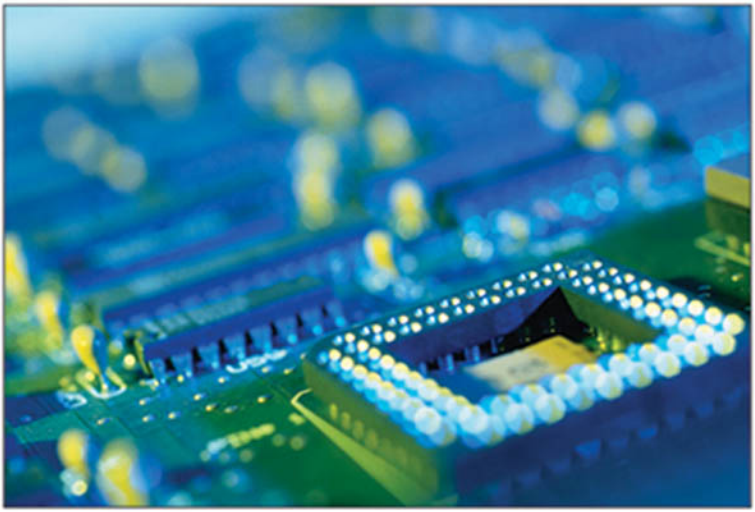
PREMIER REFERENCE SOURCE

ADVANCES IN E-LEARNING

Experiences and Methodologies



Francisco Jose Garcia Penalvo

Advances in E-Learning:
Experiences and Methodologies

Francisco J. García Peñalvo
University of Salamanca, Spain

Information Science REFERENCE

INFORMATION SCIENCE REFERENCE

Hershey · New York

Acquisitions Editor: Kristin Klinger
Development Editor: Kristin Roth
Senior Managing Editor: Jennifer Neidig
Managing Editor: Sara Reed
Copy Editor: Jeannie Porter
Typesetter: Jeff Ash
Cover Design: Lisa Tosheff
Printed at: Yurchak Printing Inc.

Published in the United States of America by
Information Science Reference (an imprint of IGI Global)
701 E. Chocolate Avenue, Suite 200
Hershey PA 17033
Tel: 717-533-8845
Fax: 717-533-8661
E-mail: cust@igi-global.com
Web site: http://www.igi-global.com

and in the United Kingdom by
Information Science Reference (an imprint of IGI Global)
3 Henrietta Street
Covent Garden
London WC2E 8LU
Tel: 44 20 7240 0856
Fax: 44 20 7379 0609
Web site: http://www.eurospanonline.com

Library of Congress Cataloging-in-Publication Data

Advances in e-learning : experiences and methodologies / Francisco José García-Peñalvo, editor.

p. cm.

Summary: “This book explores the technical, pedagogical, methodological, tutorial, legal, and emotional aspects of e-learning, considering and analyzing its different application contexts, and providing researchers and practitioners with an innovative view of e-learning as a lifelong learning tool for scholars in both academic and professional spheres”--Provided by publisher.

Includes bibliographical references and index.

ISBN 978-1-59904-756-0 (hardcover) -- ISBN 978-1-59904-758-4 (ebook)

1. Internet in education. 2. Continuing education--Computer-assisted instruction. I. García-Peñalvo, Francisco José.

LB1044.87.A374 2008

371.33’44678--dc22

2007032055

British Cataloguing in Publication Data
A Cataloguing in Publication record for this book is available from the British Library.

Table of Contents

Detailed Table of Contents

of constructive and cooperative methods and their feasibility in an e-learning platform. Moreover, we introduce a framework for dealing with language and representations to interpret students' behaviours and show examples of teaching activities. Finally some opportunities for future research are outlined. We hope to contribute to overcome the current separation between technology and educational research, as their joint use can provide matchless opportunities for dealing with most of the learning problems related to mathematical concepts as well as to linguistic, metacognitive, and noncognitive factors.

The evolution of new information technologies has originated new possibilities to develop pedagogical methodologies that provide the necessary knowledge and skills in the higher education environment. These technologies are built around the use of Internet and other new technologies, such as virtual education, distance learning, and long-life learning. This chapter focuses on several traditional artificial intelligence (AI) techniques, such as automated planning and scheduling, and how they can be applied to pedagogical and educational environments. The chapter describes both the main issues related to AI techniques and e-learning technologies, and how long-life learning processes and problems can be represented and managed by using an AI-based approach.

This chapter presents a study applied to the analysis of the utilization of learning Web-based resources in a virtual campus. A huge amount of historical Web log data from e-learning activities, such as e-mail exchange, content consulting, forum participation, and chats is processed using a knowledge discovery approach. Data mining techniques as clustering, decision rules, independent component analysis, and neural networks, are used to search for structures or patterns in the data. The results show the detection 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. From the discovered knowledge, a set of preliminary academic management strategies to improve the e-learning system is outlined.

This chapter provides an overview of the use of swarm-intelligence techniques in the field of e-learning. Swarm intelligence is an artificial intelligence 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 e-learning. The chapter analyzes several of such applications and exposes their strong and weak points. The authors hope that understanding the concepts used in the applications described in the chapter will not only inform researchers about an emerging trend, but also provide with interesting ideas that can be applied and combined with any e-learning system.

Chapter XII

Nowadays, most of electronic applications, including e-learning, are based on the Internet and the Web. As the Web advances, applications should progress in accordance with it. People in the Internet world have started to talk about Web 2.0. This chapter discusses how the concepts of Web 2.0 can be transferred to e-learning. First, the new trends of the Web (Web 2.0) are introduced and the Web 2.0 technologies are reviewed. Then, it is analysed how Web 2.0 can be transferred and applied to the learning process, in terms of methodologies and tools, and taking into account different scenarios and roles. Next, some good practices and recommendations for E-Learning 2.0 are described. Finally, we present our opinion, conclusions, and proposals about the future trends driving the market.

Chapter XIII

This chapter provides an overview of technology-based competitive active learning. It discusses competitive and collaborative learning and analyzes how adequate the different strategies are for different individual learning styles. First of all, some classifications of learning styles are reviewed. Then, the chapter discusses competitive and collaborative strategies as active learning methodologies and analyzes their effects on students' outcomes and feelings, according to their learning styles. Next, it shows how networking technology can mitigate the possible negative aspects. All the discussion is supported by significant study cases from the literature. Finally, an innovative system for active competitive and collaborative learning is presented as an example of a telematic versatile learning system.

assisted assessment tool was used to design and apply self-assessment exercises is presented. The chapter emphasizes the idea that all type of assessment needs to be conceptualized as "assessment for learning." Practical advices are detailed for the planning, development, implementation, and review of quality formative online assessment.

Chapter XVII

In this chapter we carry out analysis of the term "assessment," 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 what we call e-learning. The perspective guiding text is of a methodological and pedagogical nature. We try to plan the assessment process in online formation environments dealing in depth with the different elements which constitute it: objectives and functions of assessment, assessment criteria and indicators, people involved and assessment agents, software instruments and tools for the collection of data, and analysis of the information and reports. We raise a discussion about institutional strategies for the incorporation of this e-assessment methodology in higher educational institutions and come to the final conclusions about the validity and appropriateness of the e-learning assessment processes.

Chapter XVIII

Organizations, in particular HR/Training departments, strive to set forth good practices, quality assurance, and improvement on a continuing basis. With the continuous growth of online university programs, it is crucial for e-learning establishments to include service quality assessments along with mechanisms to help e-facilitators consistently maintain the highest quality standard when lecturing, teaching, guiding, administering, and supporting the online learner. This chapter discusses the application of an e-quality assessment matrix (e-QAM) as part of a quality assessment model that promotes continuous improvement of the e-learning environment. This model will serve as a tool for online universities and organizations to achieve a base standard of consistent quality that is essential for program accreditation and satisfaction of global customers.

Chapter XIX

This chapter presents a method to measure the quality of e-learning courses. An introduction is first presented on the problematics of quality in e-learning emphasizing the importance of considering the learners' needs in all the development and implementation stages. Next several projects are mentioned, which are related to quality in e-learning, and some of the most important existing models are described. Finally, a new proposal is presented, the e-Qual model, which is structured into four areas: learning

contents, learning contexts, processes, and results. With this chapter, the authors aim, not only to draw the attention to this complicated issue but above all to contribute to a higher credibility of e-learning proposing a new model that stands out for its simplicity and flexibility for analyzing different pedagogical models.

Preface

INTRODUCTION

Web-based training, actually known as e-learning, 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 nonformal or informal situations. E-learning 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 e-learning, due to the new possibilities it seemed to offer, gave place to a generalized feeling of disillusionment, because results did not show e-learning 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 e-learning 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. E-learning 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 e-learning is considered different from any other learning modality. Consequently, the inefficiency of e-learning seemed to be due to technological elements, because the responsibility of success or failure in e-learning 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 e-learning 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" e-learning, as Martínez (2006) says.

In spite of everything, the growth of e-learning 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. E-learning 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, that is, 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 e-learning 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 e-learning" 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 e-learning process. After this, as a preface to the practical knowledge and contrasted high-value experiences enclosed in the next chapters, we can propose a complete e-learning perspective in keeping with the concept of quality in e-learning.

A FRAMEWORK TO AVOID E-LEARNING PITFALLS

There exist quite a few works that describe a sad paradox in the deployment of e-learning 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 e-learning 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.

There is No Real Intent in Institutions ("Use the Platform or Suffer")

If no need has been created before deploying the e-learning 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 e-learning. 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 e-learning, with a clearly defined strategic model. The proper policy concerning e-learning 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.

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. E-learning necessitates many support services for teaching; without them, the teacher's job is severely limited, and consequently any formative possibilities are lost.

There is No Recognition for the Teaching Effort Needed for any Online Action

There are two rather common fallacies among those who know little about e-learning. One of them is that e-learning 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 e-learning 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 e-learning 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 e-learning 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 e-learning should be strategic, in such a way that the deployment of an e-learning 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 e-learning structure, can and should be based on the concept of "quality in e-learning."

QUALITY IN E-LEARNING

Before talking about quality in e-learning, one must define what we exactly mean when we refer to e-learning. The application of Web-based tools for learning purposes could be considered a simple definition of e-learning. However, a clearer e-learning 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 e-learning 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, mainly, the 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 "e-learning." But it is important to clarify that we are not thinking about virtual learning or distance learning when we refer to e-learning, at least not necessarily. When we try to develop a quality e-learning 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," e-learning 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 e-learning 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 e-learning as a form of distance learning, and applying its methods and categories to e-learning the results will be really poor. This is because e-learning is not nonpresential 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 e-learning 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 e-learning (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 e-learning has a twofold significance. First, e-learning 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 e-learning." Second, there is a separate but associated debate about ways of improving the quality of e-learning itself; this context is called "quality for e-learning" (Ehlers, Goertz, Hildebrandt, & Pawlowski, 2005).

Learning outcomes are at the heart of respondents' understanding of quality in the field of e-learning. When we talk about quality in e-learning, we assume an implicit consensus about the term "quality." The ISO (ISO 8402, 1986, p. 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 e-learning 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 e-learning 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 e-learning 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 e-learning, 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 e-learning because of its enormous capabilities applicable to institutions, schools, universities, enterprises, associations, and so forth. Above all, it will not give a restricted vision about e-learning, but a multidisciplinary, rich, and complete analysis of the different issues involved, intending to become a reference on e-learning literature because the different issues will not be studied as separate matters, but any question related to e-learning studied in this book will be pointed to get the highest quality in e-learning activities.

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

In Chapter I, Ray Webster presents RAPAD, a reflective and participatory methodology for e-learning 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 Web sites which can serve as Personalized E-Learning Environments (PELE), promoting a deep understanding of learning on a metacognitive and personal level.

Chapter II introduces some ideas of the German philosopher Martin Heidegger and how they can be applied to e-learning 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 e-learning consultants in the world, Dr. Sergio Vásquez.

Following with the philosophical approaches, Chapter III 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 IV, 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 best practices on design, implementation, and evaluation of e-mentoring programs.

In Chapter V, Dr. Olga Díez deals with the issue of lifelong learning and describes an experience in teacher training for e-learning 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 6VI 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 e-learning 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 VII 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 e-learning case. The main objective of the chapter is to identify some of the important issues and trends related to the perceived e-learning value. They state that new blended learning and teaching models should emphasize further the alignment of learning with work/life balance.

Chapter VIII, 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 e-learning platform in the Mathematics education context.

David Camacho et al. describe in Chapter IX both the main issues related with artificial intelligent (AI) techniques and e-learning 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 X 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 XI, the use of swarm-intelligence techniques in the field of e-learning, 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 e-learning.

Chapter XII is devoted to Web 2.0 applied to the e-learning 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 XIII 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 XIV 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 XV 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.