

## **An overview on e-learning in the Italian Universities and the efforts of Bari University**

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*Abstract:* - In the era of globalization of goods and services, there are still difficulties in knowledge diffusion. The enormous potential of internetworking systems and devices for fast information sharing is not sufficient to determine the effective exchange of knowledge, as required to avoid the digital divide.

E-learning is rightly considered an opportunity of great relevance for reducing the digital divide and ensuring faster and higher development trends. As matter of fact, several universities and companies are currently involved in using e-learning according to their own need and objectives. This notwithstanding several problems related to e-learning activities still remain.

This paper presents an overview about the use of e-learning in the Italian Universities. The distribution of the most diffuse Learning Management Systems (LMSs) is here presented, by considering both *open-source* and commercial LMS platforms and a simple model is proposed and used for their comparative evaluation. At the end, the activity experienced at the Centre "Rete Puglia" of the University of Bari is described and the most relevant results are shown.

*Key-Words:* Academic Education, Distance Learning, E-learning, Knowledge Building, Knowledge Exchange.

### **1 Introduction**

Knowledge exchange is a very complex process: although Internet has made possible the exchange of information at very high speed rate, the problem of sharing knowledge and know-how is still open and waiting for suitable solutions [1].

Distance learning has a very long history that started in Europe since the beginning of the last century. Although in the era of the Internet this approach seems quite primitive, it is interesting to note that also in the last decade several post-doc courses have been organized according to this distance learning methodology.

As radio and television devices became more diffuse, they have been also used for distance learning. This is the case of the "Nettuno" Network that has been the first example of television-based university. Nettuno uses two satellite television channels (RAI NETTUNO SAT1 and RAI NETTUNO SAT2) and also Internet to deliver courses and to perform all didactic activities. Nettuno uses a didactic model which adopts both in presence learning and distance learning.

More recently, along with the spreading of the Internet, web-based learning has been considered

with special interest, since Internet makes possible to use didactic material without space and time constraints [2, 3, 4]. Therefore, e-learning market is continuously growing, and also many Universities have been attracted by e-learning solutions [5].

In this paper from the consideration that e-learning is based not only on technological tools but also on a complex environment in which the process of teaching/learning occurs, some of the main aspects of e-learning are focused and an overview on the situation in the Italian Universities is presented. In particular, the e-learning platforms adopted by the different Italian Universities are first discussed. Successively, a comparative analysis of the different platforms is performed. Finally, some solutions currently in progress at the Center "Rete Puglia" of the University of Bari are highlighted.

### **2. The e-learning process**

The teaching/learning process is extremely complex since it involves people with different abilities, needs and expectations. Furthermore, when the teaching/learning process occurs by means of e-learning systems and methodologies, additional aspects must be carefully considered.

### 2.1 Cultural

One of the most relevant barriers to effective diffusion of e-learning concerns the cultural and personal attitudes of teachers towards e-learning. In fact, in many cases the teacher lacks of specific experience, training and motivation in working in ICT-based educational environments. Of course this requires additional time for the teachers in order to prepare well-defined didactic material (learning objects) for students and also specific time for cooperation with students. It is worth noting, in fact, that the idea of learning as a collaborative process is very important when students are separated by distance. In this sense it is absolutely necessary that the teacher encourages and monitors collaborative learning [6, 7].

### 2.2 Technological

The perfect running of systems and devices is very relevant for e-learning activities. Equipment malfunctions can produce a great detriment for an e-learning course. Therefore, in order to avoid negative judgments on the overall perceived quality of the course, it is necessary that possible technical problems are foreseen and the adequate interventions are planned. The preparation and experience of the staff is very relevant to reduce and overcome technical difficulties [8].

Another relevant aspect hindering the diffusion of an effective e-learning is due to the lacking of skilled personnel able to meet the application needs and the different skills required [9].

### 2.3 Environmental

The trivial assumptions that distance learning is impersonal and dehumanizing has been recently revised on the basis of the evidence that a strong feeling of learning community can be developed also in ICT based distance environment. Moreover, as clearly stated also by the European Community Commission, undeniably e-learning can be as efficient as traditional learning [10, 11]. Of course, quality of e-learning tools, products and processes is of paramount importance to the success of education programs. In this sense, several models have been proposed to “measure” quality and impacts of e-learning processes. Of course, the selection of the strategy or the combination of strategies must be performed according to the interests of all stakeholders [12, 13].

### 2.4 Economical

In general, the cost-effectiveness of an e-learning program is very difficult to evaluate at least as its

efficacy [14]. In fact, e-learning is not so convenient if costs related to the realization of e-learning products are considered. For this purpose, several initiatives have been defined by the EU, such as [15, 16]: the “eLearning – Designing Tomorrow’s Education” programme; the plan of action delineated in Commission’s Communication to European Council and Parliament (2001, 28 March); the European Social Fund including Long-Life learning measures.

### 2.5 Political and Regulatory

As many innovative tools and practices, also e-learning is waiting for complete regulations. Still today there is a great debate in several EU countries on the legal validity of certifications obtained by e-learning courses, also in comparison with certifications obtained by traditional courses [17].

## 3. Situation in the Italian Universities

This section presents an overview on the LMS platforms used in the Italian Universities. Successively, a simple model is proposed and used for the evaluation and comparison of LMS platforms.

### 3.1 LMS platform choice

As Figure 1 shows, some Italian Universities are adopting commercial platforms, other ones are using open-source ones and ad-hoc solutions are also in progress in some cases. A few universities have not adopted at all any e-learning solution. Table 1 shows the platforms adopted in Italian Universities.

Among the various platforms, Moodle is the most utilized, it is followed by Blackboard, the IBM LMS and the Oracle LMS. In some Universities more than a single platform is adopted, according to specific needs and particular requirements.

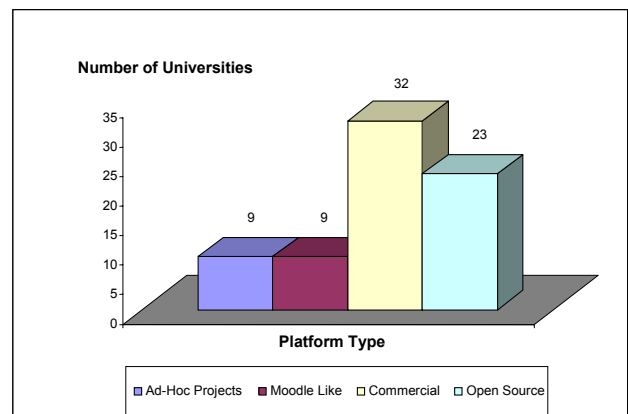


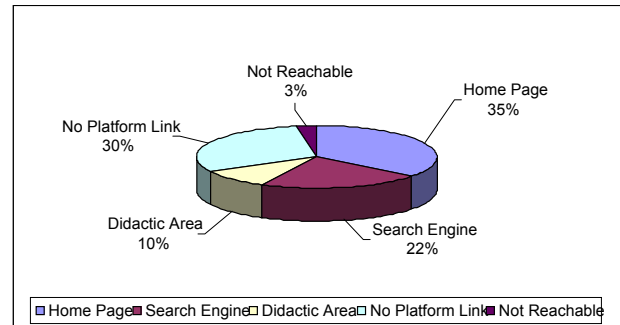
Figure 1. LMS platforms in the Italian Universities

UNIVERSITY	PLATFORM													
	Ilias	Plone	uPortal	Atutor	Claroline	Docebo	Mytwm	Webct	Moodle	Moodle-like	IBM Lms	OracleLMS based	Blackboard	OTHERS
ANCONA								X						
AOSTA														X
BARI - UNIVERSITA'									X			X		
PERGAMO	X										X			X
SBLOGNA				X	X	X			X					X
BRESCIA – S. CUORE													X	
BRESCIA – UNIVERSITA'												X		
CAMERINO									X					X
CAMPOB. – S. CUORE												X	X	
CASSINO														X
CASTELLANZA									X					
CHIETI									X					
COMO - DELL'INSUBRIA													X	
COSENZA - DELLA CAL.														X
CREMA - UNIV. MILANO														X
FERRARA														X
FIRENZE									X					
GENOVA										X				
LECCE										X				
MACERATA		X	X				X	X						
MESSINA														X
MILANO STATALE														X
MILANO BOCCONI											X			
MILANO POLITECNICO														X
MILANO BICOCCA						X								X
MODENA e REGGIO EMIL.										X				
ALESS. NOV. VERC.										X				
NAPOLI FEDERICO II											X			X
NAPOLI ORIENTALE														X
PADOVA									X					X
PALEREMO										X				
PAVIA														X
PERUGIA										X				
PISA									X					
ROMA LA SAPIENZA									X					
ROMA TOR VERGATA													X	
ROMA TRE									X					
ROMA CATTOLICA														X
SASSARI										X				
PALEREMO								X						
SIENA									X					
TORINO									X					X
TRENTO														X
UDINE							X							
URBINO														X
BARESE													X	
VERONA														X
VENEZIA				X										
VITERBO					X									

**Table 1.** LMS platforms adopted by Italian Universities

Moreover, Figure 2 shows the results concerning the simplicity in reaching e-learning services starting from the home page of the various Italian Universities. The 35% have a link directly in the

home page of the institution; the 10% have a link in the didactic section; the 22% do not have an explicit reference to e-learning activity in institutional web pages, but e-learning activities can be accessed by learners through search engines; the 30% of the Italian universities do not offer a visible link to e-learning services; whereas the 3% present an incorrect link.



**Figure 2.** LMS platforms visibility

### 3.2 LMS platform comparison

In order to evaluate the LMS platforms, in this research specific efforts have been devoted to the development of an evaluation model. The model considers the following five characteristics: system parameters, administration facilities, interaction support, teacher services, and learner services.

Moreover, each characteristic concerns various sub-characteristics. System parameters considers: compliance with standards, search engine availability, additional contents inclusion, on-line help availability, scalability with respect to student number, accessibility, language support (Italian), privacy management. Administration facilities section considers: login security, installation easiness, interface personalization, activity tracking, upgrade facility, documentation availability. The interaction support section considers: the availability of an integrated e-mail system, the mailing-list management, forum availability, chat system availability, notice board support, integrated videoconference system implementation, group and classes management, service personalization. The teacher services section considers: the availability of an integrated authoring tool, the type of possible additional contents, the availability of statistics, the possibility of developing tests, the support of vertical interaction with students. The student service section considers: interface friendliness, different course type support, the possibility of planning activities, the possibility of vertical interaction with teachers and tutors and horizontal interaction with other students.

Each feature has been evaluated, according to the standards of estimation of *ISO 9001:2000* reported in Table 2. The score 0 represents an unsatisfactory judgement; the other three scores graduate the level of the satisfactory judgement.

Global Judgement	Level	Score
SATISFACTORY	High	3
	Medium	2
	Sufficient	1
UNSATISFACTORY	Unacceptable	0

**Table 2: Judgement Scores**

Five experts have anonymously estimated each sub-characteristic of the different LMS platforms, assigning a score from 0 to 3. In this way, the strength points and the eventual deficiencies of the LMS platforms are focused.

For the evaluation procedure the following open-source LMS platforms have been considered: ATutor, Claroline, Docebo, Ilias, Moodle, Plone, uPortal. In addition also the Oracle iLearning LMS platform, which is hosted at the Centre “Rete Puglia” of the University of Bari, has been considered. The results are reported in Table 3.

The evaluation process shows that some open source LMS platforms are adequate to support effectively e-learning processes, as well as the Oracle iLearning LMS that, in some cases, outperforms the most effective and diffuse open source platforms.

#### 4 Experiences at the University of Bari

The Centre “Rete Puglia” of the University of Bari started its activities on distance learning in 1996. The Centre has the aim to support the introduction of ICT technologies and e-learning not only to the various Faculties of the University of Bari, but also to the whole Regional Academic System and to the various Institutions and Companies of the Apulia Region [18].

Characteristic	Sub-characteristic	Atutor	Claroline	Docebo	Ilias	Moodle	Plone	uPortal	iLearning
System Parameters	Compliance with Standards	3	2	2	2	2	3	2	3
	Search Engine Availability	3	3	1	3	3	3	3	3
	Additional Contents Inclusion	3	3	1	3	3	3	3	3
	On-line Help Availability	3	3	1	0	3	3	1	2
	Scalability (student number)	3	3	3	3	3	3	1	3
	Accessibility	1	2	3	1	2	3	2	2
	Language Support (Italian)	3	3	3	3	3	3	1	3
	Privacy Management	1	3	1	1	3	1	1	3
Administration Facilities	Login security	3	3	3	3	3	3	3	3
	Installation Easiness	1	1	1	0	1	3	0	2
	Interface Personalization	3	1	3	1	3	3	1	1
	Activity Tracking	3	2	0	3	2	0	3	3
	Upgrade Facility	1	1	3	0	3	0	0	3
	Documentation Availability	1	1	1	1	1	3	1	1
Interaction Support	Integrated e-Mail System	0	0	0	0	0	0	0	0
	Mailing List Management	3	3	3	0	3	0	1	2
	Forum Availability	3	3	1	0	3	0	1	3
	Chat System Availability	3	3	3	0	3	0	3	3
	Notice Board Support	3	3	3	3	3	3	0	3
	Integrated Video-Conference System	0	0	3	0	0	0	0	2
	Group and Class Management	3	3	3	0	3	3	3	3
	Service Personalization	1	3	1	3	3	3	1	2
Teacher Services	Integrated Authoring Tool	0	1	1	1	1	0	3	2
	Types of Additional Contents	1	3	3	0	3	3	3	3
	Availability of Statistics	3	3	3	1	1	0	1	2
	Development of Tests	3	3	1	1	3	0	3	3
	Vertical Interaction Tools	1	3	1	1	3	1	3	3
Learner Services	Interface Friendliness	2	3	2	0	2	2	1	2
	Different Course Type Support	2	3	1	0	3	3	1	3

**Table 3: LMS Platform Evaluation**

The activity of the Centre “Rete Puglia” has been realized according to three major projects [19, 20]:

- The RETE PUGLIA project;
- The PROTEO project;
- The SCORE project.

These projects allowed the realization of a technological infrastructure able to gain, collect and distribute the know-how in the different knowledge domains. On the basis of the results achieved, the “Rete Puglia” Centre has become the pilot Centre specifically devoted to train students to use e-learning in the University of Bari. To develop activities, a specific functional model has been considered [19, 21], consisting in:

- Area Centres (A.C.);
- Concentration Centres (C.C.);
- Specification Centres (S.C.).

Each area centre has been provided with a “Multimedia University Desk”, which has been specifically developed and patented for the purpose [22, 23]. Furthermore, for the start-up of the project several ICT equipments, and the necessary servers, have been placed in the “Rete Puglia” Centre [24].

On the hardware infrastructure realized, the NetLearning learning management system (LMS), based on Oracle iLearning, has been installed to store Learning Objects (LO) produced by using the course maker (CM) “Lectora Publisher” [25]:

- The main features of the CM are: Advanced Learning Object management; Accessibility by standard browsers; Accessibility to courses by disabled people; Easy integration of multimedia components; Development of educational products by people without programming experience.
- The main features of the LMS are: Integration of standard didactic contents; Management and publication of didactic contents and multimedia material; Starting, in progress and final test management; Complete tracing capabilities of individual learning activities; Reporting and statistics capabilities; Creation and management of user profile; Creation, planning and administration of educational remote activity; AICC and SCORM compliance; On-line help and fully documentation; Accessibility by standard browsers; Virtual Classroom with audio-video on-line interaction among users, electronic blackboard, application sharing, etc.; E-mail facilities, Forum and message management.

Furthermore, in order to allow effective

communications from the servers to the users in the University of Bari, a gigabit Metropolitan Area Network (MAN) is used to connect the Centre “Rete Puglia” with the teaching rooms [26]. Finally, a well-defined portal has been realized to give all students access to the platform for the e-learning activities [27, 28].

Of course, the use of technologies and systems is sustained by supporting the teachers of the University of Bari, also by well-defined courses on the use of CM and LMS. Similar courses have also been disposed for the training of administrative secretaries and technicians of the University of Bari [29, 30].

The efforts carried out at the Centre “Rete Puglia” are producing a growing community of teachers interested in e-learning. Some of them have produced some learning objects as for Operating Systems, Office Automation, Multimedia System, methodologies and statements for a basic course of Latin Language, a Trip to Apulia through Images, Human Anatomy [19, 27], Economic Geography: Ambient Certification, Data Warehouse, Teaching on Cultural Heritage, A Culture in Playing: to construct consciously the European Estate; Microscopic Anatomy and Neurology Anatomy, Audiometric Techniques, Salento Transformation in 18<sup>th</sup> and 19<sup>th</sup> century, Historical Profile of the University of Bari, Sources and Methods to Study Families in the Modern Age, Matlab: Optimization Toolbox, History of International Relations: an Introduction, History and Foundations of Physics.

The evaluation of processes and products has been also accomplished by adopting well-defined protocols and quality models, according to the UNI EN ISO 9000-Vision 2000 [28, 29].

## 5 Conclusion

E-learning is a powerful tool for knowledge acquisition and know-how exchange in the e-society.

In this paper some of the key aspects and open problems concerning e-learning activities are focused and discussed. Furthermore, the analysis of the most relevant choices carried out by the Italian Universities in the field of LMS platforms has been presented and a comparative analysis has been performed, also by considering the Oracle iLearning LMS available at the “Rete Puglia” Centre.

Finally, the experience matured at the “Rete Puglia” Centre of the University of Bari has been presented and discussed.

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