e-learning at the University of Bari:
The PROTEO Project

N. GRECO[#], G. DIMAURO[*], A. FERRANTE[#], S. IMPEDOVO[*], M.G. LUCCHESE[*], R. MODUGNO[#], G. PIRLO[*], L. SARCINELLA[#]

[#] Centro "Rete Puglia" – Università degli Studi di Bari - Via G. Petroni, 15/F.1 – 70124 Bari - ITALY
[*] Dipartimento di Informatica – Università degli Studi di Bari - Via Orabona, 4 – 70126 Bari - ITALY

Abstract: - The PROTEO Project has the aim to support the University of Bari in using e_learning systems. For this purpose a technological infrastructure has been realized and well-defined teaching activities have been organized for professors of the University of Bari, in order to make possible to fully exploit the potential of e_learning. This paper presents the main objectives of the project and the most valuable activities that have been performed. Since PROTEO is still in progress conclusive results are not available yet, but some of the most valuable preliminary results are presented and discussed.

Key-Words: - E_learning, Internet, Distance Learning, Multimedia, Virtual Classroom.

1 Introduction

Along with the spreading of the Internet, distance learning has acquired enormous potentialities in the context of the contemporary society. In fact, the need to transfer know-how is of paramount importance in the Information Society in which knowledge represents the most important resource for the economical and social development [1].

In this scenario, e-learning is rightly considered as one of the most valuable approaches for education in our daily life since it allows learning without time and space constraints. Infact, e-learning allows, through the use of suitable technologies, to benefit the didactic material independently from the geographical distance among the teacher and the students, which can work every time and in every place, simply connecting their computer to the Internet, also by wireless communication technologies [2,3,4].

Most recently, technologies permit the realization of virtual classrooms (with capability of chat, forum, application sharing, etc.) that allow to a single student an active share to the lessons. This way the use of servers and the net, is intended not only as tool for repository and transmission of the didactic material, but above all as 'place' in which the process of teaching/learning develops [5,6,7].

This paper deals with the "PROTEO" project (PROTEO: "Project of Technological Educational Organizational Oriented Networks"), that is currently in progress at the University of Bari - Italy. PROTEO has the aim to enhance the University of Bari in using e-learning, with respect to all the different knowledge domains. Through the paper the most relevant activities carried out for the project are described and the main experimental activities are discussed. In this sense these results can be of

extraordinary value for other universities that are interested or already involved into similar activities.

The organization of this paper is as follows. Section 2 describes the PROTEO project. In Section 3 the ICT equipment acquired for the project is briefly illustrated and the main characteristics of the technological infrastructure are discussed. In Section 4 the planning of didactic courses attended by the professors of the University of Bari involved into the project is briefly reported. The experimental activities carried out so far are discussed in Section 5. In Section 6 the conclusion of this work is reported.

2 The PROTEO Project

The "PROTEO" project is currently in progress at the University of Bari, that is one of the main academic institutions in the south of Italy that involves more than sixty-thousand students and more than four-thousand professors and researchers [8].

The aims of PROTEO is to support the University of Bari in using e_learning, by realizing a technological infrastructure able to gain, collect and distribute the know-how in the different knowledge domains.

For this purpose, PROTEO, that has been financed by the Italian Ministry of Education, University and Research, is carried out by the Interfaculty Center "Rete Puglia" that is the pilot Center specifically constituted by the University of Bari to support the entire University in using ICT for e-learning. The PROTEO project has been organized into two parts:

- The first one concerns the development of a technological infrastructure for knowledge management within the University of Bari. The infrastructure involves some of the most relevant Faculties of the Bari University: Medicine; Medicine veterinarian;

Economics; Biotechnologies; Mathematical, Physical and Natural Sciences; Literature and Philosophy; Education Sciences.

- The second one concerns teaching activities devoted to pilot groups of professors, who belongs to different Faculties of the University of Bari, for promoting e-learning activities on their own domain of knowledge.

3 The infrastructure for e-learning

In order to realize an ICT infrastructure for promoting e-learning at the University of Bari, a well-suited functional model has been considered, as Figure 1 shows.
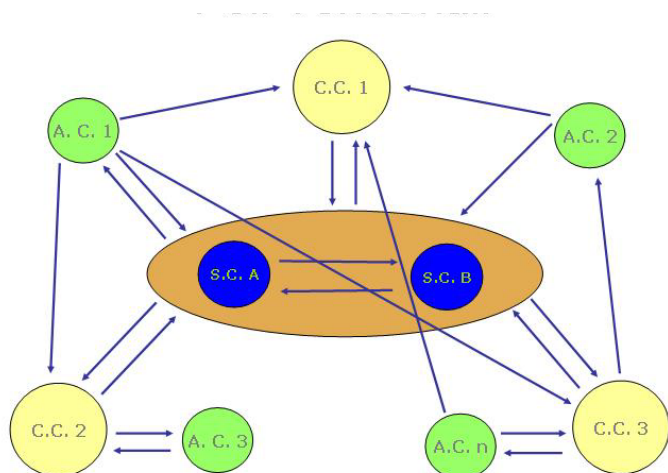

Fig.1 The functional model

It is constituted by:
- *Area Centers (A.C.)*, that are centers in which the knowledge is acquired (i.e. by getting the know-how directly from the teachers);
- *Concentration Centers (C.C.)*, that are centers in which the knowledge is collected and organized (i.e. using computers servers);
- *Specification Centers (S.C.)*, that are centers in which the technological and methodological aspects of e-learning (systems, products, operative methods, etc.) are investigated and divulgated to the whole infrastructure.

Each center has been provided by a "Multimedia University Desk", which has been specifically developed for this aim [9]. The "Multimedia University Desk" includes in an ergonomic way all the equipment for teaching in distance learning mode and in presence. Figure 2 shows a "Multimedia University Desk" and its main ICT components:
(a) Digital Blackboard;
(b) Multimedia PC, with cordless mouse and keystroke, CD/DVD, internet board, satellite board , etc.;

(c) Sites for mobile equipment (i.e. video-projector, desk radio-microphone, videocamera, etc.);
(d) Electrical Engine and electromechanical system (under to desk) to move the monitor-panel;
(e) Audio amplifier;
(f) Videocommunication system (ISDN, TCP/IP, ecc.) ;
(g) Videotape recorder;
(h) Radio-microphone receiver;
(i) Site for mobile équipement (i.e. radiomicrophones, remote controllers , etc.);
(j) Audio Pre- amplifier;
(k) Audio-Video Matrix;
(l) Main panel (room controls, monitor pamel controls, etc.);
(m) Audio Speakers (included into the rear panel of the desk);
(n) Electrically controlled monitor panel;
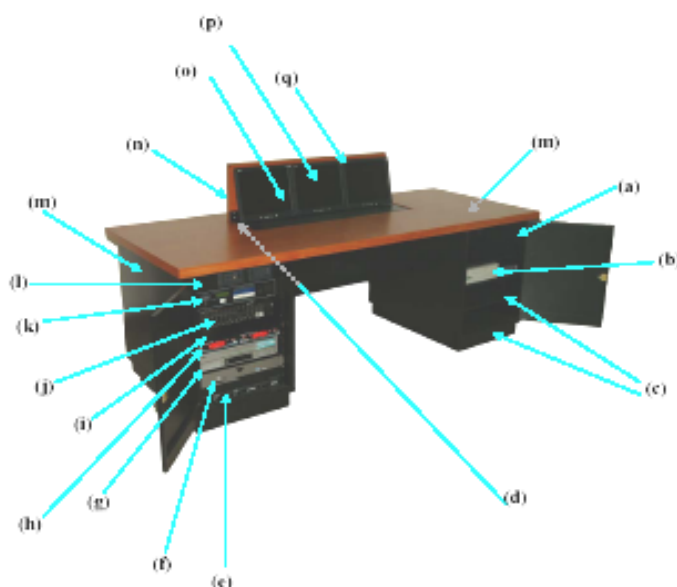(o) Remote room controls;
(p) Control Monitor;
(q) PC Monitor.

Fig.2 The "Multimedia University Desk"

Indeed, for the startup of the project several ICT equipment (servers, etc.) have been allocated at the "Rete Puglia" Center, in order to allow the maintenance of complex ICT systems (i.e. web servers) by the technicians of the Center:

- five web-servers DELL PowerEdge 6600, each one related to a specific knowledge domain (Figure 3);
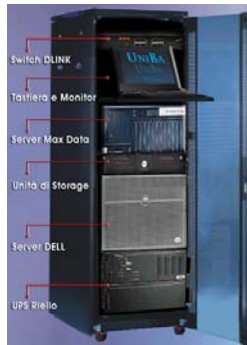
Fig.3 A server DELL PowerEdge 6600

- the conferencing systems, arranged in the video-conference room (Figure 4);

Fig.4 The video-conference room

- the didactic network of the tele-teaching room (Figure 5);

Fig.5 The tele-teaching room

- the high performance acquisition device ICG 370, with a resolution up to 12000 dpi (Figure 6);

Fig.6 ICG 370 Drum Scanner

- the high performance rendering device HP DESIGNEJET 5500PS plotter (Figure 7).

Fig.7 HP DESIGNEJET 5500PS Plotter

Furthermore, in order to allow effective communications from the servers to the users in the University of Bari, a wide-band connection in optical fibres is being realizing to connect the "Rete Puglia" Center to the RAM (Metropolitan Academic Network) connecting all the network nodes of the University of Bari.

4 The teaching activities

The second phase of the PROTEO project has the aim to increase the interest toward the use of e-learning systems from professors of the various disciplines of the University of Bari. For this purpose some groups of the most interested professors of the various Faculties have been engaged in some pilot courses. The aim of such courses is to show the functionalities of the new equipment provided by the project in the different Faculties and to show the main features of the e-learning software used in this project. Two main software are considered for this purpose: The "Lectora Publisher" as Course Maker (CM) and the "NetLearning" as Learning Management System (LMS):

→ Concerning the CM, the courses have presented to the professors the main features of the "Lectora Publisher" like for instance [10,11]:
- Learning Object management;
- Accessibility by standard browsers (client platform independence);
- Accessibility to courses by disabled people;
- Easy integration of multimedia components (Audio, Graphics, Animation, Video-streaming, etc.);
- Development of educational products by people without programming experience.
→ Concerning the NetLearning LMS, its main features discussed during the courses are [12]:
- 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, at individual and virtual classroom level;
- Creation and management of user profile, for controlling accesses and authorizations;
- 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.

In particular, concerning the specific capabilities of the LMS, also administrative personnel of the various Faculties of the University of Bari has been engaged for attending the courses, in order to allow the advancements of the careers of university students by using the reporting provided directly by the LMS.

5 Experimental Activities

Although the PROTEO project is still in progress, some preliminary results are available yet. In fact several professors attending the courses have developed some prototypes of their e-learning courses using "Lectora Publisher" that have been published by "NetLearning" LMS.

Although an e-learning course can integrate a very large variety of multimedia components (text, graphics, animation, audio, video-streaming, etc.), a typical university course realized up to now for PROTEO contains:

- ❖ slides, which include the texts and graphics concerning the didactic contents;
- ❖ written comments, which appear in an additional text-box within the slide;
- ❖ audio comments, which can be played as many times as necessary by the user. It can be used to explain and enrich the information conveyed in the slide;
- ❖ verification tests, which help each student to appraise by himself the level of understanding of the matters treated during the course and his capability to progress in attending the course. Of course, verification tests are generally provided after each Learning Object and at the end of the whole course.

For example, Figure 8 shows the initial slide of the course "Operating System" developed for PROTEO. Figure 9 presents a slide of the same course concerning the Dekker Algorithm in which texts and graphics are used. The text box containing the additional written comment on the slide and the bar for controlling audio comments are also shown.

For the development of this course, specific attention has been devoted to quality features, also considering well defined models [13,14,15].

Fig.8 The course "Operating System":
Main Page

Fig.9 The course "Operating System":
the Dekker Algorithm

6 Conclusions

PROTEO is an important project in progress at the University of Bari (Italy) that has been founded by the Italian Ministry of Education, University and Research (MIUR). PROTEO has the aim to support the entire University in using e_learning systems. For this purpose, the PROTEO project, that is carried out primarily by the Interfaculty Center "Rete Puglia" of the Bari University, has been organized into two parts.

The first part concerns the technological infrastructure for e-learning connecting several centers, according to a well-defined functional model.

The second part concerns the training of professors and other personnel of the academic secretariat in using the Course Maker and the Learning Management System, according to their own needs.

Some experimental activities concerning the development of e-learning courses have been already performed and are briefly described in this paper.

References:

[1] "eEurope 2005: An information Society for all", Communication from the Commission of the Council, the European Parliament, the European economic and social committee and the committee of the regions, European commission, 31 Jan. 2002.

[2] "The concrete future objectives of education and training systems", Report from the Education Council to the European Council 5980/1, Council of European Union, 14 Feb. 2001.

[3] "eLearning: Designing Tomorrow's Education – A Mid-Term Report: SEC (2003) 905", Commission Staff Working Paper, 30 July 2003.

[4] S. Impedovo, G. Dimauro, G. Pirlo, "*Traditional Learning Toward On-Line Learning*", TEL'03 Proceedings: International Conference on Technology-Enhanced Learning, P. Grew and G. Valle editors, FAST, Milan, Italy, November 20-21, 2003, pp. 355-360.

[5] G. Dimauro, S. Impedovo, G. Pirlo: "Teledidattica per la Formazione Universitaria" - AICA – Special Issue Teledidattica, Teleformazione e Telelavoro a cura di Sebastiano Impedovo - vol. XXIX n. 3 Settembre-Dicembre 1999.

[6] G. Dimauro, D. Impedovo, G. Pirlo, "Wap Application for e-learning" , Atti Didamatica 2004, AICA, Ferrara, Italia, 10-12 Maggio 2004, eds. A. Andronico, P. Frignani, G. Poletti, pp. 1087-1092.

[7] "The role of Universities in the Europe of Knowledge", CUM(2003) 58, European Commission, 5 Feb. 2003.

[8] http://www.uniba.it

[9] S. Impedovo, G. Dimauro, D. Impedovo, G. Pirlo, "*Una Cattedra Multimediale Integrata per la Formazione 'In Presenza' e 'A Distanza'*", EXPO-LEARNING 2004, Ferrara, Italia, 9-12 Ottobre 2004.

[10] http://www.trivantis.com

[11] http://www.lectora.com

[12] http://ilearning.oracle.com/

[13] S. Impedovo, G. Dimauro, A. Ferrante, N. Greco, M. G. Lucchese, G. Pirlo, L. Sarcinella, "*Evaluation of Multimedia Systems during their Lifecycle*", V[th] International Conference 'Multimedia in Business and Education', Częstochowa, Poland, March 15-17, 2005, pp. 162-165.

[14] G. Dimauro, D. Impedovo, S. Impedovo, M.G. Lucchese, R. Modugno, G. Pirlo, L. Sarcinella, *"An Experimental Investigation on Web Site Usability"* V[th] International Conference 'Multimedia in Business and Education', Częstochowa, Poland, March 15-17, 2005.

[15] D. Impedovo, L. Bovino, C, De Meo, L. Sarcinella, "*Quality Models for E-Learning: A Case Study in the Italian Public Administration*", Proc. of E-Society 2003, IADIS International Conference, eds A. Palma dos Reis, P. Isaias, Lisbon, Portugal, June 3-6, 2003, p. 591-596.