

## **ICT: the support to the Knowledge based Society. Some experiences of the Bari ( Italy) University.**

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*Abstract:* - In this paper the description of some experiments developed for the introduction of Information Communication Technologies at the University of Bari (Italy) and consequently the definition of a route towards knowledge based society development are described. The results of three main projects: "Rete Puglia", SCORE and PROTEO, are reported and their progress is described. More specifically, the activities in progress for the introduction of e-learning activities are presented. The infrastructure supporting e-learning already realized is shown and the first results of the experimental use of the systems and platform are reported. Some tests of the incoming activities are also presented.

*Key-Words:* - ICT, e-learning, Knowledge-based society, Internet, Course maker, Learning management system, Metropolitan area network, Optical fiber, Broadband networks.

### **1 Introduction**

In some Italian Universities, problems related to the great number of students, and therefore to the need for larger lecture rooms, have recently been very pressing and even today still remain partially unsolved. To meet this request in the past years, several solutions have been tried, obviously the first was the construction of new lecture rooms and in some cases even new universities were created, specifically in those geographical areas where the student concentration was higher than in others. In fact, the University of Bari was the biggest in the Apulia Region with more than seventy five thousand students before splitting into three new Universities: the Bari University, the Bari Polytechnic, and the Foggia University. Now it is generating also another two new universities, in Taranto and in Brindisi. But notwithstanding this and the efforts made by the Italian Government to face this need the request for new structures still continues. This is also due to the fact that the growth of modern society requires a new type of education which is based on the need for continuous learning. In fact, we are rapidly moving towards a knowledge-based society, which implies that both in education and jobs the new paradigm is to learn to do well and soon. Obviously this depends on the need to remain competitive on the market and to improve the quality of life.

Internet helps to solve the problems. In fact everybody can connect anytime and from anywhere by using any type of computer or pods to web sites that are developed for learning purposes. It is an important aspect of the transition towards the Information Communication Society, strongly based on the Information Communication Technology (ICT).

The first experiments on distance learning were developed in 1999-2004 with the project "Rete Puglia",

supported by the Italian Ministry (MIUR) and developed by the Italian National Consortium for Informatics (CINI). Another two big national operative projects (PON)-projects: (SCORE) and (PROTEO), also supported by the MIUR with a large contribution from the EUROPEAN UNION, are now trying to introduce into the Bari University a new type of infrastructure to solve the problem of overbooking and to promote the development of a knowledge-based society.

In the following, in section 2 there is a short description of the results obtained by the "Rete Puglia" and the SCORE projects. They show the need for the transition from frontal and remote teaching towards e-learning.

Consequently, the main activities and the results obtained by the PROTEO project are reported in section 3.

The preparation of the learning object for the course of Operating Systems is reported in section 4, but many other courses of some other Faculties involved in the project have been prepared.

Some conclusions are reported at the end emphasizing the unsolved aspects and addressing the future research plans to develop a well-founded knowledge-based society.

### **2 The "Rete Puglia" and SCORE Projects**

The "Rete Puglia" project was financed with the aim of developing distance learning both for university courses and for training the highest level of employees in local public administration, allowing them to obtain European Computer Driving Licenses (ECDL) and so giving them the possibility to introduce ICT into their offices. By using several multimedia tools, among them those reported in list 1, several CDs for teaching courses were produced, and reported in Table 1.

Activity	Title	Authors
1.2	Operating Systems	S.Impedovo, G.Pirlo, G..Dimauro
1.2	Introduction to hardware	G.Dimauro
1.2	Object Oriented Technologies and Multi Tier Web Application	R. Grossmann
1.3	Linear System Theory and Digital transformation	S. Impedovo
1.3	Introduction to the Wavelet functions	G. Di Lena
1.4	Image Retrieval and Text Analysis	V. Di Lecce, A. Guerriero
1.5	Neural Networks and Fuzzy Systems	A.M. Fanelli
1.6	Conitive Models and Cognitive Sys.	E. Vaccari
1.7	Intelligent Systems for office automation	G. Pirlo
1.7	Data Acquisition Devices	S. Impedovo
2.1	Object Oriented Designing	G. Pirlo
2.1	The Khoros Software Framework	S. Impedovo
2.2	Bankcheck processing: Courtesy Amount Recognition	S. Impedovo
3.4	Computers network	M. De BLasi
3.5	Document Recognition and OCR	G. Pirlo
3.6	To inform via Web	G. Dimauro
3.6	Multimedial design	G. Dimauro
3.6	Innovative Communication	G. Dimauro
3.7	e-government	G. Dimauro
3.8	English in the Bari Art Gallery	A. Gentile, L. Rudd
3.8	Multimedia for cultural assets	A. Gentile
4.1	The Bari old city	G. Dimauro
4.2	Conversano: Culture and art	S. Impedovo, G.M. Zito
4.3	The Putignano City	S. Impedovo, L. Sarcinella
4.4	The Provincial Art Gallery	A. Gentile, L. Rudd
4.5	Business Process Reingeneering	G. Pirlo

**Table 1 CD Courses**

- Macromedia Director 7 Shockwave Internet Studio WIN;
- Macromedia Authorware;
- Macromedia Dreamweaver MX;
- Macromedia Flash MX;Adobe Photoshop 5.5 Win;
- Helix Producer Plus;
- Photovista virtual tour version 1.0;
- Adobe Premiere 5.1 – Video Editor Win;
- Frontpage 2000;
- Microsoft Office Professional;
- Toolbook II Instructor 8, Add-on.

**List 1:**

**Multimedia tools used for courses production**

Each CD gave the students who were unable to follow the lectures held in a lecture room either in presence or at a distance, to study at home.

The lecture rooms used for distance learning were equipped with AVC 400 ETHRA and VSX 8000 POLYCOM instruments. Some of these lecture rooms were used in the Faculty of Science mm.ff.nn., but many others were also used for teaching courses in the Faculties of Medicine and Law [1].

Some courses in Table 1, together with others acquired on the market were used not only for teaching university students, but also to train the employees of the four public administrations involved in the projects that is respectively those of the Bari, Putignano, Conversano Cities, and also the employees of the Bari Provincial Art Gallery. Table 2 reports the number of people from each public administration involved and who took the ECDL.

Local Government Units	Number of employers
Bari Provincial Art Gallery	5
Bari City	8
Conversano City	8
Putignano City	11

**Table 2 Public employees involved in the remote learning**

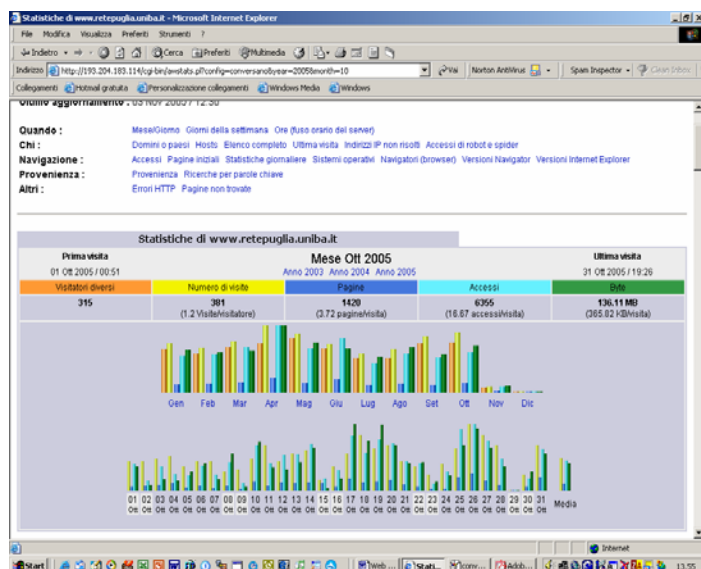
For each course two types of evaluation where made, the first to evaluate the products, by adopting the standard ISO/IEC 9126 and the second to evaluate the teaching process by using the standard UNI EN ISO 9000:2000 (Vision 2000) [2].

For each local administration a web site was also created in order to promote the spreading of the knowledge of its artistic and cultural assets. The web site realized for each of them are reported in the following Table 3.

<b>Web site for:</b>	<b>URL:</b>
Bari Art Gallery	<a href="http://www.retepuglia.uniba.it/Pinacoteca/">http://www.retepuglia.uniba.it/Pinacoteca/</a>
Bari City	<a href="http://www.retepuglia.uniba.it/Bari/">http://www.retepuglia.uniba.it/Bari/</a>
Conversano City	<a href="http://www.retepuglia.uniba.it/ComuneConversano/">http://www.retepuglia.uniba.it/ComuneConversano/</a>
Putignano City	<a href="http://www.retepuglia.uniba.it/Putignano/">http://www.retepuglia.uniba.it/Putignano/</a>

**Table 3 web sites realized for public administrations**

Some statistics related to the web site access number for each site realized were calculated and the results for the Conversano web site are reported in Table 4.



**Table 4 Access to the Conversano web site**

The project involved several professors and more than twenty young people both at graduate and undergraduate level. More than half are now employed in public and private companies and the rest is continuing the training in successive projects.

There were two main benefits for the university, the first lies in the fact that the four universities of the Apulia Region that is: Bari, Lecce, Foggia and the Bari Polytechnic were connected and therefore able to conduct some cultural exchanges both for research and teaching in distance learning. The second was that the four local administrations: Bari, Putignano and Conversano cities and the Bari Province were able to train their employers in the use of ICT, that is now used for institutional purposes, connecting the public offices with national and European Union centres.

The systems and devices developed in the “Rete Puglia” project were then completed with some new instrumentation for multimedia document production in which devices for

high resolution image acquisition and large image rendering instrumentation were installed. Some new and modern multi medial lecture rooms and a multi conference room have been also realized by means of the SCORE (Software COopeRativE development in network) project

### 3 The PROTEO project for e-learning in the University of Bari

The vast access to the web sites of the cities involved in the “Rete Puglia” project was the measure of the need of people to search for knowledge in a different way. The results show that the “Rete Puglia” project has clearly promoted experiments towards learning which is free of time and place. The right answer to this request is e-learning, and some extended experiments are now in progress with the “PROTEO” project at the University of Bari [3,4]. The aim of the PROTEO project is to support the University of Bari in spreading e-learning, by means of the realization of a technological infrastructure capable of collecting and distributing the know-how of the different knowledge domains [5].

For this purposes, PROTEO is carried out by the Interfaculty Centre “Rete Puglia”, that is the pilot Centre specifically constituted by the University of Bari to train the University to use ICT for e-learning. In order to realize the ICT infrastructure for promoting e-learning at the University, the functional model, shown in Fig.5, is adopted. In Fig.5 three different types of center can be seen: Area Centres (AC) that are territorial poles, the Concentration Centres (CC) and the Specification or Specialization Centres (SC):

- *Area Centres (AC)* also known as territorial centres, are centres in which the knowledge is distributed, not only in presence by teachers, but also in distance learning mode. These centres are equipped with a multimedia desk [6,7];
- *Concentration Centres (CC)* are centres in which the knowledge is collected and organized;
- *Specification Centres (SC)* are centres in which the technological and methodological aspects of e-learning (systems, products, operative methods, etc.) are investigated and divulged to the entire University.

In Fig.1 the technological infrastructure of the Coarse Wave Division Multiplexing (CWDM) is reported, it is the representation of the Metropolitan Area Network (MAN) that has been used for the purposes of this project.

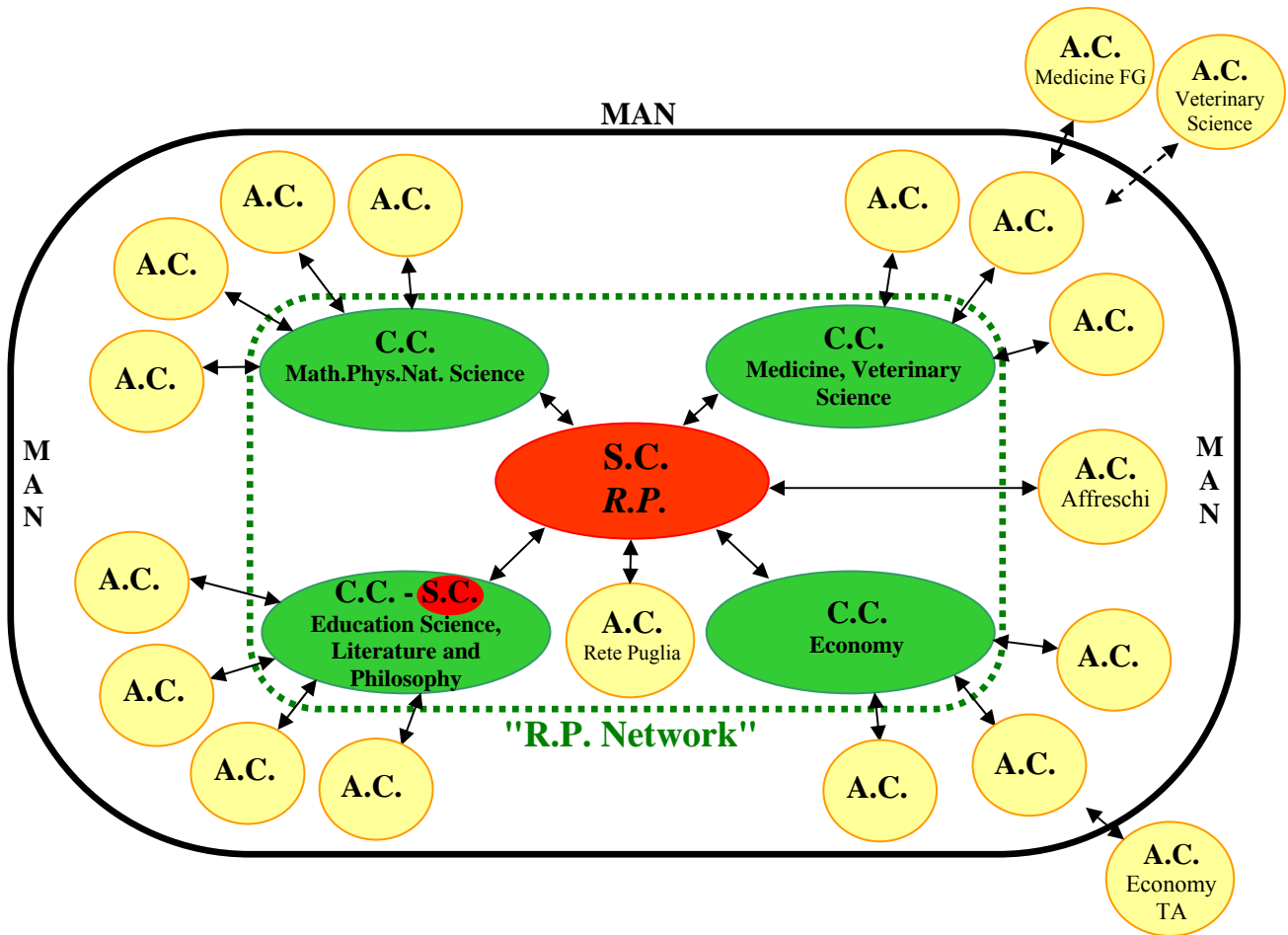


Fig.1 PROTEO MAN

#### 4 e-learning courses preparation

In this section an example of e-learning course preparation is reported but many other courses all covering different cultural areas have been prepared and tested. The one here reported is the Operating System [8] course consisting of all the learning object related to the presentation of the learning object reporting contents on the processes and threads, the scheduling, the memory and the file system.

The learning objects (LO) have been produced by using the course maker "Lectora Publisher". All the LO are stored in one of the five servers of the system, that has several terabytes of memory capability. More specifically, each server is devoted to contain a well defined domain of knowledge. There is one for natural science, one for medicine and veterinarian, one for literature, philosophy and education science, another for Economy and the last is used for testing and training the entire group of teachers. The access to the system is guaranteed by a Portal specifically designed and all the management of the contents are allowed by means of a learning management system (LMS). It is important the fact that the platform allows to trace all the activities developed booth by teachers

and students along the entire learning process and it also give insight and suggestions to each student in order to go up in the learning process or to repeat the parts unlearned. Obviously it is done through a feedback system based on the answers to specific questions.

A part of the project that has not tested yet is the one connected to the automatic control of the student carriers in order to take the degree since it must involve also the employers of bureaucratic controls as for instance the taxes payment. However this will be one of the next aspect to investigate.

#### 5 Conclusions

In this paper a short presentation of the basic experience developed to address the introduction to e-learning and to knowledge based society are presented reporting the results of three main projects, they are the Puglia Network, the SCORE and the PROTEO projects. An example of learning course is presented but the preparation of many other courses are in progress and some of them are presented in this conference. The testing of the entire platform is also in progress.

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