Facilities of E-learning for Long-Distance Learning

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Abstract

This paper presents some facilities for e-learning that can be used to implement long distance learning systems. The CAL (Computer Assisted Learning) techniques combined with Web techniques can be used as a frame for developing modern systems for long distance learning in many fields, including economic branches. Economic subjects involve certain activities that need to be solved by the data processing solutions used for long distance learning. For example, statistical techniques can be combined with artificial intelligence techniques to develop previsional models and solve business problems.

Key words: *e-learning, computer assisted learning, long distance learning, Website*

Introduction

E-learning or Computer Assisted Learning represent techniques and technologies from computer and communications domains used in the field of education to provide new teaching instruments and new learning conditions [1].

Today, the internet and intranet networks are accesible for everyone and the diffusion of the information is done so rapidly that the online learning environments have become to appear as a very effective solution. Done through a formative research, a type of research capable to provide an immediate feedback to the teachers, there will always be a possibility to improve the online education. And this is a major advantage that an online environment can offer to the teachers.

The computer can be used to replace some teaching materials like 3D models for geometry, experimental laboratory material for physics, chemistry or other subjects. With certain topics, the computer simulations allow a good understanding of some problems that cannot be presented by real experiments (the function of a nuclear reactor or other technological plant).

For the students, the computer assisted learning offer the possibilities to organize the time for learning according to their needs, to replay some lessons for a better understanding of some issues and to fill in the tests for self assessment or for final examinations.

Using the modern communications techniques like the Internet, the e-learning can be offered to many people to cover the distance between the educational institution and their homes. E-learning offers the students the opportunity to organize the learning time function of their needs.

Today there are a lot of researches done to develop virtual universities or the virtual campus. These are virtual communities where the members are linked with other communities' members by the internet, using e-mail, chat, audio communications and video communications, and share some specific resources like books, courses, syllabus etc., all in electronic format.

Long distance learning is a learning mode that appeared before the computer and the Internet. The development of computer and communication techniques provides new possibilities for the organization of long distance learning programs.

In this paper we present the structure of a system designed to support the long distance learning programs.

Long-Distance Learning System Requirements

A long distance learning system must fulfill a lot of technical and managerial conditions [1]:

o   The courses and syllabi are available to be distributed to the students;

o   There are large possibilities to communicate between the students and the tutors;

o   The proposed references for any subject are easily accessible for every student;

o   The students' assessment can be made mainly by projects and homework without attendance.

These requirements can be satisfied using an application based on the web technologies and e-learning techniques.

Economic subjects present concepts and paradigms about economic processes and need support for these concepts by simulating some processes. Specific for these subjects is the fact that they use a great number of data processed by algorithms with a low-medium level of complexity. The use of computer increases the speed of solving specific problems and offer the possibilies to represent the results in graphical formats. Another advantage offered by the computer technologies consists in the possibilities to extract information from large data collections using mechanisms like OLAP, Data Mining and heuristic or intelligent techniques.

E-learning Solutions

The requirements of a long distance learning system can have various solutions. The courses and syllabi can be printed and distributed to every student. In order to communicate one can make use of the common means of communication such as phoning, writing letters etc. The references can be consulted in libraries or purchased right from the editors and the assessment can be achieved by projects and homework handed in by the students themselves or sent using the mail system.

With the aid of the computer and communication technologies we can design and implement a long distance learning system that can provide students with faster access to the educational resources.

But the real advantage of the e-learning techniques for long distance learning systems consists in the following:

o   the courses and syllabus can be developed using multimedia techniques. These techniques offer the trainer large possibilities to make the contents of the subjects more attractive and easier in order to be understood by the students. These materials can be offered in the classic mode, like Word or PDF documents for printing.

o   communication between students and teachers is easier making use of various means like: e-mail, chat, audio and/or videoconference;

o   the students' evaluation can be made by the teacher or, automated, with the support of the information system for long distance learning;

o the system can organize and maintain a database with Frequently Asked Questions (FAQ); this database can be used by the students to understand common topics.

In figure 1 we present a proposal for a long distance learning system structure. Our objectives for this system are the following:

o the structure is organized in distinct and independent modules and databases that communicate with one another using a common protocol;
o the courses and syllabi would be developed in different file format, with no restrictions for the authors;
o for some subjects (literature, modern language, history etc.) the courses and syllabi will be developed in a document format (*.doc or *.pdf) to be printed by the students;
o to solve the information requests of the students we introduce an automated module for searching databases using intelligent techniques and semantic techniques. To reduce the searching time, the systems preserve a frequently asked questions database.
o the assessment is implemented like a separate module and offers complex automated evaluations;
o the technologies used to develop the proposed system are web-based technologies.

Knowledge searching modules aim to perform complex searching processes to solve students' requests. Because the main technologies used to develop the system are web-based, the searching modules implement semantic web technologies combined with intelligent techniques.
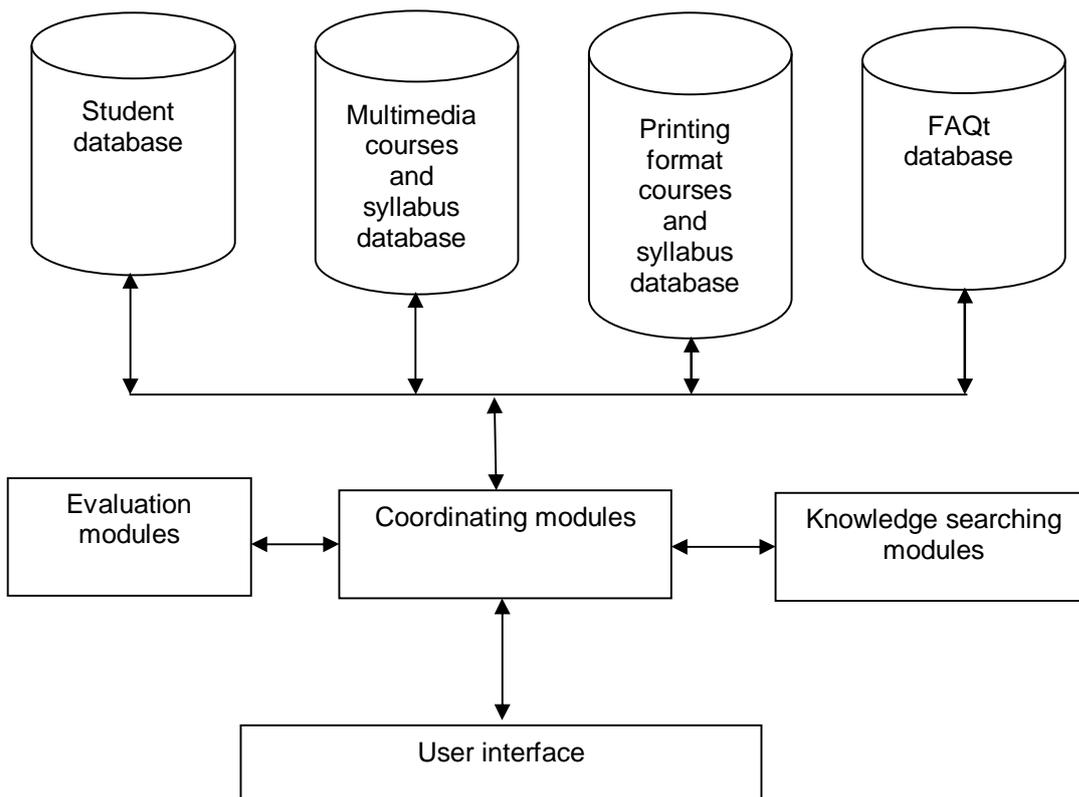

Fig. 1. Long distance learning system structure

For security reasons the acces to the system will be made through the coordinating modules. These implement the security mechanism to allow the acces of the users based on account and password.

The student database can be a dedicated relational database, developed with the aid of MySQL DBMS or can be the general database of the university. In this case it is required one interface mechanism with the university database, mechanism that assures internal conversions between internal databases format and long distance learning system.

The multimedia courses and syllabus database assure the storage of files in different format. The main formats accepted in the system are HTML, PowerPoint presentation but other file formats, like Asimetrix Toolbook can be accepted as well.

Some performing applications to simulate various processes are also allowed. Internal, multimedia database is a relational database with path information files and the entire collections of multimedia courses and syllabi, stored in different folders.
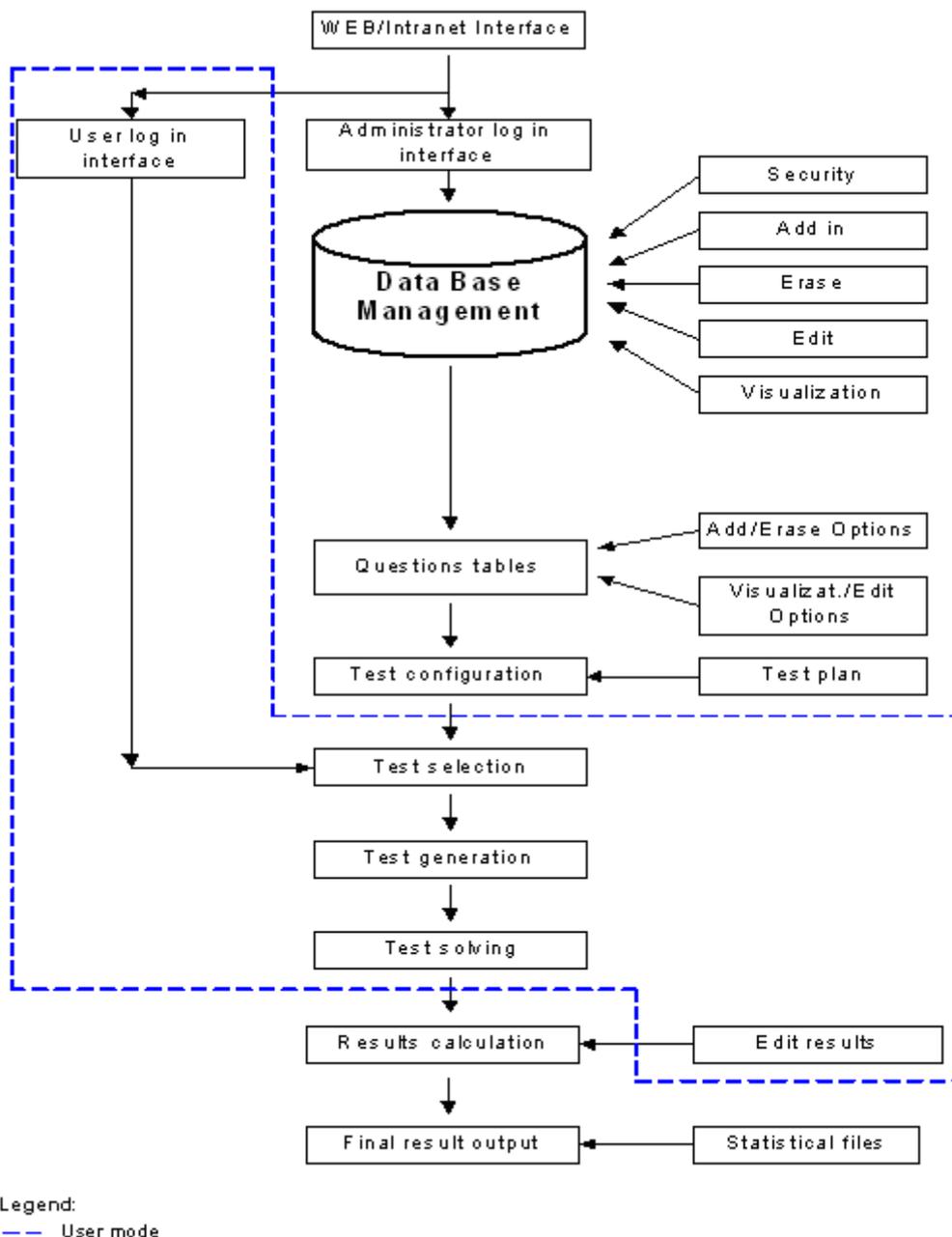

Fig. 2. Architecture of evaluation module

The structure of the evaluation module is presented in fig. 2. The aim of this module [4] is to offer the teacher the possibilites to develop various evaluation tests and to perform complex assessment processes to establish the real level of students' knowledge.

As we can see in the above figure, the evaluation module uses a question database to store the questions grouped into subjects. The teachers can use the questions from that database or can add new questions.

One of the main design principles was also to develop software capable of offering the possibility to choose a set of questions at random (multiple choice and/or true/false type), with five different levels of difficulty [4], without providing possibilities to the users to learn the questions or the correct answers and which can be easily used for several purposes: self assessment, primary and/or secondary evaluation, professional training etc.

Conclusions

The paper presents the structure of an information system for a long distance learning system that can be developed with the aid of computer assisted learning technologies.

This system is modular and simple and can be implemented step-by-step because the modules are independent and can be implemented and tested separately.

The evaluating modules are implemented and tested by Mrs. Iuliana Dobre as a software package that was developed in order to perform an online student evaluation. The software was generically called E.S.A.C. Soft, which is, in fact, an abbreviation coming from the original title in Romanian language which can be freely translated as software for students' evaluation mediated by the computer.

Generally speaking, this software was designed in a manner that offers the possibility to be applied with all subjects and in both internet and intranet environments.

The search modules, that combine classical search techniques with artificial intelligence techniques assure a low time response for the students questions without the teachers' intervention.

For the future, the authors' aim is to develop the intelligent searching algorithms, to implement and to test them in close relation with other modules.

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Facilităţi E-learning pentru învăţământul la distanţă

Rezumat

Acest articol prezintă o serie de facilităţi ale e-learning care pot fi utilizate pentru a implementa sisteme de învăţământ la distanţă. Tehnicile IAC (Instruirea Asistată de Calculator) combinate cu tehnicile Web pot fi utilizate ca suport pentru dezvoltarea de sisteme moderne de învăţământ la distanţă, pentru multe specializări, inclusiv specializările economice. Disciplinele economice implică anumite particularităţi care pot fi rezolvate cu ajutorul soluţiilor informatice folosite pentru învăţământ la distanţă. De exemplu, tehnicile statistice pot fi combinate cu tehnici de inteligenţă artificială pentru a dezvolta modele previzionale şi a rezolva probleme de afaceri.