

# INSTRUCTIONAL SOFTWARE PROGRAMS USED IN THE ROMANIAN HIGHER EDUCATION SYSTEM

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## ABSTRACT

The social and political framework from Romania and the new technological revolution issued a revolution in the Romanian education system. There were initiated new forms of education and new instruction fields. Software programs developments have realized the necessity to elaboration of useful applications for instruction, and the professors have perceived the necessity to use these applications for instruction process, both for the traditional education and distance education. This paper wants to make known the experience of the authors (teachers of a state university from Romania and a software engineer) about the utilization of two software applications, one of them is dedicated to distance instruction management, the other is dedicated to design and to realize the contents of online courses. The applications focus the role of the students in the education process with all their specifics features.

## KEYWORDS

Course online, Pleiad, e-learning, Web based training, distance learning.

## INTRODUCTION

The term ‘e-learning’ is used to define learning that involves the computer and the Internet. Theoretically, e-learning stands for online training that can be accessed from any place using a great variety of “electronic” learning solutions such as learning using the Web, the discussion groups, the virtual classes, video and audio, the chat on the Web etc.

From the point of view of complexity and quality, “e-learning” products and services can have the following characteristics:

- Simple courses or dedicated programs;
- Individual or group study;
- Training with or without certain types of support services such as access to libraries or other means of information;
- Courses that can be frequently updated or courses with a static content;
- Access to course material on a schedule or free access depending on the time of the student;
- Synchronous or asynchronous online training;
- E-learning systems that contain self-evaluation modules;
- Interactivity and online communication between teachers and students.

Computer assisted instruction technologies

Technologies for online education are tools used in developing and delivering electronic courses:

1. Technology for developing electronic courses: consists in software programs used to develop pedagogical resources, applications of databases for knowledge administration, online tutorial units, course’s units, applications to track the students’ performance.

- Technology for delivering online courses: consists in hardware devices and software applications used to stock pedagogical resources and to transmit online courses to the students anywhere, anytime they need.

Further on, there are presented two applications for e-learning: Online course – a tool for develop contents of e-courses and Pleiad – a software platform dedicated to manage distance learning, that have been used in Petroleum-Gas University of Ploiești.

### ONLINE COURSE- TECHNOLOGY FOR DEVELOPING COURSES

Online Course is a software application concerned with e-learning that offers its users a learning environment that is more complex than a simple source of information.

The first version of the application was launched in 2001 at the Petroleum-Gas University of Ploiești, as the result of the need for online training that involves the computer and the Internet. In the summer of 2002, the second version of the application was launched. This version was better than the first one from the point of view of navigation, the presentation of the content and interactivity.

The main characteristics of the concept of e-learning are present in the basic modules of this application, Online Course being a Web Based Training (WBT).

Online Course is an application of the client-server type that works using Internet languages and protocols as well as a database in order to make the convergence between the content of the courses, students and teachers.

Online Course is running on a dedicated server that stocks up the content, implements the logic of functioning and makes most of the necessary processing. The application is accessed using the Internet. The classical actors of an e-learning script can be found in the Online Course application being represented by interdependent entities: Teacher, Student and Administrator.

In figure 1, it is presented the architecture of the application Online Course and its way of functioning.

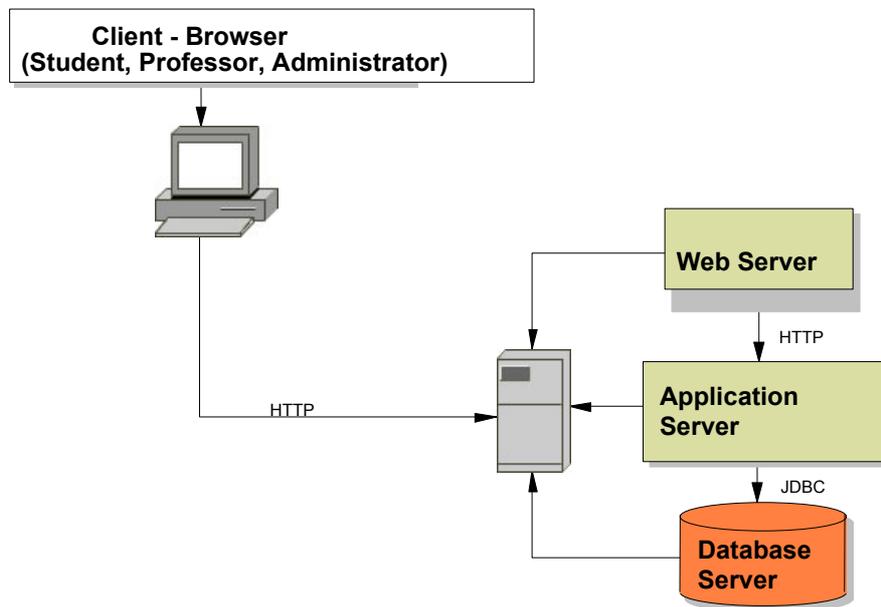


Figure 1. The architecture of the application Online Course

Each entity accesses the application with the help of a Web address. This solution offers access to Online Course 24 hours a day and the requirements are not too many (access to Internet, reasonable PC resources, any operating system). Each user be it student, teacher or administrator can have an access account to the application.

Online Course has an intuitive, well organized and easy to use interface. The main modules of the application – Courses, Self-evaluation tests, Forum and Administration- are present in separate sections, each section bearing the mark of the module that it presents. The application business logic is very well organized.

Online Course represents itself a System of Management Learning (SMI) which is an application that permits the creation and administration of courses and accounts but also their online and offline presentation.

Further on, there are presented the main characteristics of the SMI - Online Course application:

a. Organized and efficient system

There are two important administration operations available with the Online Course: on the one hand administrating the access accounts and implicitly the study groups and on the other hand administrating the learning content and student feedback. Each operation of administration has a certain role, in this way a good determination of the action zones within the framework of the application is being made.

b. The classical institutional structure

The logic of the Online Course application is based on the structure and way of functioning typical for a classical educational institution.

Hereby, in order to be able to make use of the application, the user needs to be registered first and then he/she will be assigned one of the three available roles: Teacher, Student or Administrator.

Each role of the application has a personalized utilization interface that allows the user to perform the operations that are specific to the respective role. (For example: Teacher – to create the content and to view the catalogues, Student – to read and learn the courses and to take the self evaluation tests, Administrator – to create access accounts).

For a good organization of the students and an efficient cataloguing of the activity of each user, Online Course maintains the students' distribution on faculties, sections and groups.

In order to have an active role within the framework of e-learning, a student has to be registered by an administrator in a group, section or faculty and then assigned to a course.

Good organization of the learning material represents one of the basic principles of an e-learning quality product. Online Course contains a dedicated section that allows the insertion and administration of the learning material –Management of Learning Content System (SMCI). This section allows a standard structured and modular organization of the content of a course. In this respect, all the courses registered in the application have a hierarchical and concise structure and contains schemes and images. A course has the following elements: chapter, subchapter, paragraph, note, image, table, key word and glossary term. For a gradual and coherent assimilation of the information, Online Course has a self evaluation module, each chapter having its own self evaluation test.

This structure of the course ensures a maximum of efficiency in assimilating the knowledge. The insertion of a course in the application implies creating the structure on chapters, writing the paragraphs and attaching the notes, images and tables. Besides the online presentation of the courses, the application offers the possibility of creating an offline course and its presentation on a CD.

Online Course contains an Administrator module, a Teacher module and a Student module. Each module has a corresponding role in order to have access to the application. The interface of the application is particularized for each of these modules. However Online Course maintains a unitary structure of the menus and tools.

The differentiation of the modules from the point of view of the interface is done immediately after logging in the application. The login window is the start element and it is unique for any role of the application.

The texts of the menus and the buttons in the application are available in many languages. The user has the possibility to choose from the start window the language that he wants to work with within the application. In figure 2 it is presented the start window of Online Course.

In order to be able to make use of the Online Course, the student, teacher or administrator user must have a username and a password. The application is delivered with only one Administrator's account, this user having the duty to create all the access accounts. Once logged in, the user will access the application and he will use an interface according to his/her role.

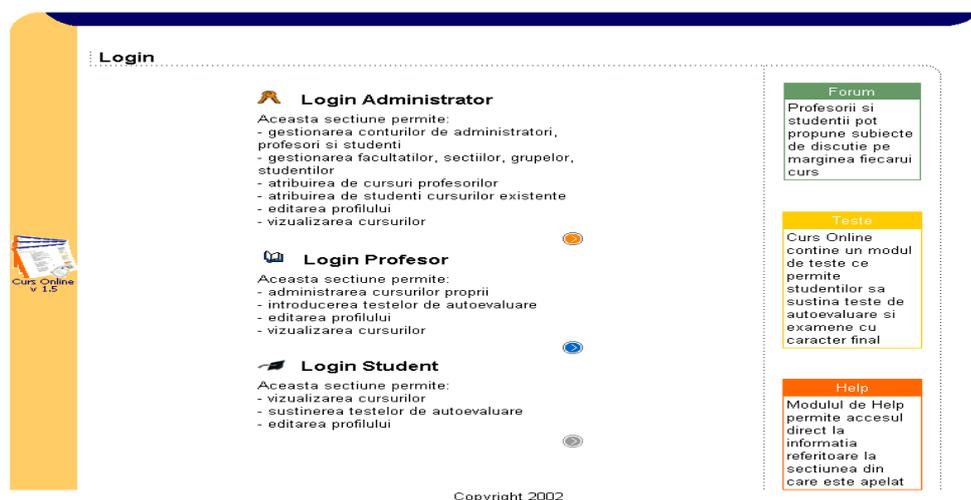


Figure 2. The Start Window

When the Online Course application is accessed, the start window will open. This window has the task of allowing the user to select one of the three access roles that are available: Administrator, Teacher, Student. Once the role has been selected, the user is guided to the actual login window that corresponds to the chosen role, which is called simply login window. The user has to introduce the name of the account and the password in this window (see figure 3).

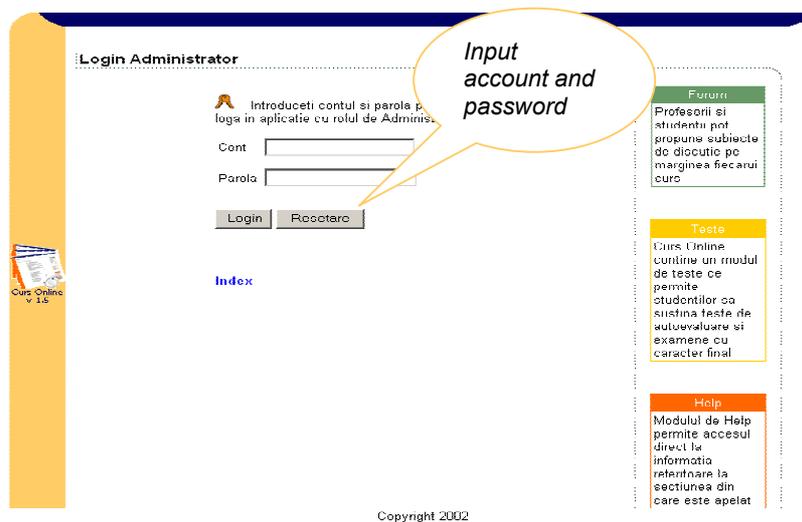


Figure 3. Login window

Administrator is the role that enables account and courses administration operations. The window of the administrator menu is divided in four action zones. These zones are The Menu Bar, The Content Zone, The Footer Zone, The Profile Zone. The division of the work window in these action zones is similar to the division for the Teacher's and Student's interface.

**Administration:** a menu that enables operations of management for the administrators, teachers and students accounts. Also, in this menu it can be created the virtual institutional structure based on faculties, sections and groups. If this button is pressed a window that contains five submenus will be opened.

**Administrators** - Enables the creation and editing of the administrator accounts

**Teachers** - Enables the creation and editing of the teacher accounts

**Faculties** - Enables the registering of a new faculty and the editing of a registered faculty's data

**Sections**- Enables the registering of a new section for a faculty and the editing of an already existing section. Also, a list of all the sections arranged by faculty can be obtained from this menu.

**Students and Groups** - Enables the registering of a new group for a section and the editing of an existing section's data.

- Enables the creation of lists of all the groups or of a faculty's/section's group.
- Creating and editing a student's account



Figure 4. The Administration Environment

**Courses:** a menu that enables the forming of the group studies – distributing students and teachers to courses.

**Forum:** button that enables the access to the application's discussion forum.

**Help:** this button enables the access to the user's guide of the application.

The **Content Zone** is the zone where the menus of all the buttons from the menu bar and the Profile Zone are shown. This zone enables the navigation through the above mentioned buttons and is also the main zone of interactivity with the user, enabling the collection of the information that is introduced by the latter (e.g. name and password for creating a new account etc.)

The **Foot Zone** is the zone that offers information about the producer of the Online Course application and enables the log off from the application.

The **Profile Zone** is made up of three menu and information boxes. This is the zone where the user can modify the personal data and the data regarding the access account for the application using the Edit Profile and Password Change buttons.

**Edit Profile:** a button that enables the editing of the user's personal data - Name, First name and the account's name.

Password Change: a button that allows the changing of the logged user's password. The zone also contains a box that offers different information and tips for an efficient use of the application.

Teacher is the role which has as a main purpose the creation of the learning content. Further on there are presented the elements that make up the zone Menu Bar of the Teacher's interface, the other three zones function in the same manner as the zones of the Administrator's interface. For the Teacher role, the Menu Bar is made up of 5 buttons: Courses administration, Courses view, Results, Forum and Help (see figure 5).



Figure 5. The Menu Bar

Courses administration: a menu that enables management operations of the logged teacher. The management of the courses implies the following operations:

- Creating a new course
- Editing a course
- Deleting a course
- Translating a course in other languages
- Inserting the self evaluation tests
- Exporting a course

*Courses view*: this button enables the viewing of the logged teacher's courses.

*Results*: this button enables the access of the tables that contain the results of every student's evaluation tests.

*Forum*: this button enables the access to the application's discussion forum.

*Help*: this button enables the access to the user's guide of the application.

Student is the role that enables the viewing of the courses, taking the tests of self evaluation and the participation in the forum.

Further on, there are presented the elements that make up the Menu Bar zone of the Student's interface, the other three zones being identical as a way of functioning with the Administrator's interface zones.

For the Student role, the Menu Bar is made up of 4 buttons: Courses, Results, Forum and Help (see figure 6).



Figure 6. The Menu Bar

*Courses*: this button enables the viewing of the courses that the logged students have been registered to.

*Results*: this button enables the access to the tables that contain the results of every student's evaluation tests.

*Forum*: this button enables the access to the application's discussion forum.

*Help*: this button enables the access to the user's guide of the application.

The Administration System of the Online Course application has two major functions: the administration of the access accounts and implicitly of the study groups and the administration of the learning content. The administration of the access accounts and of the study groups are assigned to the users with the Administrator role and they suppose the creation and management of the virtual institutional educational structure.

The main operations that describe the e-learning character of the online Course application are creating and viewing the courses. The creation of courses supposes the existence of a user with Teacher role. The latter creates the structure of the course and he/she writes its content.

In order to be able to view the existence a certain course, a user with Student role has to be registered for the application in the framework of a faculty, section and group and the Student has to be registered to the respective course.

The Administrator role supposes the following operations in the framework of the application:

- Administrating the accounts of the administrators, teachers and students
- Administrating the faculties, the sections and the groups
- Administrating the courses

The management of the administrators, teachers and students accounts is similar operations from the point of view of the work interface.

Creating the learning modules and the evaluation tests is the most laborious stage in preparing a course for e-learning. Online course has integrated a module named Management of Learning Content System (SMCI).

With the Online Course Application, the user with the Teacher role has the task of creating a course. All the courses introduced in the application have a unitary structure made up of: chapter, test, glossary terms, key words. The tree structure of a course is presented in figure 7.

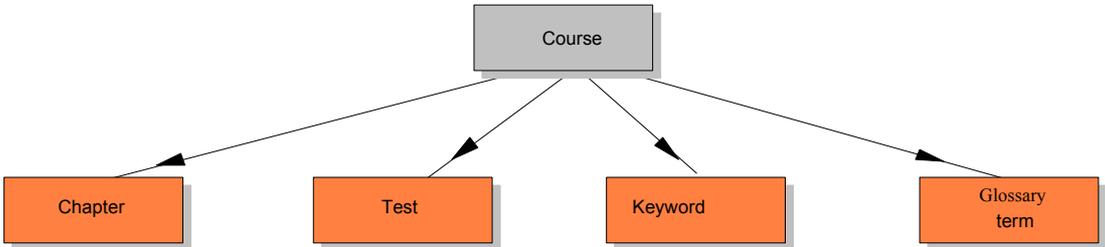


Figure 7. The structure of a course

Each chapter is in its turn a collection of several elements, such as paragraphs, tables, notes and images.

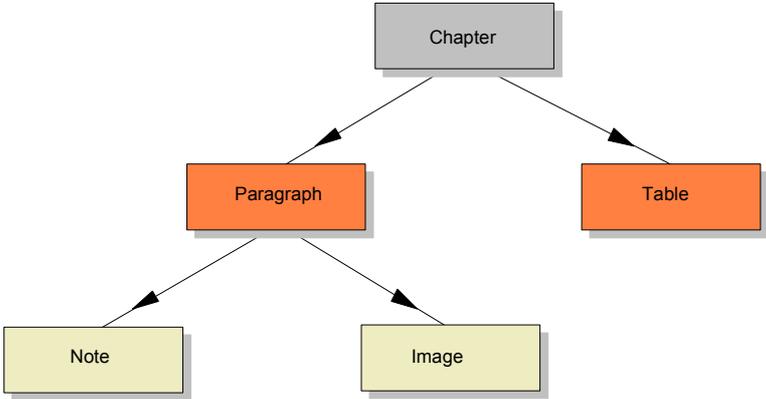


Figure 8. The structure of the chapter

In order to insert a course in the application, a user with Teacher role will choose from the menu bar the Courses Administration button.

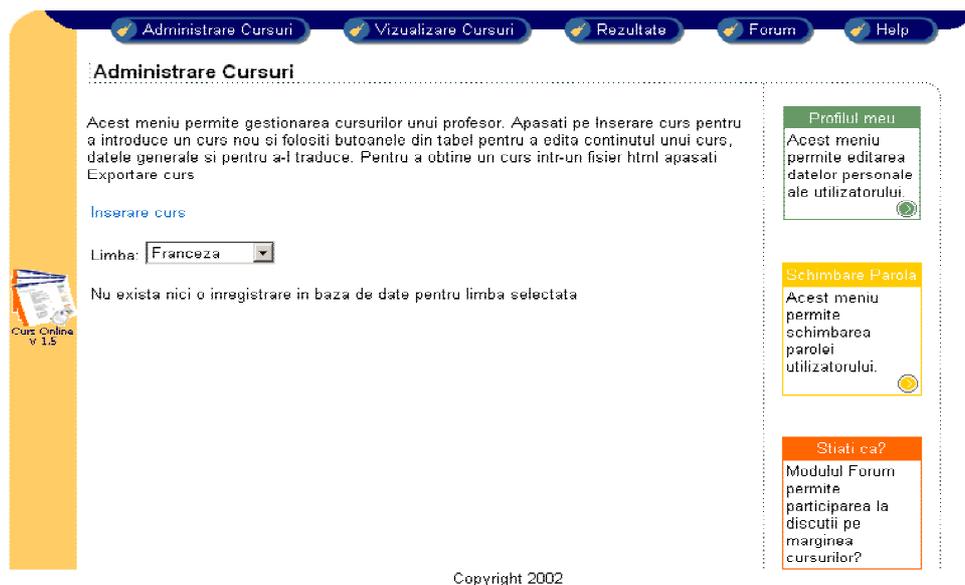


Figure 9. Creating a new course

The interface for creating a new course requests to the user information about: the name of the course, its abbreviation, the level, the starting and finishing dates as well as a short description of the course. Once these data have been filled in, the course is initiated and the user with the Teacher role is ready to create the tree structure of the course's chapters.

The export of a course supposes obtaining the content of a course in a single html file with the purpose of downloading the file on the user's disk. The export is done by the user with the Teacher role using the Export button from the courses' table. An archived file is obtained.

Saving a course on disk supposes obtaining the structure and the content of a course on the user's disk. In order to do this Save Course command is used.

The Forum module of the Online Course application implements the characteristics of interactivity and online communication proper to an e-learning product.

Each available role in the application has access to the Forum realizing, in this manner, a real time communication between all the users of the application.

The development of the system for distance learning imposed the utilization of new technologies belonging to the communication and information systems in the educational process. The high number of students registered in this form of education, geographically distributed on a large area, involved the utilization of the Internet in the educational process.

## PLEIAD - TECHNOLOGY TO DELIVER COURSES

To choose a method to deliver courses online consists in to choose a quickly information transmit, to choose an efficient method for students.

The lower and ordinary supports are: diskettes, CD-s, DVD-s. The complex methods need LAN, WAN networks and Internet.

To use computers networks involve to choose a hardware and software technologies about servers, workstations and communication between them. Our university made an option: Pleiad.

The main object of the utilization of the Pleiad program package is facilitating the transmission of knowledge to a greater number of persons. Pleiad is a software tool that explores the potential of the Internet, making connections between educators, students and pedagogical resources.

There are four types of services available with the Pleiad program package:

1. access to the pedagogical curriculum;
2. access to pedagogical resources associated with the following programs:
  - courses, exercises, applications;
  - Web format, links to other sites, downloadable files...
3. different communication and exchange services:
  - incorporated messenger;
  - discussion forums between all users;
  - communication with the educator;
  - chat in real time.
4. management of the data and search.

With Pleiad, the instruction can be realized in a standard pedagogical way or it can be done according to the individual needs of the students. That consists in a series of activities and uses multimedia pedagogical resources, applications, links to other sites.

Pleiad platform is a Web site. In order to have access to the program, the teachers and students have to introduce in the address bar of a browser the following address: <http://pleiad.upg-ploiesti.ro>.

The interface of Pleiad software follows the principles of working with the internet. The authorization of the users is realized with the help of an account and a password (see figure 10).

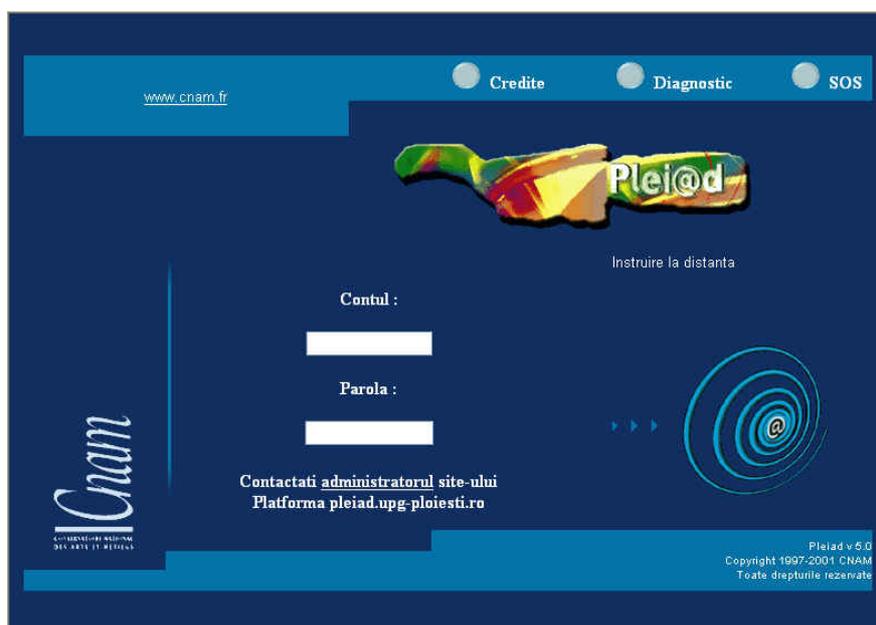


Figure 10. The identification window

The general organization of the Pleiad software is:

1. the home page
2. the identification page
3. the learning units page
4. the work page

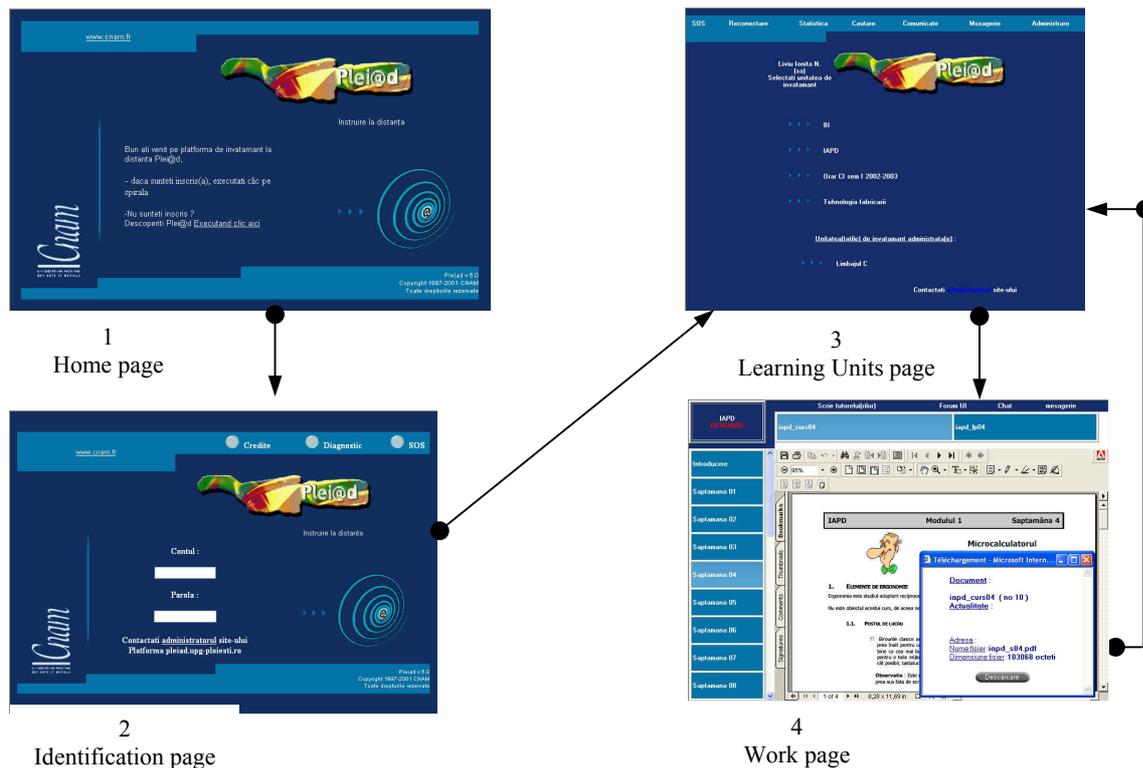


Figure 11. General Organization

The type of the user (administrator Pleiad, teacher, student) determines the type of the software window. The student has to select with one click, the learning unit where he is registered in, then with the help of the work window the instruction is facilitated.

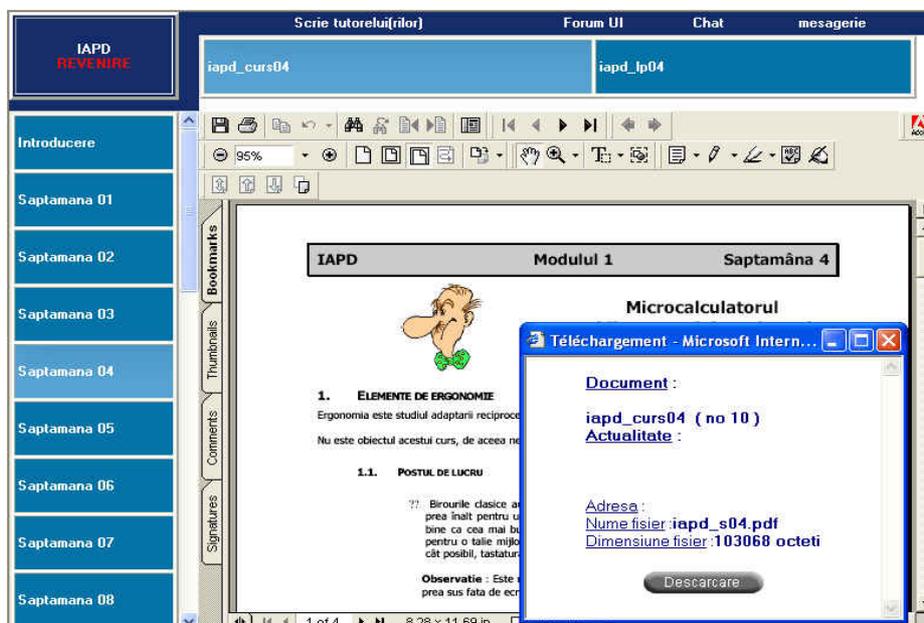


Figure12. The work window

The formative, the teacher and his/her assistant have to design the instruction, the educational resources, to permanently communicate with the student, to undertake periodical evaluations, the final exam; the grading exam taking place in the classroom.

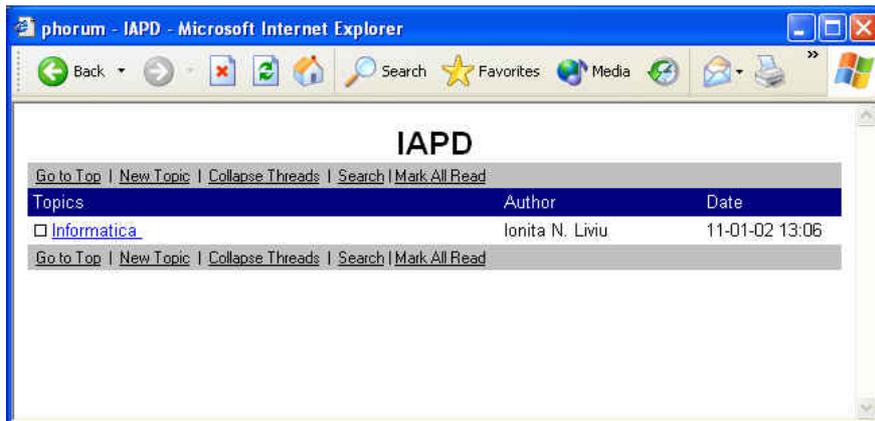


Figure 13. Forum associated to the learning unit

The Pleiad administrator has to manage all these processes, to configure the application in order to be successful in the instructional process.

The instructional platform Pleiad proposes two ways of working: online and offline.

The first way of working implies the permanent connection to the internet. The students will visualize the pedagogical resources with the help of the Acrobat Reader software (it is available with the Pleiad Software) and will communicate in real time with the teachers, through the software's communication tools (chat, forum).

In the case of the second way of working, the students will save the pedagogical resources on the hard disk of their computer and will communicate with their teachers through e-mail.

A learning unit is structured according to the distance learning technologies. The latter contains a lot of pedagogical resources structured according to an academic year.

Each student registered in a certain specialization will study the pedagogical course corresponding to his/her specialization. Eventually, the link between teachers and students is realized through the learning unit. The learning units have as a result the successful achievement of the instructional process, this process being focused on the student, the central element in the educational process.

The administration of the software supposes the creation of accounts for users, the management of the rights, of the means of communication of all the learning units, of the courses. Each course is divided in study sequences that have attached educational resources (fig. 8).



Figure 14. The administration module

## CONCLUSIONS

The advantages using Online Courses software are:

- Teachers make online courses with an enforced structure which follows our educational ministry requirements.
- Contents an evaluation units (partial or final evaluation).
- Opportunities to semantic search of information.
- The courses can be released in more languages.

The advantages using Pleiad software are:

- The software is easily to use even for novice learners.
- Opportunities to search of information on the web using search engine.
- Implementation costs are minimal because this software uses Linux and MySQL data bases.
- The possibility of synchronous and asynchronous communications (e-mail, forum, chat).

This two software satisfy the needs of distance instructions from our university. The problems which were issued are in connections with educational efficiency. E-learning offers both advantages and disadvantages. In the future we want to track down these and to propose a method which combines the traditional education with electronically education in order to harmonize educational process.

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