

## **COMPLETE: A NEW E-LEARNING PLATFORM FOR ENERGY/TRANSPORT/ENVIRONMENT DOMAINS**

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***Abstract:** The e-Learning platform developed in the frame of the COMPLETE project address the specific needs of learning methods „**Problem Based Learning**” (PbL) and „**Project Based Learning**” (PjL). These methods are „group oriented”, and one of the main actions on the platform is to create groups of users for each problem/project based learning module. Each problem or project can be allotted to more than one group – the PbL/PjL module is an assembly of the problem/project and the group. From a technical point of view, the solution chosen is to integrate the open-source e-Learning platform Moodle and also other open-source tools in the uPortal, which is an open-source application too - uPortal is a free, sharable portal under development by institutions of higher education. The structure of the uPortal framework is based on channels. Everything in uPortal is channel. The interface is constructed by assigning more channels to each user or group of users. The basic idea for PbL or PjL configuration is to create small groups of users, one group for each problem or project, and to set one uPortal interface for each group.*

**Keywords:** Problem Based Learning, Project Based Learning, e-learning, e-platform, portal

### **Introduction**

In EU and in Romania, modern training programs require new learner-centered teaching and learning methods, as Problem-based Learning (PbL) and Project-based Learning (PjL), e-learning methods in general. They are good ways to use the trainees experience and value it to shorten study time. The COMPLETE project (Leonardo da Vinci Pilot Project RO/04/B/F/PP – 175016) is completely in line with these requirements. Therefore, the project proposes new strategies for acquisition of lifelong learning competences by using the PbL and PjL interactive and interdisciplinary methods for trainers, tutors and facilitators of training programs.

The goal of COMPLETE project consists in *developing new strategies for increasing the trainers’ lifelong teaching and learning competences by using interactive methods and modern training programs in energy – transport - environment engineering*. One of the project aims is producing the practical tools required for implementing this innovative approach:

- Developing and adapting an e-lifelong learning platform, taking into account the training needs in energy - transport - environment engineering, where the new e-products are included;
- Designing and developing e-products (e-learning objects) in ETEE domains, facilitating interactive and innovative teaching and learning methods.

### **The COMPLETE E-Learning Platform**

The general characteristics proposed for the e-learning platform are:

- the platform is Web-based;
- has the ability to launch more than 50 e-learning courses and accompanying assessments, supplying over 150 hours of instruction;

- it has a flexible content-hosting model;
- it offers an online course catalogue and course search engine;
- has a free demo area for registered and not-registered users, to access sample e-learning courses;
- it is highly customizable.

The administrative and management functions of the e-learning platform are:

- tracking learner's progress and performance;
- controlling the learner's level of content learning;
- allowing users to focus on only those content areas that are most relevant to their learning needs by means of learning products design;
- management of groups, users and courses;
- searching course catalogue;
- storing user's learning history information with completed courses and assessments;
- reporting user access and test scores;
- enabling self-registration;
- enabling to edit profile and change password;
- enabling working in groups.

The goal was not to develop an entirely new platform, but to choose and adapt an existing one, in line with the specific needs of the project.

From a technical point of view, the solution chosen is to integrate the open-source e-Learning platform **Moodle** and also other open-source tools in the **uPortal**, which is an open-source application too.

The components of the system are listed in the table below.

Table 1 - Software for supporting the COMPLETE e-platform

<b>Software</b>	<b>Role</b>	<b>Comments</b>
Operating System	Provide the support for the operate of all programs on the Server	Windows 2003 Server; Windows XP Pro – on the workstation
Apache 2.0	HTTP server	open-source software
Apache Tomcat 5.0	JSP container – support for uPortal	open-source software
MySQL	Database Management System – used by uPortal and Moodle	Free software – General Public License
PHP 4	a reflective programming language originally designed for producing dynamic Web pages – support for Moodle	Free software
uPortal	An unique entry point for all the resources of the project, including e-Learning content	open-source software
Moodle	Content Management System (the core of the COMPLETE e-Learning system)	open-source software
IlohaMail	Web-Mail server software	open-source software
XML Search	Search for resources on the platform	developed in the framework of the project
ADL –Scorm	Support for courses Scorm 2004 compliant	open-source software

On the workstations, the only software required for accessing the COMPLETE e-platform is Internet Explorer, or another compatible browser.

The e-Learning platform developed in the frame of the COMPLETE project address the specific needs of learning methods „Problem Based Learning” (PbL) and „Project Based Learning” (PjL). These methods are „group oriented”, and one of the main actions on the platform is to create groups of users for each problem/project based learning module. Each problem or project can be allotted to more than one group – the PbL/PjL module is an assembly of the problem/project and the group. For each of these modules, the teacher (course administrator) will have to create a Tab in the uPortal. The teacher will then add content to the Tab by subscribing to one or more of the existing channels.

The use of a portal was chosen because of the multiple advantages offered by this kind of software application:

- it offers an unique access point for users, partners and guests
- the users can access the Web services from any terminal
- portals are highly flexible; can be combined in a network which includes all the software applications in an institution, allowing access from inside and outside through a *firewall*.

Thanks to the benefits offered, portals become a standard for Web applications. It is anticipated that the portals will become the new generation of working environment. Portals are different by other software systems by their capacity of integration of various systems and their support in execution of the function offered by these. So, the portals are not exclusive and do not oblige to use specific existing systems. This is of major importance, especially when taking into account that Web services are meant to maintain the Web application expansion. As the portals can access the Web services, the conclusion is obvious: the portals offer the unique possibility to integrate functions of the new technologies as well as those of the mature ones, of the software systems already imposed on the market.

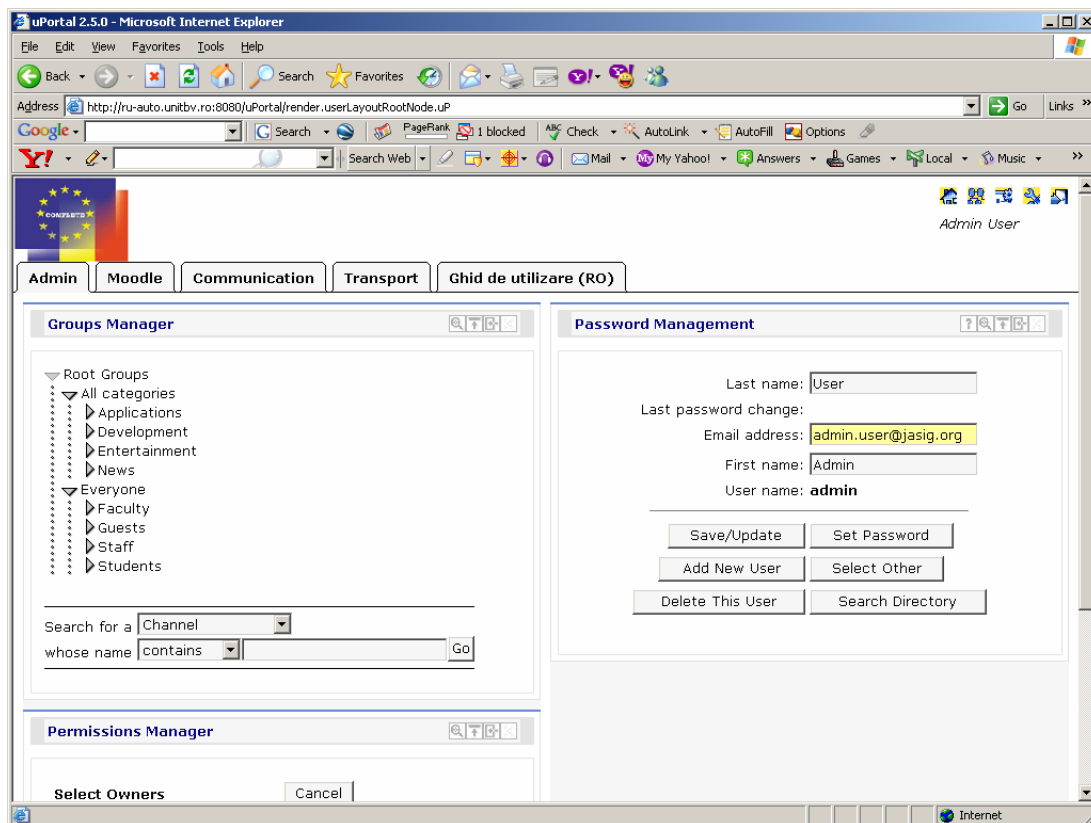


Figure 1 – uPortal implementation in the frame of COMPLETE project

**uPortal** is a free, sharable portal under development by institutions of higher-education. This group sees an institutional portal as an abridged and customized version of the institutional Web presence. Customization allows each user to define a unique and personal view of the campus Web. Community tools, such as chat, forums, survey, and so on, build relationships among campus constituencies.

**uPortal** is an open-standard effort using Java, XML, JSP and J2EE. It is a collaborative development project with the effort shared among several of the JA-SIG member institutions. uPortal has integrated Apache Software Foundation's Pluto software to become JSR 168 compliant allowing it to host Portlets. The structure of the uPortal framework is based on **channels**. Everything in uPortal is channel. The interface is constructed by assigning more channels to each user or group of users.

The basic idea for PbL or PjL configuration is to create small groups of users, one group for each problem or project, and to set one uPortal interface for each group. This can be done by creating fragments (in the meaning of uPortal) and publishing the fragments for the related groups. So, each user will see on the portal one or more tabs, one tab for each problem or project group to which he belongs (each tab is a sheet). In each tab the user can find the channels defined for the related problem or project. The content of each channel is adapted to the specific problem (eg: the message list, the course list etc.).

The most important application integrated with uPortal in the framework of the project COMPLETE is the e-Learning platform **Moodle** (figure 2).

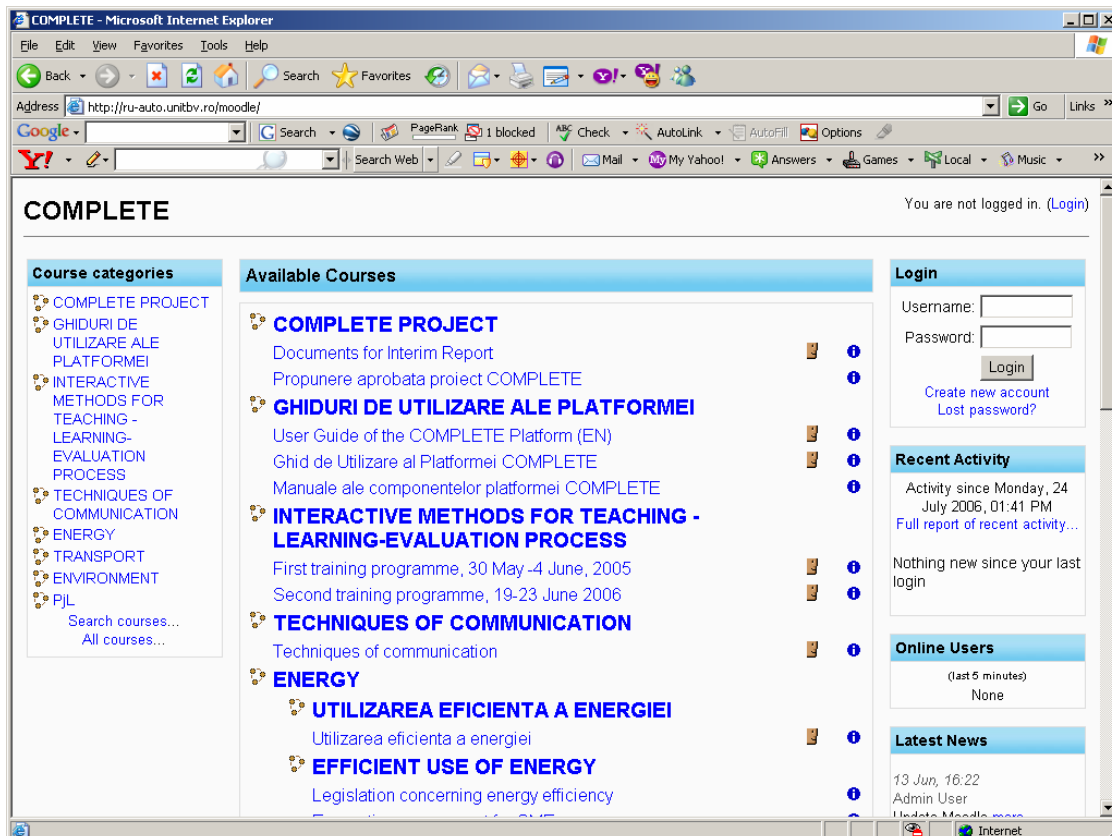


Figure 2 – The entry page of Moodle, in the COMPLETE project implementation

**Moodle** is a course management system (CMS) - a free, Open Source software package designed using pedagogical principles, to help educators create effective online learning communities. Moodle is now a mature application; the latest version (20.06.2006) is 1.6. Moodle is Scorm 2004 compatible.

Moodle support the following user's roles: administrator, course creator, teacher and student. In addition, a visitor can log in as guest and see demo and free courses. The rights of the users depending by their roles are:

Administrator	<ul style="list-style-type: none"><li>- configure uPortal, configure Moodle and the other tools</li><li>- create/edit channels</li><li>- administrator rights for Moodle (course management, user management...)</li></ul>
Course coordinator (Author)	<ul style="list-style-type: none"><li>- define user groups (problem/project related)</li><li>- create courses, edit the course content (including quizzes and assessments)</li><li>- define the problems and projects</li><li>- all tutor rights</li></ul>
Tutor (Teacher)	<ul style="list-style-type: none"><li>- manage quizzes and assessments</li><li>- use calendar – can put also data in the student's calendar</li><li>- use chat, forum – can create new threads in the forum</li><li>- view/edit grade books</li></ul>
Student	<ul style="list-style-type: none"><li>- view courses</li><li>- take assessments</li><li>- view grade book</li><li>- upload files (when requested by an assessment)</li><li>- use calendar, chat, forum</li></ul>
Guest	<ul style="list-style-type: none"><li>- view the glossary</li><li>- view demo courses</li><li>- fill in the registration form (apply for a student account)</li></ul>

## Conclusions

The current development phase of the e-platform is *testing and improving*. Future improvements of the e-platform functionality and appearance will depend by the feedback from the partners involved in the testing activity. Two training programs were already organized in the framework of the COMPLETE project, using the e-learning platform as learning support. An e-learning centre was organized at Transilvania University of Brasov, where the teachers can prepare their on-line courses using the hardware and software tools provided. Some example courses are uploaded on Moodle, to help authors to develop their courses using the PbL and PjL methods.

## References

- [1] uPortal home page – <http://www.uportal.org>;
- [2] Moodle home page – <http://moodle.org>;
- [3] COMPLETE project home page – <http://www.leonardo-complete.eu>; <http://complete.unitbv.ro>.



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