

Research Project on Implementation of Open Distance Learning Method in University Education

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Abstract

This paper outlines the findings of the research project in relation to implementation of e-Learning (computer assisted teaching, including distance learning) and its conceptual, terminological, technological, methodological and pedagogical aspects. The paper also outlines the results of the experimental testing of the two integrated software platforms designed specifically for supporting e-Learning that are in use at the State University of Moldova (SUM): AeL (Advanced eLearning) and Moodle (Modular Object-Oriented Dynamic Learning Environment).

Keywords: AeL, Moodle, e-Learning, Open Distance Learning (ODL), e-Testing, Information and Communication Technology (ICT)

1. Introduction

The increasing importance of Open Distance Learning (ODL) in the modern society driven by “knowledge” is emphasized in a number of electronic and paper sources. ODL is acknowledged as an area of priority in numerous countries developmental strategies. The role of ODL in modern society increases as the requirement to quality of knowledge increases and the importance of teaching quality continues to grow. The requirements to qualification of specialists in various areas are more stringent, which calls upon the improvement in quality of education and is reflected in society’s need for the reform of the educational system.

Digital, electronic and multimedia educational materials become a credible source of bibliography and imaging for various subjects and professors become better acquainted with the specific ways of preparation to educational activities using Information and Communication Technology (ICT). There are more and more educational institutions around the world operating exclusively through the Internet, delivering either a full cycle of subjects for a degree or offering specialized courses for a wider range of users “(Brut, 2006)”.

In the Republic of Moldova, the following project was implemented in order to promote the reform of the educational system:

Project 08.815.08.04A “*Development and application of innovative methods in distance learning*” runs as part of the larger National Program “*Development of the Scientific and Technological support for the growing informational needs of the society of*

Republic of Moldova (RM)". The project commenced in 2008 and is planned to be finalised in 2009. During the project a number of research activities and experimental tests have been performed with the aim of integrating the innovative methods and modern information technology, including ODL, with University education. "(08.815.08.04A project, 2008)".

At the start of the project the research team included 10 members: 2 university professors, 2 PhD students, 3 competitors, 2 masters in informatics and 1 student. In 2009 the team expansion has been separately financed. This resulted in engaging of 4 additional university professors and 5 future tutors, who will participate in elaboration, implementation and testing of the digital contents of the project.

Objects of research activities related to various aspects of implementation and delivery of ODL, including methodological, technological, pedagogical and infrastructural issues. The starting point of ODL's implementation is a pilot program offering the Masters Degree at the State University of Moldova (SUM), Faculty of Mathematics and Information Technology during the academic year of 2009-2010.

The following can be considered amongst the most significant results of the project's research activities:

1. Adoption of local distance education concept "*Distance Learning: Concept and Terminology. Initiation Guide*", authors Bragaru Tudor, Gheorghe Capatana, Ion Craciun, Chisinau, SUM, 2008;
2. Adoption of local Regulations of ODL for State University of Moldova, Ion Craciun, T.Bragaru, Gh. Capatana;
3. Development of the information resources for distance education, authors T. Bragaru, Vs. Arnaut, I. Craciun;
4. Development of methodological aspects (Bragaru T., Cirhana V., Craciun I. Development of the information resources for distance education, Chisinau, State University of Moldova, 2009; Bragaru T., Cirhana V., Craciun I. *Computer assisted testing. Methodology*. Chisinau, State University of Moldova, 2009; and other user guides).
5. Research, testing and adoption of hardware and of the software platform necessary for carrying out of the formal distance learning education that consists of 2 components: Moodle (main platform) and AeL SIVECO (second platform).
6. Development and maintenance of the Web page designated to ODL, creation of a virtual community with the interest in the relevant topics, further advertising of ODL and of the innovations in delivering traditional education (<http://idd.usm.md>).

Successful implementation and continued development of ODL at the State University of Moldova and in Republic of Moldova in general requires a large scale preparation of teaching professionals (including professors, authors of study units' contents, tutors and managers) through systematic training courses, seminars, conferences, etc.

2. Research Project's Terminology and Concept

Research with respect to terminology promotes a dialogue between different users of the modern types of ODL and serves the purpose of standardisation of the terminology in the

area, exchange of information and free access to information. The guidance developed within the project's framework "(Bragaru and Capatana and Craciun, 2008)" can be accessed by general public on <http://idd.usm.md>.

Electronic education, e-Learning, distance learning are examples of the extension without limitations of the traditional form of education, carried out with the assistance of ICT "(Bragaru and Capatana and Craciun, 2008)", and as such electronic education method is fundamental to modern learning.

This form of learning has emerged as a necessity of a continuously changing society and currently represents a real challenge for educational system. Electronic education is a generic term covering numerous educational scenarios where there is a significant use of the ICT. Some of the terms that one can come across include: e-Teaching, e-testing, e-Training, e-Education. Semantic representation of the concept of e-Learning also includes terms Online, Virtual, Web based, Internet based learning, computer-assisted learning, Internet-based education, learning through digital television and satellite media, etc. (Figure 1).



Figure 1. Semantic representation of the e-Learning concept (adapted based on "(Rosca I. Gh. and Zamfir G., 2002)")

Thus, e-Learning is a wide term meaning a variety of educational situations, which rely significantly on the utilisation of information technology and communications. Definition wise, the semantic interpretation of e-Learning links with the assisted training, multimedia training, online training (online learning), virtual training, flexible training etc.

In a more narrow sense e-Learning represents one type of distance education that is offered by an institution, which provides study materials in sequential and logical manner that allows utilisation of these materials by students in their individual ways. Carrying out of this form of education is done via the Internet. Internet thus represents the environment for distribution of materials as well as a communication channel between the participants of the educational process. (<http://elearning-forum.ro/resurse/a1-elearning.html>).

3. e-Learning Environment

In essence, e-Learning environment consists of a number of components and dimensions and is defined in a number of ways, such as organisational, technical, technological, operational, pedagogical, with the specific features determined by the supporting digital technology that covers a wide range of applications and educational processes.

From a **pedagogical** point of view, e-Learning environment offers a modern method of studies, teaching and learning based on digital technology, networking and multimedia resources. This method allows the accelerated exchange of information and knowledge,

**Computer
Web
Internet**

**Based
Assisted
Aided
Managed
Mediated**

including ways of understanding or interpretation, between the teacher and the student anywhere, at any time as well as on demand. The result is the fast and efficient education process.

From a **technological** point of view, e-Learning environment represents a technology for maintenance of the processes of teaching, studying and learning which comprises authorisation, distribution, evaluation and administration of the courses' content and other materials of didactical nature. This maintenance of the teaching process is realised through utilisation of digital, communication and multimedia technologies.

From the **contents** point of view, e-Learning environment includes the following:

- *databases and knowledge bases* formed by links to all materials placed within Web-sites (courses, study guides, syntheses, etc), accompanied by explanations and interactive directions as to finding and identifying the subjects of interest. It represents a virtual library, which is easily accessible and makes available to students and others participants of the process the information that theoretically can not be limited by volume of knowledge and can be from any area of activity. Information can be accessed individually or within any established training programs, free of charge or at cost;

- *on-line support* represented by forums, discussion groups (chat rooms), on-line news bulletins, emails or messenger applications (Microsoft and Yahoo Messenger). These are interactive tools that offer interested parties a possibility of asking questions and receiving quick or immediate answers;

- *means of teaching assisted by digital technology*

From a **functional** point of view, e-Learning environment includes the following components:

- *e-Learning platform*, which represents software and hardware support of the electronic teaching, studying and learning processes;

- *e-Learning resources*, which include all data of interest in e-Learning environment, and consist of the following:

- *knowledge*, represented by all knowledge resources that are available for students in all areas during the whole educational process;

- *information* that defines user identity and roles in relation to any resources in e-Learning environment. Depending on the role the user might be a student (beneficiary of knowledge), a professor (provider of knowledge addressed to student and creator of teaching strategy), or an administrator (the one who ensures normal functioning of the e-Learning system and is not directly linked with the teaching process)

- *strategy* that define methods of teaching, learning and efficient assessment, tailored to the complexity of the educational objectives (e.g. for business or general interest) and to specific features of each type of education (full time and part time training or open distance learning). Strategies are also tailored to behavioral differences of students based on age and possibilities of direct communication (through classrooms) or indirect communication (through the use of digital technologies of communication) with the professor. Strategies are further tailored to modern forms of education (teaching, learning and assessment) which may include virtual classes, Web-based training, etc.

An e-Learning platform is a software environment available through the internet and which restricts the access to its internal operations. This is achieved through assigning of usernames and passwords, where every user has access to different functionality features of the system depending on the rights assigned by the administrator.

An e-Learning platform can be better or less functional depending on its component hardware and software (servers, networks, internet connections, operational systems, administration of databases, web applications, etc.). In this context it is a software product designed for ultimate user (student, tutor, didactic staff or program administrator).

3.1 AeL Platform for University Distance Learning

The Well-known system of e-Learning AeL developed by SIVICO Romania “(<http://www.advancedelearning.com>, <http://www.siveco.ro>)” that is accessible on the corporate site of SUM at <http://siveco.usm.md:81> is used in all schools and lyceums in Romania, in over 60 schools in Republic of Moldova and in some other countries. This system allows the electronic synchronous, asynchronous and open distance teaching and instruction and includes knowledge assessment system. This product can be applied at any level (undergraduate, graduate and post-university degrees) and is suitable for all forms of instruction (full time or part time university studies, distance learning). AeL can quickly and objectively assess students’ knowledge, provide feedback to students on their performance, it offers corrective activities, guides and assists in better absorption of the studied materials.

It should be noted however that while AeL operates sufficiently well within the local networks, it is not so effective for distance learning operating through the Internet, even at the speed of 100 Mbps, sustained by the network. This is possibly due to the weakness in settlements or weaknesses of design, etc. The supplier from who SUM acquired the AeL platform could not satisfactorily resolve this problem during the one year duration of the pilot project. As a result of our experimental test runs we came to an assumption that the problem arises due to the design issues, however this is a separate discussion altogether.

Among the other shortcomings that limit the efficient use of the AeL platform for carrying out higher education e-Learning is the system’s poor documentation and insufficient support by the developer and distributor of the product, who is mainly concerned with different issues and does not have enough interest in the successful implementation of this product for graduate and post-graduate university education processes. Another issue was unsatisfactory test runs of the system in the distance learning mode through the Internet. AeL’s success for schools and colleges is rather supported by the teaching content offered within the product, as opposed to the functionality of the platform.

Several universities in Romania and SUM, have not been successful in implementing this system for their formal distance learning programs, abandoning the system after few years of pilot operation. This situation might change in the future.

3.2 Moodle platform for university distance learning.

From the performance point of view Moodle “(<http://www.docs.moodle.org/>)” is one of the most powerful and most commonly used open platforms for e-Learning. This

platform is being currently implemented at SUM, including being tailored in order to suit the processes of teaching and assessments of students for both distance learning and traditional methods of full-time graduate degree studies. (please refer to <http://moodle.usm.md> for more details).

Moodle platform is a software of the 'open-source' category, which constitutes a considerable advantage. Based on delivery, development, access, etc this system is considered to be substantially different from that of the AeL platform. The teacher creates all processes necessary for studying a subject (study unit contents, practical exercises, lectures, tests, supporting materials for student's information, etc). Students can then take over the whole educational activity and work through the materials in the independent mode, including going through lectures, practicing the exercises at the agreed timing (activities can be planned for particular calendar days), then the feedback is provided to the student as to how well he/she scored in a particular activity.

This system does not include libraries of lectures or tests, unlike AeL, however, it has a powerful engine for generating the assessment tests with numerous types of questions. The lack of lecture and test libraries is compensated by the fact that in the present market one can find educational materials of the content that's more diversified and tailored than that available through AeL libraries, the content of which is predominantly oriented towards college study subjects.

The Import-export functionality of the digital educational resources in Moodle is of a higher quality and ensures compatibility with different formats (GIFT, TXT, XML) as well as with isolated systems for e-testing. These features ultimately allow significant time savings for the professors – authors of study units contents or questions for tests. Tests can be built in a very flexible manner. The same test might include different categories of questions with different degrees of difficulty. Access to study units may be restricted by passwords and keys.

After registration and enrollment students gain access to methodological and didactical materials recommended by the responsible course administrator, which can all be downloaded and studied at their own pace at home, or at their work place, or at other places with the access to the Internet, as well as in the specially organised computer rooms at the educational institution. Students have the opportunity to link to or make an appointment for a consultation with a particular tutor, and tutors have the possibility of inviting students for tutorials and individual consultations, or group discussions in the form of forums, chat rooms, etc. Consultations and tutorials can be organised in groups or individually, online or offline in accordance with the adopted decisions, solutions and schedules. After obtaining the materials, students have the opportunity to sign up for the final examinations, individual work, training and practice work based on the approved timetable schedule.

4. Web-site <http://idd.usm.md>

As part of the project the web-site has been created with the main purpose of it being to meet the growing needs of our society in efficient education by simplifying and extending the access to educational distance learning resources.

The objectives of this web-site are as follows:

1. Simplification and extension of access to university graduate and post graduate degrees delivered through ODL;
2. Advertising and promotion of ODL in Republic of Moldova;
3. Creating a virtual community for reflecting the best practices and for exchange of experience with respect to organizing and carrying out of ODL, including benchmark conditions, methodical and teaching recommendations, methodological support for authors creating digital educational resources aimed at supporting the ODL process, supporting managers and students participating in ODL;

Generally the site audience includes people who are older than 17 -18 years who have graduated from high school or lyceum: students, trainees, workers who are looking for self-education or wish to obtain a second degree, etc.

5. Conclusions

Presently one can evidence a steady development of educational systems based on ICT. There exist numerous solutions and copyrighted platforms (such as AeL, Prometheus, Hipermethod etc.) as well as the open platforms, of which Moodle is used the most.

The following questions generally require to be addressed when selecting a platform. What is the best way to select the most efficient solution for a specific utilization mode? What should be the principal criteria for selection? What are the risks?

Some of the relevant aspects that have been compared between the two e-Learning platforms tested as part of the the pilot project at the SUM and where Moodle scored better than AeL were as follows: platform is open source, it allows operations export / import for the tests of different formats, allows to plan actions (lectures) which students can access on particular dates, allows project work as a team, allows discussions, meetings and consultations in real time in through 'chat' tool.

Experimental test runs have been performed by a group of professors-authors of study units content and tutors for a period of one year for AeL platform and a several months for Moodle platform. As a result of test runs SUM decided to utilize Moodle. The decision was made by reference to the following features of Moodle:

1. **Scalability.** Allows easy expansion of infrastructure in proportion to increasing subdivisions, participants and educational resources, similar to AeL.
2. **Robustness.** Stability, availability and security are better ensured in Moodle compared to AeL. In exceptional cases or refusals Moodle, unlike AeL does not require the intervention of the author.
3. **Ease of use/operation.** Both platforms incorporate new technology and are multifunctional, have a simple and user-friendly interface, which practically does not require additional training for users who are already using Windows or Linux, with support of the Wizard type for the complex functions with contextual help incorporated. But after surveys of teachers and students participating in the test runs of both platforms the majority of the survey respondents preferred Moodle.
4. **The time needed to implement.** Moodle allows for fast implementation of the computer aided teaching, including distance learning. It allows to for easier recoupment

of the invested funds, which boils down to the development of educational resources and operating the system. AeL has an additional high cost of acquisition and maintenance, compared to Moodle, which is free.

5. Reliability. Moodle has better reliability and operational speed that is constant with the number of users simultaneously working in the system. Moodle has a better quality support services that are cheaper compared to that of AeL. Dead / idle time occurred while testing AeL diminishing its effective use, this implied additional costs for launching the back up versions of programmed evaluations. No such occurrences happened during test runs of Moodle. That said, the As the number of tests performed on AeL was significantly higher.

6. Security. In addition to limiting unauthorized access and unauthorized copying, and securing against intentional or non-intentional destruction, both systems prevent access to items and tests, or populations of items from which self-testing and other testing exercises may be generated. However, Moodle has an advantage of allowing automatic mixing of order of the responses in multiple choice questions, which makes unauthorized copying or memorizing the answers in order to transfer information outside the test environment more difficult.

7. Administration and configuration. Both platforms allow centralised administration and configuration from the distance without administrators, managers or system engineers needing to move between each personal computer user. Other administration features are similar in both platforms. However, AeL charges additional fees on top of costs of supplier of the platform as well as additional fees for assistance.

8. Access to support. Ease and speed of installation and easy access to support for Moodle platform are internationally recognised. Being widely used platform Moodle develops much faster than AeL with operational costs being much lower. Forum on Moodle allows exchanging the experience and resolving problems quite efficiently. There are a larger number of Moodle users and specialists, which are available for the exchange of experience and developed resources, than that of the AeL platform..

AeL platform was found to be better utilized for computer-assisted teaching in local virtual classes, which are based on local performance networks.

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- Rosca I. Gh. and, Zamfir G. (2002): *Informatics Training*. Bucuresti (Eds).

Scientific Reports:

- 08.815.08.04A project (2008). *Development and application of innovative methods in distance learning*. SUM, Chisinau.

Web-resources:

- AeL, official documentation <http://www.advancedelearning.com>; <http://www.siveco.ro>
- Moodle, official documentation, <http://docs.moodle.org/>