

The art of teaching and learning online

Cristina Pop, Vasile Cornita

Abstract

Good coaching or moderation of online courses by teachers, trainers and experts is often a critical success factor of e-Learning, especially when working with groups, who are new to computer technologies and online learning. E-Learning combines education with the medium internet used to impart knowledge. Principal components of online learning programs are contents in the form of texts, pictures, animations, audio and video sequences. The access to the course contents can take place without any time or regional limit and the learner can study with the help of the computer at his work place or even at home. As the contents are dynamic they can be combined optionally and can get updated easily, too. Via communication services like e-mail, chat or forums the learner can communicate with the teacher and also with other learners. Computer, information, and communication technologies certainly play a major role and are a basic requirement for e-Learning.

1 Introduction

This paper examines how online learning is changing the traditional forms of teaching used in education. It is argued that, if managed correctly, online learning methods can add value to traditional face-to-face methods and provide opportunities for reducing some of the weaknesses of traditional teaching methods. Online learning takes on its forms, structures and discourse, in the same way as traditional classroom-based and face-to-face learning. What is fundamentally different is the nature of the medium and its added dimensions in time and place. The change of medium offers new opportunities to move some of the contemporary and the traditional approaches towards learning in more interesting and efficient ways.

2 General aspects of e-Education, e-Teacher, and e-Learning

E-Education involves e-teaching and e-learning along with the various administrative and strategic measures needed to support teaching and learning in an Internet environment. It will incorporate a local, regional, national and international view of education. E-teachers are the new generation of

teachers who will work in an Internet environment in both regular and virtual classroom situations. They will build new concepts of working in time and space. E-teachers collaborate, build and discover new learning communities and explore resources as they interact with information, materials and ideas with their students and colleagues. E-learning is learning which takes place as a result of experiences and interaction in an Internet environment. It is not restricted to a regular school day and can take place in a variety of locations including home, school and community locations e.g. libraries, cafes etc. An effective e-learning strategy must be more than the technology itself and the content it carries. E-learning is flexible learning using Internet resources, tools and applications, and focusing on interaction among teachers, learners, and the online environment and on collaborative learning.

3 Advantages of e-Learning

The target group for the e-Learning is represented by scholarships and students. They need to accumulate a large variety of knowledge, to learn how to think, to connect all school value with the life reality, to transform the theory into practice and so on. For this reasons, the e-content prepared to be delivered by IT&C infrastructure, designed for self learning or assisted by the teacher, has to be in full accordance with the didactical and pedagogical principles.

- Students participate from a variety of locations and may "attend" multiple learning institutions and/or their local school.
- Students may determine the times when they access e-learning opportunities.
- Students can choose to work individually or collaboratively with people who may or may not be in their regular class.
- Classes may be synchronous or asynchronous.
- Students may take classes from more than one school.
- Students may set their own objectives and explore their own learning needs and agendas.
- Students can follow a non-linear path at a pace that meets their individual needs at that time, i.e. just-in-time learning. The teacher is facilitating the activity
- E-teachers can work in more than one school.
- Students can proceed at their own pace
- Students can replay audio lectures or video clips
- Slower students do not slow down their classmates

4 Comparative analysis of the most popular elearning systems

This paragraph presents some advantages and disadvantages of the most popular elearning systems. Geoplan-Geospace is a 2D and 3D interactive geometry software to create and manipulate interactive figures for eLearning. It features euclidean geometry objects (lines, circles), numerical functions, numerical sequences, geometrical transformations. Geoplan-Geospace is a mathematical software which is dedicated to math-teaching/learning from primary school level up to University. Its new multilingual interface is particularly adapted to international exchanges and to English-speaking schools. Geoplan-Geospace is the result of over ten years of a work led by a team of math-teachers and didacticians, and has become a standard in French educational system. Geoplan-Geospace offers an opportunity to produce and manipulate numerical and geometrical objects in plane as well as in space. Geoplan-Geospace is a software for mathematical constructions that allows dynamic and interactive representations. Another eLearning system for mathematics is WMI (WebMathematics Interactive). WMI is an open web-based eLearning system for grammar school and/or university students, including basic mathematical functions (equation solving, function plotting) and thematic modules. It is like a computer algebra system, but with an easy accessibility on the web and support for educational purposes.[7]

Interact is a platform for the delivery and support of online learning. It differs from many other elearning platforms in that its aim is to concentrate on the social/interactive aspects of teaching and learning. It is an open source online community environment designed with the intention of making it easy for people to interact online, based around constructivist views of learning. The key advantage of Interact is the ability to structure a learning space the way you want it, rather than being stuck with a predefined separation of content and interaction. The user starts off with a blank slate and can build their space up anyway they see fit using a selection of 'Components'. There is no preset structure that forces the user into any particular pedagogy. Interact is a flexible, open source, online learning and community management environment. It can be used as a full intranet/portal as well as an online community environment. Features include a user-centred interface that works on most browsers, and powerful, feature-rich, interactive content and multimedia components for creating new and dynamic online experiences. In essence this means that people learn best as they interact and engage with others. With Interact, use of discussion forums, blogs, and sharing areas mean that communication occurs frequently between members. Interact is committed to providing tools that encourage and facilitate online collaboration and interaction.

V-MAP is a visual mapping tool for generating ePortfolios for Personal Development Plans, implemented on the Java platform. It is a project funded by JISC as part of their eLearning tools initiative. The objectives of the project are to:

- Enable the learner to interact with a pre-defined institutional template for preparing e Portfolios in a format that is most accessible to the learner;
- Enable the learner to plan, construct and update an e Portfolio through the use of a visual mapping interface, on their own personal desktop;
- Enable the learner to share, publish and disseminate an e Portfolio through the use of a visual mapping interface, to their institutional system.

Dokeos is an elearning and course management web application (LMS), translated in 34 languages, already helping thousands of organisations worldwide to manage learning and collaboration activities. It has many tools, is light and flexible, and free software. Advantages of Dokeos system: [7]

- SCORM is the norm for e-learning content import/export. Most professional courses today are delivered as SCORM packages.
- Convert a Powerpoint or Openoffice slideshow into an online SCORM course, add audio on the slides and tests between the slides.
- Build web pages with diagrams, animations, video, audio etc. in an online editor relying on templates and media galleries.
- Multiple choice, fill-in-the-gaps, open question, hotspot, choose the type of question in accordance to the competence to assess.
- Assemble multimedia content, tests and interaction activities into a SCORM learning path and get accurate reporting on completion, time and score step by step.
- Import all types of documents into the course and organize the info using folders and sub-folders.
- Register users individually or by groups in the system and in the courses through the Dokeos administration panel.
- Manage groups of users and associate them to courses in time-based sessions under the supervision of a coach.
- Teach or meet remotely live using audio and video duplex + a whiteboard and a shared presentation.

5 Proposed architecture of an advanced e-learning framework

The general architecture of the proposed e-learning framework uses a typical 3 layered software architecture. The main responsibilities of server include learning modules storage on a pertaining web server and delivery of e-learning data content on client software application request. The remote client application sends requests to Server and snapshots with student actions on predefined time intervals set by the trainer. For a particular client request, the server decides on and takes the appropriate action.

This can be represented graphically as below:

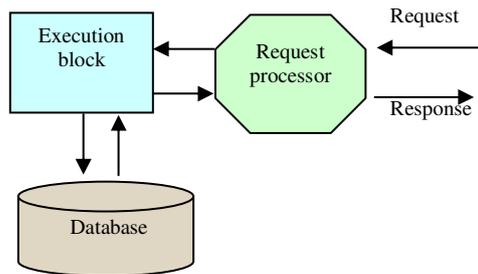


Fig.1. e-Learning server general architecture

The main functions of each block are explained below:

- Request processor takes as input a request and interprets it. After all request characteristics have been determined, it is up to the execution block to act appropriately.
- Execution block communicates with both the request processor and the e-learning Database content in order to execute the client request. It must be mentioned that this layer executes when the request characteristics have been determined by the request processor layer and only then.

Both, requests and responses can take message or file transfer forms, depending on the specific context.

A simplified graphical representation of the Client application architecture is depicted below:

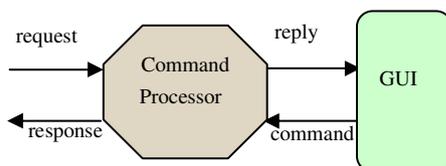


Fig.2. Client software application general architecture

As it can be easily seen, all that happens is driven by user commands, making use of a well-designed graphical user interface. The command processor is a logical entity that transforms client requests into an appropriate format for the server to understand and process, including here http request to the web server contained by the e-Learning server. All these requests are transported between client and the server encapsulated in a general request type, this ensuring both, flexibility and extensibility for the request transport level. The communication mechanism between client and server uses both messages and files. The data interchange operation is realized via file transfer making use of standard XML language. Also, when a client request a connection to the e-Learning server a user and password has to be provided in order to fulfil the connection. For each user predefined settings can be set by the corresponding teacher such as lessons to attend, obtained marks, to ensure a controlled learning environment, but leaving in the same time the learner the possibility to advance in his own way.

The novelty of this proposed architecture is that web content is delivered via an graphical user interface that is capable both , of visualization of e-learning data from server and of server monitoring of user actions like intervals between mouse clicks on different e-learning content, navigation tree and verification questions via which the e-learning server is capable of deciding which level of e-learning content to deliver on subsequent lessons as well as giving the monitoring teacher the possibility to visualize the attention given to a specific lesson by a group of student.

For implementing the web Server part of the proposed e-Learning server and connecting Client software applications general programming books [8] [9], C++ programming books [10] [11], and socket programming books [12] [13] have been used.

6 Conclusions

Online learning is the solution for people who want to gain education but don't have time to go to school. The infusion of the ICT in the educational systems, at different levels and different forms, as a possible solution for identified problems, became familiar. But use of ICT in the educational landscape assembled a lot of other questions marks concerning the educational value of this use in terms of learning quality. Instruction appears to be a complex matter and simple “look and feel” in front of computer does not signify learning and/or teaching. The literature focused on ICT use in education report its benefits in enhancing aspects of the teaching/learning processes. But those benefits are not only the result of putting a student in front of a computer. The computer must provide a learning environment, a space where learning process is enhanced in some aspects of teaching process are also included. The aim is to provide an overview concerning the development of the learning environments provided true computers, emphasizing the design phase that has the most important role in the prediction of the learning quality.

References

- [1] Maggi Savin-Baden, *Problem-based learning online*, Open University Press 2006, pp. 121-132.
- [2] Shirley Bach, Phillip Hayness, Jennifer Lewis Smith, *Online learning and teaching in higher education*, Open University Press 2007, pp. 180-191.
- [3] Sorin-Aurel Moraru, *Preparatory Module Course*, Lux Libris 2004, pp. 112-117.
- [4] Doina Fotache, *Groupware. Metode, tehnici si tehnologii pentru grupuri de lucru*, Polirom 2002, pp. 78-82.
- [5] Mihaela Brut, *Instrumente pentru e-learning. Ghidul informatic al profesorului modern*, Polirom 2006, pp. 110-115.
- [6] Implementation of *Education and Training 2010* work programme, European Commision Directorate General for Education and Culture.
- [7] <http://sourceforge.net>
- [8] Thomas H. Cormen, Charles E. Leiserson, Ronald R. Rivest (2001). Introduction to algorithms, 2nd edition, The MIT Press.
- [9] Anthony Jones, Jim Ohlund (2002). Network Programming for Microsoft Windows, Microsoft Press.
- [10] Shaharuddin Salleh, Albert Y. Zomaya, Sakhinah A. Bakar (2007). Computing for Numerical Methods Using Visual C++, 1st edition.
- [11] Bjarne Stroustrup (2000). The C++ Programming Language: Special Edition, 3rd Edition.
- [12] Dave Roberts. Developing for the Internet with WinSock, Bk&CD-Rom edition, Coriolis Group Books.
- [13] Jeffrey Richter, Christophe Nasarre (2007). Windows via C/C++ (Pro - Developer), 1st edition.

Cristina Pop
Academy of Economic Studies of Bucharest
Faculty of Cybernetics, Statistics and Informatics
Calea Dorobantilor 15-17, Sector 1
ROMANIA
E-mail: cristinel19@yahoo.com

Vasile Cornita
University Politehnica of Bucharest
Faculty of Electronics, Telecommunications and Information
Technology
B-dul Iuliu Maniu 1-3, Sector 6
ROMANIA
E-mail: cornita_vasile@yahoo.com