A DYNAMIC ENVIRONMENT FOR DISTANCE LEARNING

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Abstract: Research was conducted concerning Learning Management Systems (LMS) resulting in 'Moodle' being an efficient tool in dynamic distance learning environment. The fact that Moodle is an open source program allows the programmer to modify and extend it thus provide the possibility to develop a chat module that allows online communication in real time. Chat is in 'question - answer' form. The characteristic of this module is a virtual user. This user will be used in future development, in relation with data mining technology, in order to answer to students' questions. In addition, wikis was embedded into the system due to their wide range of implementations in education. Both types of wikis, closed and open, were included into the system. 'MediaWiki' was used in order to create the open wiki. Additional tools involved in the environment enable users to upload files, create quizzes, forums, calendar, questionnaires and more, aiming to the creation of a dynamic environment of distance learning. Regarding the dynamic environment developed, the program was tested in a high school as a tool, in terms of asynchronous learning environment, in order to ensure that is functional and easy to use.

1 INTRODUCTION

The kind of education, which incorporates various means of communication like mail, e-mail, video, computers and many others, is called "distance learning". This form of education does not require the physical presence of the students in a specific space in order to conduct the lesson. Instead, in distance learning the communication between the teacher and the student is very brief and in many cases there is none.

In our days, in order distance learning to work, the personal computer and the use of the internet is essential, that is why some times the term "distance learning" is mixed with terms such as "e-learning", "computer assisted learning", "online learning", "online education" and "web based education".

There are two types of distance learning, the synchronous and the asynchronous (Gregory, 2003). In the first type, the education process is in real time. The student watches the lesson at the same time but at a different place. Characteristic examples are: video conferencing, telephone, chat, web conferencing and web based VoIP

In the second method, the lesson takes place both at a different time and place. The student can watch the lesson in a totally different time with that of the presentation via mail, email, printed material, CD-ROM, DVD and other.

In many cases these two forms of distance learning can be combined. This way, the opportunity is given to the student follow his own pace of learning and at the same time with the synchronous distance learning a chance is given for interpersonal and communicational skills between the teacher and the student to be created.

In several occasions, education management systems are used in order to electronically record files, reports and others, as well as for registration of teachers and students in classes. They are also used by many other educational institutions, as an extra tool of enhancing their lesson procedure. Most education management systems, in order to make the access to educational material and its management easier, are internet based. Nevertheless, there is a differentiation of the platform on which the lessons deploy, depending on the system. There systems such as Moodle and Atutor that have been activated with PHP and MySQL while others have been activated with ASP.NET and MSSQL Server. Similarly, there are systems that are open coded and others that are not.

Some of the most known Learning Management Systems and their websites are:

- Atutor (http://www.atutor.ca)
- Moodle (http://moodle.org/)
- Claroline (http://www.claroline.net/)
- Dokeos (http://www.dokeos.com/)

- ILIAS (http://www.ilias.de/)
- JoomlaLMS (http://www.joomlalms.com/)
- Desire2Learn (http://www.desire2learn.com/)

The term wikis concerns wiki websites or software used to create this type of websites. Wiki websites are a collection of interconnected documents and files (McKiernan, 2005), to which a person has free access and can process them with the simple help of a browser. This means that the readers of a wiki webpage have the ability to process and modify existing wiki web pages and also to create new ones. Wiki software is the tool that gives its users the ability to create their own webpage through the internet.

Wikis are divided in three categories, public, private and hybrid (Klobas, 2006). In the first category, access is free for everyone and they can all read and process these wiki web pages. In the second category, access is limited to specific groups of people.

2 TOOLS

Moodle (Modular Object-Oriented Dynamic Learning Environment) constitutes a free software (open source) of education management system. It was created by Martin Dougiamas who in the past was the manager of WebCT. It was designed with the purpose to manage the education activities and it is mostly used for the needs of asynchronous distance learning.

Moodle can be installed in Unix, Linux, Windows, Mac OS X, NetWare environment and in any other operational system that supports PHP. The data are stored in a SQL database. It is better combined with MySQL or PostgreSQL but can also be used with Oracle, IBM DB2, Microsoft SQL Server. 1.9.4+ Moodle edition was installed in 'D.A.Lab. server' of Democritus University of Thrace at: http://dalab.ee.duth.gr/~schatzi/moodle/

Moodle provides a useful environment which gives teachers the ability to create a website for their lessons. Moodle has been chosen basically because of its open source nature, which supports modification and expansion of the system according to the user needs. Thus, in relation with Moodle, users are distinguished to admin, teacher, student and guest depending on the roles, the provided tools are differentiated. All the enrolled users can have access to this site. In order for this lesson to be functional and more dynamic Moodle provides a variety of tools. According to Uzunboylu et. al., (2006), some basic characteristics of the system are:
Discussion Forums: The messages may enclose attachments of pictures or web addresses. For the creation of the messages a text writer is used with tools similar with those of Microsoft word. The students can receive the synopsis of the discussion messages via web mail, on a daily basis.
File Sharing: Students can submit their assignments electronically.
E-Mail: Students must have an external email address.
Chat: It provides a discussion tool, which supports the images. It creates history files for the teachers, which can be shared with the students. Students are able to see who else, from their department, is online. Teachers can manage the discussion by using the department calendar as well.
Help: Context sensitive help where users can have access.
Group work: Teachers can create groups.
Student Community Building: Moodle, on the main page has a large community of users.
Eschool was implemented with Moodle, since the latter was primarily developed for distance learning needs exclusively for schools.
Other than moodle in 'D.A.Lab. server' an edition of 'MediaWiki 1.14.0' program was installed.
The name is 'Eschool wiki' its relevant website is: http://dalab.ee.duth.gr/~schatzi/mediawiki/.
The open code software MediaWiki which is written in PHP, is a software used to create wiki pages. Wikipedia is an example of such application.

3 IMPLEMENTATION

The distance learning environment that was created is called Eschool. It is created as a tool for asynchronous distance learning with the purpose to enhance the learning ability of the students.

The main page of the implementation (figure1), displays the list of the lessons in its central part. To the right a calendar is displayed right below the search tool of the E-school wiki library. At the bottom of the page links are provided addressing to other web sites as well as links providing information and contact details relevant to Eschool. The environment of Eschool is multilingual so the user has the choice between English or Greek
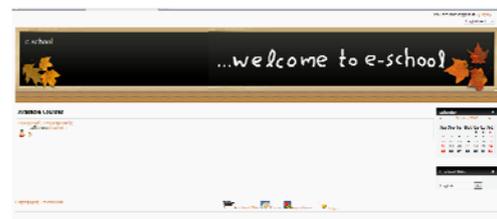

Figure 1: Eschool main page.

language, the environment can be easily subjected to modifications with the potential to add more languages. The user can also choose the "login" link in order to enter the system after typing his username and password. After entering the system, the menu of the web page appears which depending on the user's rights it differentiates. Specifically, there are four types of users: administrator, teacher, student and guest. At first the lesson "Computing applications" was created as well as accounts for students and teachers. This particular lesson is taught in the fourth year of all the high schools in Greece. Twelve thematic units have been created that match the chapters of lesson's book. The teacher can add material to the lesson such as text files, presentations, questionnaires, wiki pages, exercises, assignments, voting, forums, chats and others.

Specifically, text files are added to the lesson as well as presentation files, relevant to the material of the book chapters. Questions were created and used in an exercise, the types of which were multiple choices and can vary. "Exercise 1" is displayed as an activity in the lesson. Student has the ability to project and solve the exercise. The teacher can check

which students worked on the exercise and at what point did they find the answers. Furthermore an assignment was put together for file uploading which was displayed in the first chapter of the lesson as well as in the list of assignments. Students can read the subject of the assignment and can send their file electronically after its completion. Grades can be displayed for each assignment.

Beside the assignments and exercises the teacher has the ability to display news and announcements to the lesson and also add facts to the calendar. The students can also take part in electronic voting and watch the results at the end. The teachers can create a forum by entering a discussion topic. The user can create wiki pages that can be displayed in a list and also individually. For every thematic unit of the lesson there is also chat tool. The tool displays which users are connected through a list from which a user can choose someone for conversation, a virtual user seems to be constantly connected in order to be used for further studies in the future.

At the same time, the Eschool wiki was created, which is a public wiki where articles and material concerning lessons of high school education can be published. At the main page of the application some categories are created for a possible future attachments of articles related to them.

The main page of the environment involves the navigation menu, the search tool and the tool menu that are projected at the left. At the center of the page, the index of the article/page is projected and at the upper section, the option of "Discussion", "Edit" and "History" are given, which concern the current

article of the page. To the upper right, the choice "Create Account/Login" transfers the user to the login page where, in case of a registered user, can register username and password. Otherwise, just choosing "Create an account" and typing his personal data on the appearing page can register him.

4 TESTING AND RESULTS

The Eschool distance learning program was applied in real conditions, in order to gain information regarding its efficiency and functionality. Specifically, the application took place at a high school of Greece (Lyceum of Iasmos). The dynamic environment of distance learning was implemented during the lesson in terms of asynchronous distance learning in order to enhance the teaching process, students were gradually familiarised with the application so that in the future this application will be incorporated in their school.

In this application two questionnaires were created, in order to be answered by students. The application was complete in three stages. In the first stage, a visit took place at the computer laboratory of the school, and lasted for two hours. During the first hour, there was a briefing about the program and the students experimented with the application so that they would be familiarized with it. After that, they worked on some of the tools this program has to offer, such as: reading wiki articles from the incorporated Eschool wiki library, reading lesson material, participation in voting and finally completing a questionnaire concerning the Eschool environment. During the second hour, the students used the chat tool of the application. The chat had the form of question-answer. Every student had the ability to exchange knowledge with one or many students. The purpose of this chat was to record data to the database, which will be used for future studies. At the end of the school hour, filled a questionnaire regarding the subject of the chat.

During the second and third stage, there were two more visits to the school in different time of period. The students that took part, were asked to use, exclusively, the conversation tool, because the purpose was the enrichment of the database. It should be pointed out, that the students that were chosen for this part were the students from the previous session, since they were already familiarized with the application.

The students used all the tools of the application with success and without facing any difficulties. The chat tool draws their attention and expressed their enthusiasm during its use.

5 FUTURE DEVELOPMENT

As Vygotsky (1978) pointed out, "in a collaborative scenario, students interchange their ideas for coordinating when they working for reaching common goals. When dilemmas arise, the discussion process involves them in learning". According to Juan et. al., (2009), when the learners work in groups they reflect upon their ideas (and those of their colleagues'), explain their opinions, consider and discuss those of others, and as a result, learn. In this way, each learner acquires individual knowledge from the collaborative interaction. As the importance of collaborative learning is widely accepted in learning theorists, implementation of collaborative learning in Learning Management Systems (LMSs) arises as of crucial interest. The three basic factors in collaborative learning are: the tutor, the learner and his/her co learner. The role of the late is crucial. Many students emerge from basic science courses with inabilities to apply the scientific concepts or principles that they ostensibly learned, with significant misconceptions, and with poor problem solving abilities. They need to, and they use to address questions and so they expect to get answers. Tutors respond to their questions with accuracy and their responses are also characterized for their educational value. This is not the case when the learner addresses questions to his co learner. A co learner responds inaccurately and in many cases gives fault answers. Even so, the presence of a co learner is meaningful. Aim in future studies is to expand chat module in order to transform virtual user, using data mining algorithms, into a virtual co learner. The goal of building a computerized Simulated Student (VanLehn et al. 1994) is to facilitate the learner's own efforts at learning by employing cooperative learning techniques.

6 CONCLUSIONS

As mentioned before, Moodle is an efficient tool in dynamic distance learning environment. Its main characteristic is its open source nature which gives the opportunity to the programmer to expand, modify and adjust it to a particular case in order to cope successfully with the user needs analysis. The extra chat module that has been developed - allowing online communication in real time - is a robust example of system's flexibility. In future studies, chat tool can be enhanced, so as a virtual user to become a virtual co learner, being able to answer automatically to student's questions.

In addition, the system could easily connect with an external page such as Eschool wiki. This can be done either by following a simple link or through a search engine that has been placed in the main page of Eschool. Both types of wikis, closed and open, were included into the system.

Moodle is an application which is easy to install and use, providing unlimited capabilities to its users. Eschool proved to be a useful tool in asynchronous distance learning for enhancing students learning abilities. The program was tested in a high school as a tool, in terms of asynchronous learning environment, in order to ensure that is functional and easy to use. Students faced some difficulties in adding wiki pages but could easily find and read the ones already created. Nevertheless, they found the whole idea of eschool charming and they felt enthusiastic in terms of future incorporation to their school teaching program.

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