DEVELOPING AN ADAPTIVE ASYNCHRONOUS E-LEARNING ENVIRONMENT IN MOODLE

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ABSTRACT

The utilization of asynchronous e-learning through Learning Management Systems (LMSs) is becoming extensively popular, and Moodle is one of those. Moodle has gain its popularity because of it being open-source at the same it has revolutionized the learning process by offering an advanced and user-friendly solution for encouraging collaborative work of students and teachers. Though the current state of the LMSs is already acceptable by many, still it has the lacking feature of not being adaptive to the pace of learning of the students. It still doesn't help students maximize their learning experience by providing them learning materials that are mainly based on their learning needs and performance. In short, the current state of the LMSs is instructor-directed and homogenous. Thus this study aimed to develop an adaptive learning environment in Moodle. This aimed to help students maximize their learning experience by providing them learning materials and tests that are based on their learning needs and performance.

Keywords:

<LMS, adaptive learning environment, Moodle, asynchronous learning>

Chapter 1

INTRODUCTION

1.1 Background of the Study

E-learning is the delivery of a learning, training, or education program by electronic means (*Derek Stockley, 2003*) with the use of network technologies, such as the internet, to create, foster, deliver, and facilitate learning (*CISCO Systems, 2007*). Over the years, the method of education through e-learning is becoming popular and practiced by a number of universities utilizing Learning Management Systems (LMSs) as its medium, slowly substituting the traditional learning method or commonly known as the instructor-student interaction inside a classroom.

There are two types of e-learning environment, the asynchronous e-learning and the synchronous e-learning (*Stefan Hrastinski, 2008*). Usually the asynchronous type of e-learning, a student directed and self-paced learning, is mostly utilized by many universities, which is why the proponents decided to delve more into the asynchronous e-learning environment with the utilization of learning management systems. In the asynchronous environment of e-learning, studying materials, activities and tests are provided via learning management systems by the instructor. However, the learning environment is limited to being homogenous, homogenous in the sense that materials of every learner who have access in a course have the same resource materials and same tests.

On another perspective, the learning environment of the current asynchronous e-learning is basically instructor-directed, mainly because resource materials, activities and tests are homogenous and could not provide the adequate learning experience to the

individual student's needs. The learning environment that the current LMSs provide doesn't help the students maximize their learning experience because of the incompatibility between the learning materials provided by the instructor and the needs of the student as an individual. Since the supposed focus of learning should be the students, thus learning experience and needs of the student are crucial. Learning needs assessment for each student should be evaluated frequently so that it would be based on the individual performance of each student.

1.2 Technology Application Context

The main focus of the proponents is to develop a learning environment that can help maximize the learning experience of students by providing studying materials, activities and tests that adapts to their individual learning needs and performance. In order for the current asynchronous learning management system to be more effective, it needs to focus beyond the pacing of the learner but content as well as assessment and remediation should also be customized based on an individual learner's performance.

Given that this study focuses on developing an adaptive learning environment, the technology that was utilized in this study by the proponents is a Learning Management System (LMS). The specific LMS that the proponents utilized in this study was Modular Object-Oriented Dynamic Learning Environment (MOODLE) and limited to the use of it. The proponents choose to utilize Moodle because of its popularity and being open-source. In this study, it is necessary for the proponents to study the existing operational design/framework of Moodle and implement some changes. Since Moodle has its existing libraries, the proponents utilized it to modify the existing code and design of the

learning environment in such a way that it is adaptive to each student.

With the utilization of the mentioned technology and to fill in the technology gap, this study will be able to help the student maximize their learning experience by providing them an adaptive learning environment which is basically based on their learning needs and performance. This application will be able to monitor the academic performance of the students at the same time provide students remediation of the learning materials that they need to master or to improve on. Indeed, this kind of approach can be considered a student-centered learning environment.

1.3 Objectives of the Study

The general objective of this research is to develop an adaptive asynchronous e-learning environment in Moodle.

The specific objectives are:

- To add functionalities in Moodle (e.g. hiding and viewing of needed remediation) by modifying the source code
- To structure the quiz module of Moodle to have an option of providing remediation to students who needs it
- To provide student performance assessment every after certain number of items specified by the teacher
- To use the Computer Programming 1 (CS111) subject of the Ateneo de Davao University as the sample course used in this study

1.4 Significance of the Study

This study will be significant to all who uses Moodle as learning management system; specifically to the:

Students: The system would provide them a better learning experience, for this learning environment would be adaptive on their performance and learning needs.

Teachers: Though this approach will somehow put more work for the teachers because they need to provide a lot of learning materials of three different levels (beginner, intermediate, advanced), however, it will be a lot easier for the teacher to track the improvement and performance of their students and ensure that learning is facilitated according to the specific needs of the learner.

1.5 Scope and Limitations of the Study

The scope of this research study focused on the development of an adaptive learning environment on Moodle as the utilized learning management system. This study has accomplished the tracking and monitoring of learner's performance and assesses students every after the number of items specified by the teacher. Also, this study is able to provide a remediation to the students who needs it every after the test that they took. The Moodle version that is used is 1.9 and the sample course that is used is Computer Programming 1 (CS111) of the Ateneo de Davao University.

1.6 Definition of Terms

Adaptive learning:

Provides content and services to meet individual or group learning needs with improved learning achievement and efficiency. (TrainingPlace.com, 2010)

Asynchronous learning:

Student-centered teaching method that uses online learning resources to facilitate information sharing outside the constraints of time and place among a network of people. (Madayas, 1997)

Bloom's Taxonomy:

A classification of learning objectives within education proposed by a committee of educators chaired by Benjamin Bloom which divides educational objectives into three domains: Cognitive, Affective and Psychomotor. Within the domains, learning at the higher levels is dependent on having attained prerequisite knowledge and skills at lower levels. (Bloom, 1994)

E-learning:

Compromises all forms of electronically supported learning and teaching. The information and communication systems, whether networked learning or not, serve as specific media to implement the learning process. (Tavangarian, et.al, 2004)

Learning Management System:

A software package, usually on a large scale, that enables the management and delivery of learning content and resources to students. (Oak Tree Systems, 1994)