An Integrated Architecture of ELearning System To Digitize The Learning Method

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Abstract-The purpose of this paper is to improve the e-learning system and digitize the learning method in the educational or learning sector. The learner will login into e-learning platform and easily access the digital content, the content is downloadable and teacher can take an assessment for evaluation. Learner can get access to these digital resources by using tablet, computer, and smart phone also. E-learning system can be defined as teaching and learning with the help of multimedia technologies and the internet by access to digital content. E-learning replacing the traditional education system through information and communication technology-based learning. This paper has designed and implemented integrated e-learning system architecture with University Management System. Moodle (Modular Object-Oriented Dynamic Learning Environment) is the best e-learning system, but the problem of Moodle has no school or university management system. In this research paper, we have considered the university students because they have the internet access and used to technologies. The University Management System has different types of activities such as student registration, account management, teacher information, semester registration, staff information, etc. If we integrated these types of activity or module with Moodle, then we can overcome the problem of Moodle, and it will enhance the e-learning system architecture which makes effective use of technology. This architecture will give the learner to easily access the resources of e-learning platform anytime or anywhere which digitizes the learning method.

Keywords-- Database, E-Learning, LMS, Moodle.

1. INTRODUCTION

Information technology for e-learning system plays an important role in distance learning education which delivered the digital content one or more individuals. There are many learning platform such as Blackboard, Moodle, Canvas etc. and Moodle is one the best eLearning platform that have been used worldwide popularity. The systems which involved the eLearning system also called Learning Management System (LMS) or Virtual Learning Environment (VLE) or sometimes also called Course Management System (CMS).Moodle is Pedagogical Platform which designed to help educators and content experts to design and develop online course content with opportunities for communication. The use of multimedia technologies and the Internet in
learning system to delivery of instruction, curricular materials, learning activities, improve accessibility, efficiency and quality of learning by facilitating access to digital resources (Text, Images, audio, video etc) and services as well as remote exchanges and collaboration. Kanak Sachan and Dr. Rajiv Singh [1] explain the proper and best learning platforms Moodle and Blackboard both of them are best virtual learning platform while Blackboard learning platform is commercial platform.Sheo Kumar, Anil Kumar Gankotiya, and Kamlesh Dutta [2] focused on the Moodle Architecture and comparative study of moodle with other e-learning systems. Annika Andersson and Åke Grönlund [3] propose a conceptual Framework on Challenges for e-learning in developed and developing countries. The framework is useful to guide both practice and research but they don’t provide any suggestion how to overcome these challenges. Herman Dwi Surjono [4] discusses the evaluation of an adaptive e-learning system based on student’s learning styles that has been developed using Moodle(LMS). Reuben Bryant Bremer, Dave [5] presents an evaluation of open source e-learning platforms with the aim of finding the most suitable platform for extending to an adaptive one (Moodle and Blackboard). Dr. Dharmendra Chourishi and Dr. Chanchal Kumar Buttan, Abhishek Chaurasia, Anita Soni [6] explore the implementation of effective e-learning through Moodle and also present the various facilities of Moodle. This paper is mainly focused on the integrated 3-layer system architecture of Learning Management System to digitize the learning method in educational or training sector.

II. OBJECTIVES
The Moodle Learning Management System is widely used by educators today. Learning management system is one of the flexible and powerful tools that used in educational sectors or institutes to facilitating learning and improving performance by creating online course, content uploading, assessment evaluation, managing appropriate technological processes and access to digital resources. Moodle is a great eLearning platform that has been designed to help teachers and learners for better communication as well as to remove the digital divide from our society and improve the teaching and learning method in a simple and easy way. The objectives of the proposed system architecture are digitizing the learning method and implementation of an integrated solution with University Management system and Learning Management System. The specific objectives of this paper are as follows:

- To digitizing the learning method in educational sectors or training institutes.
- Improve the E-learning system architecture to automate the learning environment.
- Easily access to the eLearning platform and resources.
- To remove the learning difficulties of traditional learning system.

II. METHODOLOGY
E-learning is the learning system using computer and internet to deliver of skills, share knowledge, accessing the digital resources. It is Web-based learning, computer-based learning and has the virtual classroom education opportunities also has the
communication options between learners and teachers. E-learning allows learners to both by synchronous and asynchronous learning methodologies. In this paper we have considered Asynchronous Methodology that provides the best concept of learning management system.

Synchronous Methodology: Synchronous e-learning methodology is the process of involving online learning through live chatting, mobile conversation and video conferencing. This type of learning process is real-time. Such as interactive virtual classroom (IVCR) where learners can ask questions to teacher and teachers will answer that questions or messaging. Synchronous learning is technology based and need high speed internet connections. It requires both learners and teacher to be online at the same time and also required a specific block of time that may or may not be convenient to the learner and teacher.

Asynchronous Methodology: It is a process of learning management system where learner and teacher can interact with each-other at any time using email, electronic mailing list, online discussion board etc. Asynchronous Methodology extremely flexible because learners can log on to an e-learning platform at anytime from anywhere and download the digital content or send messages to teachers or can join in discussion forum. In this method learners will learn at their own speed, learner can view the content convenient with many times, learner reflection, learner -to- learner interactions and also there has no limitation about download the content. The great advantages are that increase the responsibility of each learners.

III. EXPERIMENTAL DESIGN

This paper designed a 3-layer integrated System architecture of Moodle with University Management system to improve the e-Learning system. The architecture consists of user interface layer, application layer and data layer.

A) User Interface Layer: UI layer is the top level of 3-layer system architecture. In this layer user inputs the necessary data to the system using the browser and the output is displayed on his browser.

B) Application Layer: It is also called the middle tier, business logic tier. This layer controls application functionality by performing detailed processing of Moodle. In this layer online course will be created by Moodle administrator and content (audio, video, text, image etc.) will uploaded by teacher or administrator and also provide assignment (MCQ, Quiz, Short answer, Fill in the gaps etc.) to the learners. Finally assessment and evaluation will be performed by teacher. Learners can see the course content anytime, anywhere and downloaded it and many others activities. Learners, from all over the world, can take part in the training programs.

C) Data Layer: This layer get the data from the Application layer and send it to the database or retrieve the data from the database and send it to the Application layer. Here has two types of database one is Moodle database and another one is University Management system database.
IV. IMPLEMENTATION

To implement the proposed system architecture of eLearning system to digitize the learning methods so we have to consider the following steps:

A. Moodle (LMS) Installation

To install the Moodle need the requirements: Apache on Windows platforms, PHP Scripting language (version 5.6.3 or +), MySQL database/SQL Server, Windows server etc. Moodle has many data table. We have considered the user table for implementation of proposed architecture. The Moodle user table mainly stores the information of all users who are accessing the Moodle platform. The structure of Moodle user table is as follows:

B. University Management system Database

This is another application database which is University Management system. It has many functionality such as student admission, subject registration, account management, teacher information, staff information etc. These type of functionality will be integrate with Moodle database. Here are the database (ums) tables of University Management system including fields and data types are as follows:

C. Integration

Application integration is one kind of system which copying data or move transaction data from one application program to another application program. To integrated Moodle data with University Management system external database authentication method are used. We have followed the following steps:
1) The external database authentication methods uses an external database which is University Management system database.

2) There are many tables to this database. The student admission table stores the student information with student username, password, email, name, department, father name, mother name, date of birth, gender etc.

3) To perform this process select the external database hosting server with database type, database, database username, password and others required fields that will be insert into Moodle user table. There have some mandatory fields and optional fields which shows in figure 5.

4) If the user’s data is exist in Moodle user table then user can login into Moodle and if the user’s data is not exist in Moodle user table then he can also login into Moodle but data have to external database. After login into Moodle the data will copy from external database to Moodle database.

D. Implementation output

For implementation of proposed system architecture we have considered two different user tables from Moodle and University Management system database. Finally able to successfully integrated student information data between University Management system database and Moodle database. After login into Moodle the users Abdur Rahman, Adam smith, Saiful Islam etc. from University Management system appear in Moodle platform which are shown in following figure 6. Also shown when the user has last login into LMS. These users will get the access of learning management system and can update their profile.
V. DIGITIZE LEARNING

The traditional learning system forces students into a constrained schedule and learning delivery happens inside classroom setting with a teacher giving a lecture and students listening and writing notes. On the other hand in learning management system there has no constrained schedule of learning. Learners able to see their course catalog, course content, complete their assigned courses, evaluations and measure their own progress. They will login into the LMS and access the digital content from anywhere and anytime.

VI. CONCLUSION

Moodle is the world’s most popular, supported by global community of developers and most widely being used learning management system. Using Moodle there are a few problems and cons. This is, of course, because nothing can be perfect. The issue is that Moodle is not fully developed to cope with complete solution. That means the system might not work efficiently with complete automation of a school, college or university. Because Moodle has no student information, teacher information, accounts information etc. But if we can integrate these functionality with Moodle application then it will be fully automated eLearning system. That’s why we have design architecture and it will increase the efficiency and effectiveness of e-Learning system. To implement this system architecture there also has some technical challenges that we have faced such as software development and interface design, organizational challenges (Economy, Training of students and Teacher) etc. In future we will work for how to overcome these type challenges.

VII. REFERENCES

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VIII. BIOGRAPHY

Md. Touhidul Islam Sarker was born in Rangpur, Bangladesh in 1983. He is student of M.Sc. in Computer Science & Engineering at the University of Dhaka University of Engineering &Technology (DUET). His areas of interest and research are in the software architecture, software quality assurance, data mining and eLearning system. He currently works at Bangladesh Navy’s Information and Technology Department as a Programmer. He previously worked at Bangladesh Open University as an Assistant Programmer. Md. Sarker is Member of Bangladesh Computer Society.

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