A Blended Learning Framework using FOSS

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Abstract—*Blended learning refers to the combination of traditional face-to-face classroom teaching with online learning/e-learning. This paper demonstrates a framework for implementation of blended learning model using Free and Open Source Software(FOSS) in a cost effective way. We have studied different free and open source software/tool; their relative merits and demerits in real time application scenarios. In the proposed framework we have chosen Moodle as the Learning Management System(LMS) and GNU/Linux as the server platform. The aim of this paper is to give an abstract idea of the model so that any educational institute/university can apply the model irrespective of the courses for the learners.*

Keywords: *Blended learning, FOSS, moodle*

1. INTRODUCTION

Blended Learning (BL) refers to the integration of traditional face-to-face classroom teaching with online learning/e-learning. BL is part of the ongoing convergence of two archetypal learning environments. On the one hand, we have the traditional Face-to-Face(F2F) learning environment that has been around for centuries. On the other hand, we have distributed learning environments that have begun to grow and expand in exponential ways as new technologies have expanded the possibilities for distributed communication and interaction [1]. Now the question is how we can design a blended learning environment? Obviously, the main constraint is cost. Over recent years, an alternative trend based on Free Open Source Software (FOSS) has gained momentum in higher education due to several benefits such as cost, license management flexibility, access to source code, security and stability etc. [2]. In this paper, we have presented a framework for blended learning using free and open source software.

2. FRAMEWORK OF THE MODEL

The proposed model can be designed in two ways:

a) The system will work in a Local Area Network (LAN) where the e-resources will be uploaded by the teachers/instructors and the students can access it across the LAN.

b) The system will work in Wide Area Network (WAN) and the teachers and students will access it through Internet; thus providing 24 X 7 accessibility.
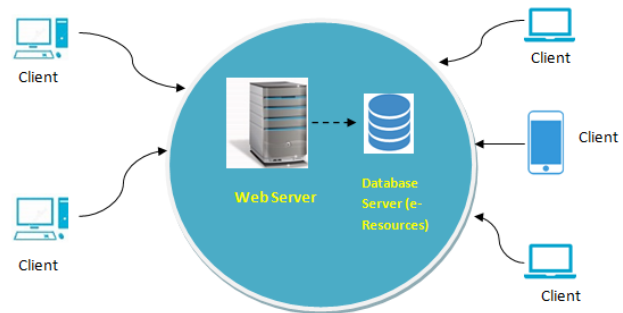

Fig. 1: Blended Learning Framework

3. IMPLEMENTATION WITH FOSS

To minimize the cost in the implementation of the model, we have studied different technologies. Firstly, in the server, any linux distribution versions can be used like Red Hat, Fedora, CentOS or Ubuntu as operating system. Secondly, in the server side we can use a Learning Management System (LMS).

A learning management system is a software application designed with the specific intent of assisting instructors in meeting their pedagogical goals of delivering learning content to students. [3]

The LMS can be proprietary software or free and open source software. Since our prime objective is to design the framework with minimum cost, here we will consider only the free and open source LMS only. We have studied the following LMS's:

OLAT (Online Learning and Training) is an Open Source LMS tailored to the needs of Universities and Higher Education institutions. OLAT is available in several languages and can provide diverse functionality in web-based learning and training. [4]

DOKEOS COMMUNITY EDITION is an open source elearning solution. It is the result of work by a large community bringing together hundreds of developers in more than 5 countries, as well as users and translators. This open source elearning solution is distributed in over 20 languages and 60 countries worldwide. [5]

eFront is designed to assist with the creation of online learning communities while offering various opportunities for collaboration and interaction through an icon-based user interface. The platform offers tools for content creation, tests building, assignments management, reporting, internal messaging, forum, chat, surveys, calendar and others. [6]

ATutor is a FREE Open Source LMS, used to develop online courses and create elearning content.

Moodle is the mostly used LMS all over the world. According to the Moodle website there are currently 62,629 registered sites in 222 countries with more than 78,260,765 users. It is written in PHP and the database is designed in mysql. [7]

After a rigorous study, we have identified that moodle is the best solution to be implemented in the framework as LMS. The followings are some of the benefits of the proposed framework:

a) Classes can be carried out in blended mode, whether in synchronous, asynchronous or both.

b) Teachers can upload various learning resources like doc, ppt, pdf and video tutorial files according to a particular lesson/topic.

c) Teachers can create classes and enroll students in a particular class.

d) Students can access the learning resources through username and password only.

e) Teachers can upload assignments for a lesson where students have to submit it online and then teacher can verify and give feedback to individual students.

f) Individual discussion forums can be added to each course where students and teachers can discuss some topics regarding a lesson asynchronously inside or outside the classroom.

g) Teachers can assign some group activity to the students.

h) Teachers can create online assessment test on some topics.

i) Teachers can monitor the activity and the learning graph of the students on a particular topic online over a period of time and depending of the knowledge gained by the students he/she can give feedback to the students online or in the classroom or in a blended way.

We have designed the framework in our institute for conducting the classes in a blended way. A HP Prolient machine is used as the application and the database server where CentOS 7 is used as the operating system. PHP 5.3 and mysql 5.5 are installed in the server. We have used moodle version 2.0 as the LMS in the server side. We have 2 computer laboratories of 80 computers in total and the server is connected with the computers in a LAN. We are successfully conducting all the theory and practical classes of MCA, MSc-

IT and PGDCA with the use of this framework. Now we are in the process of implementing this model where the server will be connected with a leased line and the application will be accessed by the students through Internet. Thus the teachers will be able to communicate with the students in the face to face classroom as well as outside the classroom 24 X 7. The latest versions of the moodle i.e. moodle 2.9 has introduced some new modules and plug-ins for better teaching/learning activities. Some mobile themes are also available in moodle 2.9 where through regular expressions, the application can automatically detect different mobile devices; thus mobile blended learning will come into reality. The following is a screenshot of the framework that has been used in our institute for blended learning. (Fig. 2)
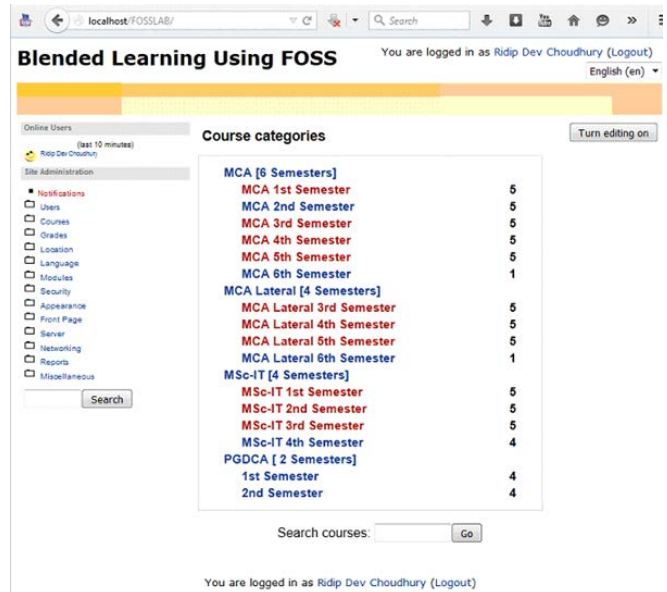

Fig. 2: Blended Learning using FOSS: A Prototype

4. CONCLUSION

In this paper, we have presented a framework for blended learning. Here free and open source software is used in the teaching/learning framework. We have studied different alternative solutions in the design of the framework. Based on the research work, we have designed three different types of prototypes on the framework for the experimental purpose. We have used Fedora, CentOS and Ubuntu as operating system and Efront, Atutor and Moodle as LMS. But we found moodle as the best solution to be implemented for the said framework.

5. ACKNOWLEDGEMENTS

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[7] https://moodle.org/