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Evaluation of An Open Source Learning Management System: Claroline

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Abstract

A Learning Management System (LMS) is a software package for delivering and managing course materials over the Internet and offering features for online collaboration. The LMS will provide the provision of on-line learning, on-line assessment and collaborative learning. A few of LMS were released under Open Source Software (OSS) license such as Claroline, Moodle and more. These LMS are totally free and very effective for e-learning. The main objective of this research is to evaluate subject being taught 'Routing Protocols and Concepts' using Open Source LMS at the Faculty of Computer and Mathematical Sciences (FSKM). The Routing Protocols and Concepts is a course offered for the Bachelor of Science (Hons) (Data Communication & Networking) students at FSKM. This research will focus on online Open Source LMS and we choose Claroline as our case study. The Claroline was released under Open Source license (GPL) version 2. The Claroline is compatible with GNU/Linux, Mac OS and Microsoft Windows. It is based on free technologies like PHP and MySQL. It allows hundreds of universities and schools to create and administer courses and collaboration spaces through the web. The platform is used in more than 80 countries and is available in more than 30 languages. At the end of this research, the results will be beneficial for universities and colleges in bringing OSS products and services that promote e-learning and online communities.

Keywords: Learning Management System (LMS); Open Source Software (OSS); E-learning; Claroline

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1. Introduction

A Learning Management System (LMS) is a software package that enables the management and delivery of learning content and resources to students. Most LMS systems are using web-base platform to facilitate "anytime, anywhere" access to learning content and administration. Most of the LMS application allows for student registration, the delivery and tracking of e-learning courses and content, and testing, and may also allow for the management of instructor-led training classes. The LMS also allow for learner self-service, facilitating self-enrollment, and access to courses. Generally LMS can be categorized into two categories which are Open Source LMS and proprietary LMS. The most popular Open Source LMS is Claroline that it is free. The advantage of OSS is that it is free and can be adapted and extended to meet one's own needs. More important, the advantage to educational institutes is that what they can obtain by applying OSS is to profile e-learning according to a clear vision of the educational methods one plans to apply. (de Vries, 2004) This research is to evaluate "Routing Protocols and Concepts" course using Open Source LMS at the Faculty of Computer and Mathematical Sciences (FSKM). The "Routing Protocols and Concepts" is a course offered for semester four (4) Bachelor of Science (Hons) (Data Communication & Networking) students at FSKM. This research will focus on the implementation of this online course based on the Open Source LMS, with Claroline as our case study.

2. Literature Review

According to Feller and Fitzgerald (2000), OSS refers to software that is developed, tested, or improved through public collaboration and distributed with the idea that it must be shared with others, ensuring open future collaboration. Open Source has emerged as a powerful new way to generate knowledge and economic value. It is available to anyone at usually little or no cost. It does not attract proprietary license fees and it may be freely redistributed. Users also have access to the source code revealing the inner workings of the software hence the term 'open source'. Such access has the potential to empower people in ways that Proprietary Software (PS) does not allow. OSS also offers users the choice to probe, modify, learn from and customize the software, harnessing the power of many small contributions from a large network of individuals, to suit their needs.

Currently, many Malaysian Universities are aware about the needs of using LMS as a tool to facilitate them in distributing materials to the student. Some of the LMS cost a lot of money to get the licenses for each student they want to provide. A lot of OSS LMS in a marketplace is very easy to manage and get. Many higher education institutes have or create their own Learning Content Management Systems, with the same characteristics and operating capacities as well known proprietary software. Administrations in the institute are likely to be concerned with quality and accessibility, as well as with cost and effectiveness. (Machado and Thompson, 2005)

Other benefits of Open Source LMS are; affordable software for individuals, enterprise and government, universal access through mass software rollout without costly licensing implication, ability to customize software to local languages and cultures, lowered barriers to entry for software businesses and participation in global network of software development. Machado and Thompson (2005) conducted a study and it came out that the most popular reason higher education institutions choose an OSS packages over proprietary software was inter-operability. Table 1 below presents a synopsis of the factors which have contributed to the increase of OSS in Higher Education.

Table 1. Four major reasons of the increase of Open Sources in Higher Education within the four domains of Education.

Domain	Reasons
Economic	- Eases the burden of software license management. - Open Sources cost less to acquire and run than proprietary software - Independence - Generic Product
Technological	- Reliable and secure technology - Open architecture - Inter-operational - Open but well protected copyrights and licenses
Pedagogical	- Possibility of using different learning scenarios - Web-based learning - Modular and multilingual - Variety of tools
Philosophic	- Collaborative approach - Anti-monopolistic - Free as education

Source: (Machado & Thompson, 2005)

There are many types of LMS that provide e-learning tools to users. Data taken from docebe.com showed those different types of OS LMS and proprietary LMS. In the Docebe Benchmark document, the company conducted a study on different types of LMS. Most universities prefer to use Claroline LMS based on the facilities that they provided. Table 2 shows that compared to other LMS, Claroline provide all the server facilities and multimedia aspects. Most universities and schools are using Claroline as their LMS tools. Data in Table 3 show that Claroline provide all the tools in e-learning such as scorm, forum, wikipedia and video conference. All e-learning tools should have all of these tools to facilitate the learning of the users. Claroline LMS is also suitable for self learning and collaborative learning.

Table 2. Initial Comparison Grid

Open Source	Claroline	University, School	Yes	Yes	University
Types of LMS	**Licence**	**Targets**	**Multimedia Learning Object Production**	**Server Facilities**	**Type of Target**
Docebo	Open Source	Corporate,University, Big Government	Yes	Yes	Commercial
Moodle	Open Source	School, Small University	Moodle partner	Moodle partner	Commercial
Dokeos	Open Source	University, Medium Size Company, School	No website information	Yes	Commercial
Atutor	Open Source	Government, University	No website information	No info	University/ Association
Ilias	Open Source	University, School	No website information	No info	University
Sumtotal	Closed Source	Corporate	Yes	Yes	Commercial
Saba	Closed Source	Corporate	Yes	Yes	Commercial
Blackboard	Closed Source	Corporate,University, Big Government	No website information	No info	Commercial
Giunti labs	Closed Source	Corporate,University, Big Government	Yes	Yes	Commercial
Plateau	Closed Source	Corporate,University, Big Government	No website information	Yes	Commercial

Source: (docebe.com)

Table 3. LMS Learning Platform

Types of LMS	Scorm	Forum	Wiki	Video Con.	Model of Learning
Claroline	Yes	Yes	Yes	Yes	Self Learning, Collaborative
Docebo	Yes	Yes	Yes	Yes	Self Learning, Blended Collaborative
Moodle	Yes	Yes	Yes	Yes	Blended Collaborative
Dokeos	Yes	Yes	Yes	Yes	Self Learning, Collaborative
Atutor	Yes	Yes	Yes	Yes	Self Learning, Collaborative
Ilias	Yes	Yes	Yes	Yes	Self Learning, Collaborative
Sumtotal	Yes	Yes	Yes	Yes	Self Learning, Blended
Saba	Yes	Yes	Yes	Yes	Self Learning, Blended
Blackboard	Yes	Yes	Yes	Yes	Self Learning, Blended Collaborative
Giunti labs	Yes	Yes	Yes	Yes	Self Learning, Blended Collaborative
Plateau	Yes	Yes	Yes	Yes	Self Learning, Blended

Source: (docebe.com)

3. Results and Discussions

3.1 Routing Protocols and Concepts Course

Routing Protocols and Concepts course is offered for the Bachelor of Science (Hons) (Data Communication & Networking) (CS225) semester 4 students at FSKM. This course describes the architecture, components, and operation of routers, and explains the principles of routing and routing protocols. Students analyze, configure, verify, and troubleshoot the primary routing protocols RIPv1, RIPv2, EIGRP, and OSPF. By the end of this course, students will be able to recognize and correct common routing issues and problems. In our experience it was shown that students of the CS225 often lack in troubleshooting the routing protocols such as OSPF. So, we proposed to add another platform for our students, which is online e-learning. Table 4 below shows the assessment for this course:

Table 4. Assessment for the course

Midterm Exams	20 %
Online Test	20 %
Skill Test	10 %
Final Exam	50 %

To pass this course, students have to score 50 marks and above.

3.2 Lecture

While using conventional methods of learning, we established that information students gather during lectures are insufficient. They have to spend more time at home learning because of the fact that the information they gather which is knowledge management, has to be fast and hasten. For this course, the lectures contain the following topics:

Topic 1: Introduction to Routing and Packet Forwarding

Topic 2: Static Routing

Topic 3: Introduction to Dynamic Routing Protocols

Topic 4: Distance Vector Routing Protocols

Topic 5: RIP version 1

Topic 6: VLSM and CIDR

Topic 7: RIP version 2

Topic 8: The Routing Table: A Closer Look

Topic 9: EIGRP

Topic 10: Link-State Routing Protocols

Topic 11: OSPF

3.3 Claroline

Claroline is a Learning Management System released under Open Source license (GPLv2). The Claroline provide a good platform for universities, colleges, schools and training companies to create and administer courses and collaboration spaces through the web. Lectures using Claroline allow building effective online e-learning and collaborative activities on the web. Claroline is used in more

than 80 countries and translated into 35 languages. Claroline is capable of hosting a large number of users and it is compatible with Linux, Mac and Windows environments. The Claroline is based on free technologies like PHP and MySQL and uses the current standards like SCORM for the exchange of contents.

Claroline provides a list of tools enabling the lecturer/teacher to write a course description, publish documents in any format (text, PDF, HTML and video), administer public and private forums, create groups of students, prepare online exercises, publish announcements, see the statistics of the users activity and use the wiki to write collaborative documents

The latest and stable version of Claroline is Claroline 1.9.1. We can download Claroline file claroline1.9.1.zip for Windows claroline191.tar.gz for UNIX, Linux and Mac OS X at http://www.claroline.net/download/stable.html. To install Claroline on a server, whether locally or remotely, you need the following devices on the computer:

1. A web server (We recommend *Apache*, but others should work too)
2. *PHP* **5.1.6** or later or **PHP 5.2.1** or later (recommended)
3. The *MySQL* databases server 4.23 or later,
4. A Mail Transport Agent (optional)

After the installation, administrator can create arbitrary number of courses and users, and grant some or all of them the rank of a Course Manager. Figure 1 shows the Course Manager's view of the Claroline LMS:

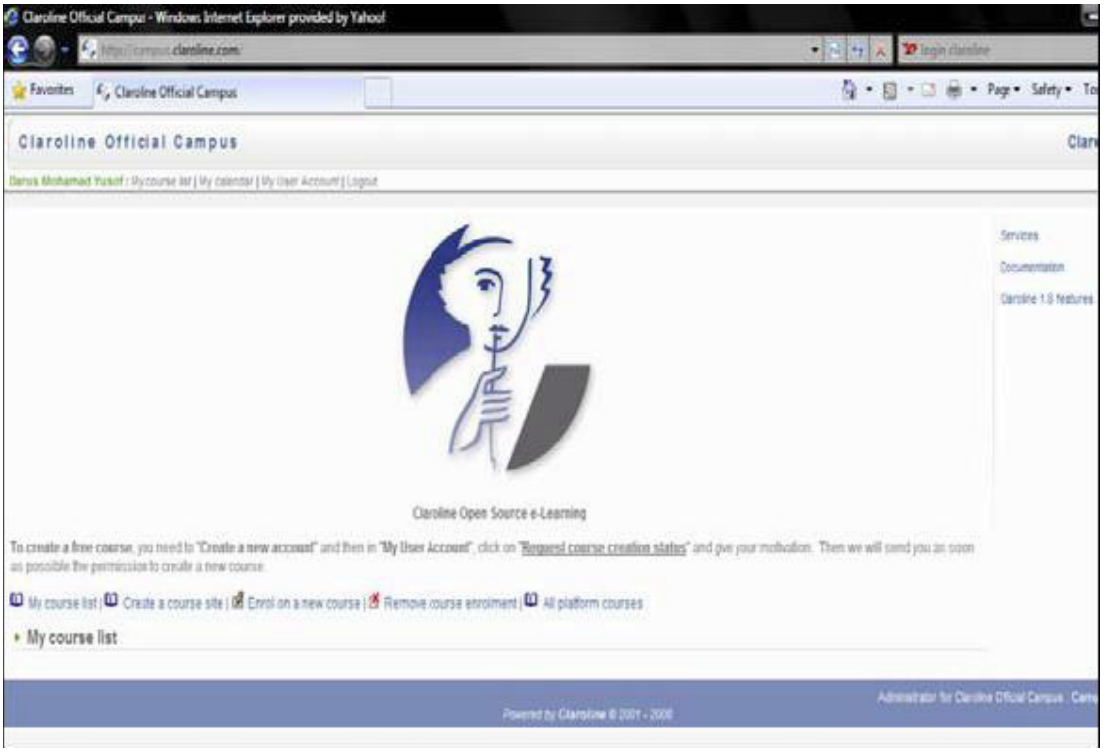

Fig. 1. Course Manager's view of the Claroline LMS

The Claroline platform is organized around the concept of spaces related to a course or a pedagogical activity. Each space provides a list of tools that enable course manager to create learning contents, manage training activities and interact with the students. Some of the tools provided by Claroline which help lecturers to manage the class are:

1. Manage Document and Links

The Administrator can publish their documents; create directories and sub-directories to gather files and create hyperlinks and build their own HTML pages. Figure 2 below shows how the administrator publishes their documents.

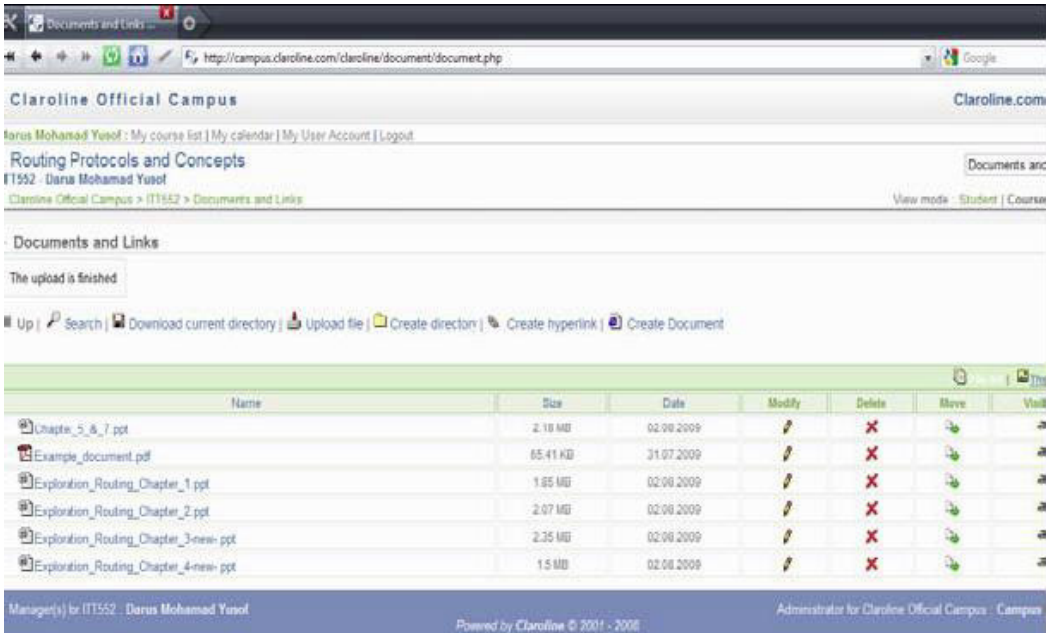

Fig. 2. How Administrator Publish Their Documents

2. Create Online Exercises

Claroline LMS allow administrator to create exercises with a list of questions, elaborating different types of questions and tracking the results of the users. The administrator can also set exam with maximum time and attempts allowed for their students. Figure 3 shows online exam using Claroline.

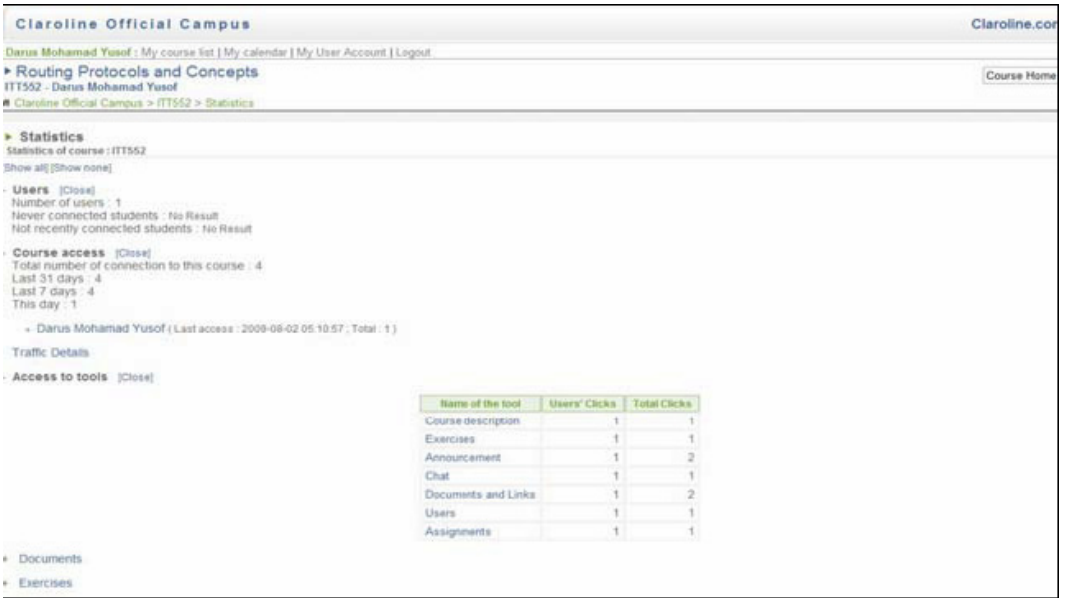

Fig. 3. Claroline Online Exam

3. Organize: Agenda And Announcements

Claroline LMS allows administrator to add events in the course calendar, showing the complete calendar and displaying the events from all courses, attach to an event a link to other tools of the course or to an existing resource, write an announcement which will be displayed on the course homepage and send an announcement by e-mail to a user or a group of users.

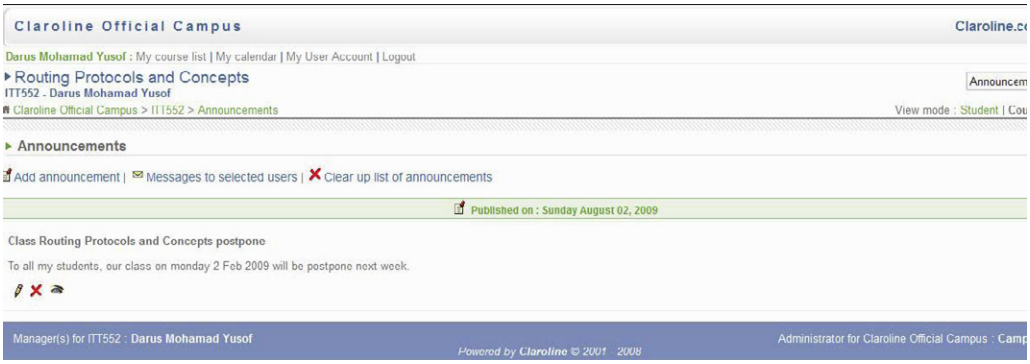

Fig. 4. Send an Announcement to Students

4. Supervise: Users And Statistics

The Claroline LMS allows the administrator to follow the access to the platform and supervising the progression of the users. Figure 5 shows an example of the statistics of a course in Claroline LMS.

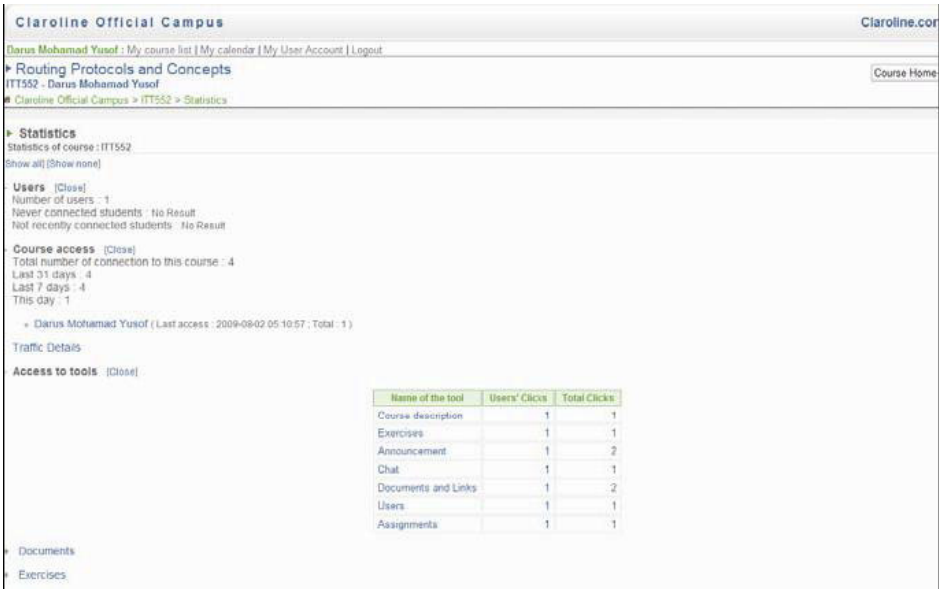

Fig. 5. Statistics of a Course in Claroline LMS

5. Coordinate Group Work

The Administrator is allowed to create several groups of users enrolled in this course, define the registration settings, provide own tools for each group and facilitate the collaboration between users during group work.

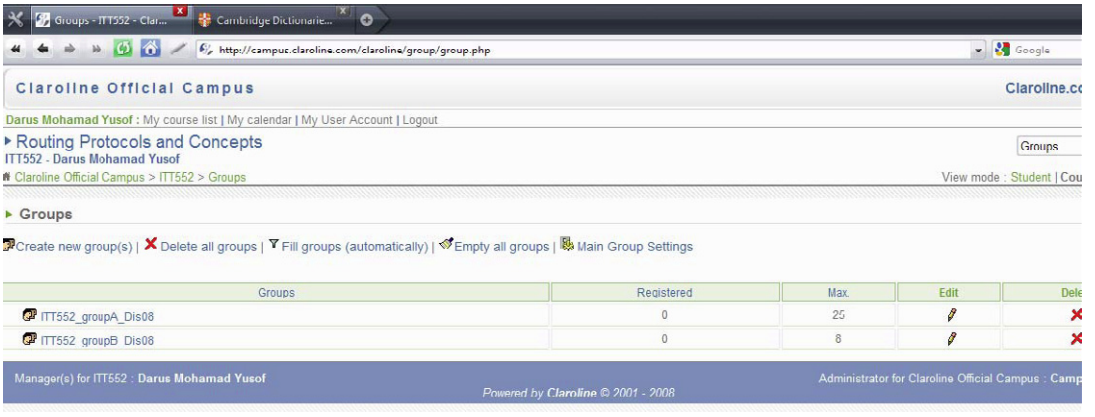

Fig. 6. Groups Work

4. Conclusions

We are of the belief that using Open Source LMS as a medium for e-learning will save us on the cost but without the loss of quality. Education can be implemented without the constraints of geographical boundaries and the social and cultural aspects. The Malaysian Public Sector OSS Master Plan was launched on 16 July 2004 to create and enhance values using OSS in providing efficient, secure and quality services. Using e-learning OSS LMS will give the opportunity to learn about and adapt to new technologies. It also gives us the opportunity to educate graduates, giving them the information they would not have received if we use the conventional methods of learning. In our experience, the Claroline is the best OSS LMS as it fits our needs. As of now, Claroline is under constant development and also get good support from the consortium communities. Being able to learn at one's own pace makes an LMS extremely useful, especially for students who may find it difficult to follow lecture-based method.

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