Scoring the Open Source Learning Management Systems

Li-Jen Y. Shannon and Marilyn Rice

Abstract—**Based on the demands of online teaching and learning programs from various levels of educational systems and enterprises in the past decade, there are many open source of learning management systems from which to choose. In order to select the most feasible and appropriate learning management software, it requires the administrators to analyze and assess the needs from their own institutions and follow up with the comparison of available software. This study investigated the vital critique items through various popular open source of learning management systems. Three critique categories were formed including Course Building Functions, Server Functions, and Training and Service. This research paper will be focused on reporting two out of three categories: Course Building and the Training and Service categories. There were eight items suggested under the category of Course Building Functions. Six items were scrutinized for the category of Server Functions. The Training and Service category included three studied items. The suggested critique items and categories from this research will serve the top managers in assisting their decision-making for implementing a tool which would be the best fit for their specific needs.**

Index Terms—**Learning management system, open source LMS, online teaching, online learning.**

I. Introduction

Evolving with the technology trends, there has been a high demand of online teaching and learning programs from various levels of educational systems and enterprises in the past decade. Close to seventy percent of higher education institutions from more than 2,800 US colleges and universities reported that online education was critical to their long-term strategy [1]. Also, 46 percent of organizations use virtual teams in their workplace which is based on a 335 participated organizations [2]. To fulfill the needs of offering online learning environment, numerous popular open source learning management systems (LMS) have been adopted either free of charge or paid with a certain amount of technical fee by the institutions. During the adoption process of selecting the most feasible and appropriate LMS, it becomes a very tedious and difficult task for the administrators. The evidence showed that the concerns of lacking faculty acceptance while promoting online education became one of critical elements for their success [1]. It would require the administrators to analyze and assess the needs from their own institutions. Following up with a detailed comparison of potential LMS would be ideal to include debate and testing if

the institution had efficient manpower and time.

This study investigated various internationally popular LMS including Edmodo, Google Apps for Education, MOOC, Moodle, OLAT, and Sakai. These popular software offer easy access to demonstration and provide details of tool functionality. From the ample of technical critiques and try out from the demonstration courses, this research filtered out the common input and merged them into three critique categories which are Course Building Functions (CBF), Server Functions (SF), and Training and Service (TS). For the Course Building Functions category, there were eight items compared for details of course quality control, interactive tools, template courses, grade book interfaces, social network subscription, calendar builder, course assessment, and resources sharing. The available functions of monitoring criteria, interacting interfaces, and assessing tools were carefully scrutinized in this category.

To investigate the Server Functions category, there were six items compared for details of file size control, enrollment process, plugins and access control, online/offline function, analytics function, and course archiving function. It is vital for the users and the institutions to have a freely accessible and quick responding server all the time. The transmission speed and storage capacity with easy access while online or offline have been evaluated in this category. However, this category will not be reported within this paper. It will be reported as a separated paper of our research project.

The Training and Service category included the three studied items of user training materials, developer forums and tips, and technical support. For new users, it is important to provide the needed training, guideline, and support. Moreover, considering whether in-house technicians and management would be needed or not, the potential selected LMS would be critiqued to analyze both the advantages and disadvantages of its design, and also to review it from the perspective of its benefits in applied modern technology.

We thrive to form an easy critique formula from this research, in order to serve the top managers in assisting their decision-making for adopting the best LMS which would fulfill their specific needs.

II. Popular Learning Management System

A. Learning Management System

LMS acts in administering to facilitate all content groups and learning activities, such as test creation, examination, evaluation of lessons, and interactive communication between the lecturers and the students [3].The LMS and tools can be used as mechanisms for creating a platform for student investment and ownership in the learning process [4]. While depending on the software to bridge the instructors and

learners' perception in learning, there are factors which impact on the success of applying LMS. Multimedia based e-learning system has been strongly recommended to integrate analysis, design, technical requirements, content development, production and integration, implementation, and evaluation [5]. The sections below will highlight some factors of how LMS presented themselves in this online learning environment.

B. Edmodo

Edmodo provides a learning environment to connect and collaborate among students, parents, administrators, and instructors [6]. Edmodo provides a planner tool as a personal, automatically updated organizational tool which eases the weekly or monthly preparation for the learning unit [7]. ISTE reported the benefits for education including privacy for digital learning, empowerment of personalized internet, collaboration to share ideas and work together, professional development, organization of everything in one place, differentiation of custom-fit for individual, authentic communication for real audiences, and engagement for greater classroom efficiency and rigor [8].

C. Google Apps for Education

Google Apps for Education (GAFE) is a suite of free productivity tools for classroom collaboration [9]. This cloud technology allows collaboration in real-time by using any device. GAFE provides communication and collaboration apps include Gmail, Calendar, Drive Docs and Sites, and a GAFE account unlocks access to other collaborative tools supported by Google [10]. The three main benefits of using GAFE are: saves school budget, boosts academic performance and motivation, and prepares students for digital communication in the real world [11].

D. MOOCs

Massive Open Online Courses (MOOCs) platforms have altered higher education leaders' perceptions and plans for offering online learning environment [12]. MOOC offers free courses for anyone who has internet connection around the world [12]. The institutions, businesses, and teachers can build and host courses for the world to take. There are various open source platforms which the faculty can create a MOOC course, such as the for-non-profit supported Coursera, NovoEd, and OpenEdX offering different features for the faculty to select from [13]. Generally, the freedom of teaching was shared in MOOCs through levels of creativity, discussion communities, control for special needs, online conferencing, and commitment to experimentation and evolution [14].

E. Moodle

Moodle is an open source with plugins platform providing the tools for educators to develop and manage course online. The founding principle of Moodle is the social network to offer forums, wiki, and various networking features [15]. The most used function among all of the features is collaborative learning which allows the educators to accomplish the common tools, such as create roles and give permission, add discussion forums, moderate discussions, subscribe and receive notifications, attach resources. It also allows the educators to rate forums [16]. However, Moodle requires that

administrators host their own LMS which applies to e-commerce as well [17].

F. OLAT

Online Learning and Training (OLAT) is an open source driven by the University of Zurich to offer diverse functionality for the needs in web-based learning and training, such as perform e-assessments and questionnaires, implement multimedia forms, provide interactive and intuitive platform, and create collaborative tools for communication [18].The aim of OLAT is that knowledge should be shared with simple and enjoyable way for everyone at all times and everywhere [19]. Therefore, the collaboration function of OLAT has been giving lectures a transferring platform for knowledge.

G. Sakai

Sakia was developed by Indiana University, University of Michigan, MIT, and Stanford to offer a platform around the world for supporting instruction, research, and outreach [20]. The standard set of tools provide versatile support for teaching and learning, communication, collaboration, e-portfolios, content and media integration, and administration [21]. In addition, unlike typical Java web apps, Sakai shares third-party dependencies with each other. The plugin adds facilities to act as an open source collaboration system for educational institutions [22].

III. METHODOLOGY

The main purpose of this research is to form a basic critique mechanism by reviewing the uniqueness of current popular LMS internationally. The software listed in the previous section, each LMS is reviewed from the official site to the demonstration courses, blogs, and literature reviews. We obtained the common terminologies and grouped the similar functions together into categories. The LMS comparison table created by Electronic Educational Environment was also utilized in this research to review and support the important items formed [23]. We do not critique or compare those popular LMS, but we do collect the effective tools and functions which could be used as future comparison purpose. The following two sections will devoteour suggested critique categories which are also listed in the appendix table.

IV. COURSE BUILDING FUNCTIONS (CBF)

A. Course Quality Control

"Easy use of course quality control which was monitored by the required process of course approval criteria, copyright statement…etc" The quality assurance is handled by the administrators to offer the best outcome of learning environment. The access code and software monitoring process would be a safe guard to achieve the quality control [24]-[27].

B. Interactive Tools

"Availability of interactive tools which could be incorporated in the LMS." The LMS is capable of allowing the users sharing resources and multimedia within activities,

such as integrating with What You See Is What you Get (WYSIWYG) editors, Learning tools Interoperability (LTI), Sharable Content Object Reference Model (SCORM), embedded external resources, and other social networks [28]-[32].

C. Template Courses

"Samples of template courses developed." The LMS has the ability to allow administrators providing uniformity of courses or allow the users to create their own course by importing specific items [15], [33], [34].

D. Gradebook Interfaces

"Easy use of setting up gradebook." A simple and basic tool allows the educators to manage the grade book. The LMS provides the import and export functions for the educators and students [27], [31], [35]-[37].

E. Social Network Subscription

"Easy use of available social network and ability for subscription." The LMS builds in the communication network where the subscription function is available to notify the users when any updated postings are available for the various types of social networks [15], [37]-[40].

F. Calendar Builder

"Easy use of course calendar, schedule, and due date management system."This function is not commonly provided by most of LMS, but it provides the ability of building a planer and exporting outside calendar assisting in educators to manage their course work in one location [27], [37], [41], [42].

G. Course Assessment

"Easy use of assessment tools available for this LMS." This function is neither commonly applied to the open source LMS. The specific features in evaluating the course would be a great tool to have, such as quiz engine, feedback from the quiz, and peer assessment functions [17], [27], [37], [43].

H. Resources Sharing.

"Easy use of how the course resources can be posted, stored, and organized."Whether the resources would be stored in the institution sites or the provided cloud space would need to be investigated while comparing the LMS [37], [44], [45].

V. TRAINING AND SERVICE (TS)

A. Training Materials

"Evidence of how the training materials are provided for new users."It is found that the LMS inspires better teaching and learning when the training materials are available. Especially, a self-service tool is available for the students to complete the courses, certificates, or academic credit [27], [45]-[50].

B. Developer Forums and Tips

"Place holder of how the developer provides guidelines and help." The discussions about the open source with coding details, guidelines, and tips have been appreciated by sharing with the users [27], [48], [51], [52].

C. Technical Support

"Provide central support and services." Whatever the LMS would offer either Support ticket Submission, or a live line help, the users value this service greatly [27], [45], [46], [49], [53]-[55].

VI. CONCLUSIONS

We believe that additional critique items could be merged in and considered as vital elements along with the evolving technology over time; such as including the ability to scale up, robust, and incorporated with innovative ideas of teaching online courses. E-learning provides instant, convenient, flexible, and long-distance learning to people, however, a successful key is its continued intention to thrive along with the development of digital technology [56]. The LMS Critique Scoring Sheet suggested below in the appendix would provide the institution a guideline of understanding what the faculty and students' value in using LMS. A need analysis would be helpful to guide the top managers using the scoring sheet to determinate the direction of adopting a LMS.

It's suggested that a pre-evaluation stage should be conducted before comparing the potential LMS. The students, faculty, staffs, and administrators are the valuable resources to assist in the need analysis. Finding out the LMS service and need from the users' points would cut down a lot of time for perusing the "buy-in" from the campus. For example, if the pre-evaluation results showed that there was a high expectation in the category of Training and Service and a low value in Server Function (which will be reported in another paper), the top managers might need to consider switching the focus from the conflict views of Information Technology (IT) Department on the server related concerns to the training related programs. If specific items appeared to have high expectations from the Course Building Functions category, moreover, the top managers would consider ensuring that the potential LMS should offer those "expected" functions for the campus users.

In this paper, we suggested 11 critique items which eight are in the category of Course Building Functions and three are in the Training and Service category. Disregarding whether a commercial LMS or an open source LMS would be considered for the entire campus or just a small program, we do believe that a need analysis should be conducted first before contributing the time and manpower in selecting a best-fit LMS.

Many institutions had experienced the process of switching LMS campus-wide. The hardship encountered with the faculty, students, and IT staffs could be eliminated from the beginning of critiquing the LMS. We thrive to create a mechanism for our future LMS selection process and transform the procedure as easy as how the users evaluated their needs in using LMS.

APPENDIX

LMS Critique Scoring Sheet		
Critique Items	Description	Score of Meeting the needs 0-5 (5 being the

		highest value)
Course Building Functions		
Course Quality Control	Easy use of course quality control which was monitored by the required process of course approval criteria, copyright statement…etc	
Interactive Tools	Availability of interactive tools which could be incorporated in the LMS.	
Template Courses	Samples of template courses developed.	
Gradebook Interfaces	Easy use of setting up the gradebook	
Social Network Subscription	Available social network and ability for subscription.	
Calendar Builder	Easy use of course calendar, schedule, and due date management system.	
Course Assessment	Easy use of assessment tools available for this LMS.	
Resources Sharing	Easy use of how the course resources can be posted, stored, and organized.	
Server Functions (Not reported in this paper)		
File Size Control	Amount of the server capacity for file transmission & storage.	
Enrollment Process	Easy use of how the learners access to the course platform.	
Plugins And Access Control	Provide plugins infrastructure and access control are available.	
Online/Offline Function	Offline capabilities.	
Analytics Function	Easy use of learning data from the collected course information	
Course Archiving Function	Easy use of courses rollover and archive.	
Training and Service		
User Training Materials	Evidence of how the training materials are provided for new users.	
Developer Forums and Tips	Place holder of how the developer provides guidelines and help.	
Technical Support	Provide central support and services.	
Total Scores		

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