eLearning 2.0: Learning Management Systems Readiness

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Abstract—Nowadays, internet becomes more user centered allowing two-way exchange of information. People become creators of knowledge and materials instead of passive readers or consumers. This advancement of web technologies and its applications known as web 2.0. In education, the integration of web 2.0 technologies and tools into educational and institutional practice is called eLearning 2.0. Researches stress on the importance of implementing eLearning 2.0 in the learning process. Universities and schools are investing substantial amounts of time and money in implementing learning management systems (LMS). If not designed with eLearning 2.0 support in mind, the LMS can pose difficulty for instructors and students to benefit from these technologies through LMS directly. The aim of this study is to evaluate the readiness of learning management systems to support eLearning 2.0. This research reviewed the literature for the most common web 2.0 tools used in eLearning process. Six tools were identified Wikis, blogs, RSS, podcasts, bookmarking and virtual environments. Then an evaluation model was developed and applied on two respective learning management systems BlackBoard and MOODLE. The results of readiness evaluation shows that MOODLE is more ready for eLearning 2.0 than BlackBoard. Anyhow, the findings of this study provide several important implications for learning management system research and management.

Keywords— eLearning 2.0, Web 2.0, Social Learning, Learning Management System (LMS)

I. INTRODUCTION

In early 1990’s, web technologies were used to deliver the information like book wise, but in different media. A few content authors provided content to a wide range of audience of relatively passive readers [1]. This concept has been changed with the advancement of web technologies in the twenty first century. Nowadays, internet becomes more user centered allowing two-way exchange of information. People become creators of knowledge and materials instead of passive readers or consumers. Many applications developed to engage users in knowledge creation and enhance web experience. This advancement of web technologies and its applications is known as Web 2.0.

Along with this advancement of web technologies, the electronic learning (eLearning) has played an important role in teaching and learning, which has become more and more popular not only in different levels of schools but also in various commercial or industrial companies [2]. According to [3], eLearning refers to the use of electronic devices for learning, including the delivery of content via electronic media such as internet, audio or video, satellite broadcast, interactive TV, CD-ROM, and so on. However, with the increasing development of the internet, the concept of eLearning has been completely and generally refer to cases which learning is done through the internet and online courses are offered [4].

The integration of Web 2.0 technologies and tools into educational and institutional practice is called eLearning 2.0. This new concept will foster the idea of placing the learner in the center of a more social, personal and flexible learning process [5]. Researches stress on the importance of implementing eLearning 2.0 in the learning practice [6], [7], [8], [9].

Universities and schools are investing substantial amounts of time and money in implementing learning management systems (LMS). If not designed with eLearning 2.0 support in mind, the LMS can pose difficulty for instructors and students to benefit from these technologies through LMS directly, and they have to find some workaround to do so.

This research aims to evaluate the readiness of learning management systems to support eLearning 2.0. The following two questions guided this study:

1. What Web 2.0 applications and tools are commonly used in eLearning 2.0?
2. How LMSs are ready for eLearning 2.0?

II. WEB 2.0

Web 2.0 means a qualitative leap in web technologies that has made the internet more creative, participative and socializing. The term Web 2.0 appeared for the first time during conference brainstorming session between O'Reilly and MediaLive International in 2004 [10]. Since that, the term has been gaining considerable traction in the corporate world, amongst developers and increasingly amongst the general public [11].

Web 2.0 can be defined as the collaborative web - with an emphasis to online collaboration and sharing amongst users [12]. Users are no longer passive receptors of knowledge, they are active participators. Users can use the web to upload, download, add comments, provide feedback, add tags and actively engage in the creation of new knowledge [10].

Web 2.0 is not a clearly defined set of sites or tools, nor a specific website or recourses center on the Internet. We cannot
'go to' Web 2.0, nor subscribe to it, register or log into it. It is not a new web, with new languages or technologies, new sites, new pages, etc. It is a concept used to refer to sites and resources or developments that have some common characteristics.

According to [13], after revisiting the concept, the key to decide if a site either is or not web 2.0 is the sentence “The Web is the platform”. He emphasized that, like many important concepts, Web 2.0 doesn't have a hard boundary, but rather, a gravitational core. Web 2.0 can be visualized as a set of principles and practices that tie together a veritable solar system of sites that demonstrate some or all of those principles, at a varying distance from that core [10].

The technology advancements behind web 2.0 enabled new applications such RSS, podcasts, scripting, wikis and XML. These applications are used and combined to create new services. Some better-known examples of web 2.0 sites include: flickr, wikipedia, linkedin, facebook, myspace and blogger.

However, what is important to recognize is that the emergence of the Web 2.0 is not a technological revolution, it is a social revolution. According to [14] and [15], today’s youth are the primary drivers of this emerging participatory culture, characterized by low barriers to artistic expression, the creation and sharing of content online, membership in online communities, the ability to work with peers to accomplish tasks and the control of media circulation through RSS subscriptions such as blogs, podcasts and news feeds.

III. eLearning 2.0

The traditional context of learning is experiencing a radical change. Teaching and learning are no longer restricted to traditional classrooms [16]. Today, without much notice, technology enhanced learning is well established at higher education institutes [17]. Reference [18] reported the results of a study published by the Giga Information Group shows that the percentage of organizations using eLearning systems in their employee training programs rose from 21% in 2002 to 75% in 2005. Additionally, nearly 75% of the 129 top US universities used web-based learning systems in 2007. Offering eLearning systems becomes one of the strategies in responding to the increased number of higher education students to help the delivery of the course content and enhance the access of the courses and subjects by both students and teachers [19].

The influence of Web 2.0 and social software as well as the rapidly evolving mobile technology are the two main driving forces for eLearning. The experience and expectations of learners in the light of their increasing use of mobile and Web 2.0 technologies starts to influence the way they learn, collaborate, and communicate [17]. According to [20] and [21], undergraduate students are rapidly adopting these tools in their private lives, to connect with friends, to build social networks and contribute to wider internet communities. Higher education institutions are discovering that new models of teaching and learning are required to meet the needs of a generation of learners who seek greater autonomy and connectivity as well as opportunities for socio-experiential learning [22].

The term eLearning 2.0 now used to describe the integration of web 2.0 technologies and tools into educational and institutional practice. Theorists discussed the importance of using web 2.0 tools to enhance learning. According to [23], Web 2.0 instruments (social software) become increasingly relevant as because they further the exchange of knowledge and the development of competencies in networks and beyond the net in an optimal way. With the emergence of various Web 2.0 applications, educators are exploring the possibilities and opportunities that Web 2.0 technology can bring to instruction [22]. They emphasized that, tools like blogs, wikis, media-sharing applications, and social networking sites can support and encourage informal conversation, dialogue, collaborative content generation, and knowledge sharing, giving learners access to a wide range of ideas and representations. Used appropriately, they promise to make truly learner-centered education a reality by promoting learner agency, autonomy, and engagement in social networks that straddle multiple real and virtual communities by reaching across physical, geographic, institutional, and organizational boundaries.

The reviewer of the literature found many case studies and universities attempt to integrate many of web 2.0 applications and tools into the educational environment. Each case used different tools or applications. According to the literature, wikis, blogs, RSS, podcasts, bookmarking and virtual environments are the most common web 2.0 applications and tools used towards eLearning 2.0 (see Table I). Each tool will be discussed in detail below.

A. Wikis

The wiki name was reportedly taken from the Hawaiian term “wikiwiki,” which means “fast, speedy; to hurry, hasten; quick, fast, swift”. Quickness is implicit in wikis because the user can simultaneously read and edit content [24].

A wiki is a freely expandable collection of interlinked Web pages, a hypertext system for storing and modifying information in a database, where each page is easily edited by any user [25]. An author can plant the seed of an idea in a wiki and, if it attracts a sufficiently large body of contributors, return one week later to see how the idea grew [24].

In education matter, wiki can be used in many forms. In its simplest form, a wiki can be used as a one-way forum to present information. Yet, in its greatest capacity, a wiki can be used to create a knowledge base for a group of people through

<table>
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<th>TABLE I. Web 2.0 tools commonly used in eLearning 2.0</th>
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<tr>
<td>Wikis</td>
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<td>Blogs</td>
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<td>Bookmarking</td>
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<td>Virtual environments</td>
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collaborative contributions [26]. Anyhow, the literature has discussed the following benefits of wiki use in education:

- Empowering the creation of knowledge [26], [27], [28]
- Facilitating peer-to-peer learning [29], [30]
- Enabling collaborative authoring [28], [31], [32]
- Developing research and other necessary skills used in the workplace [33]

B. Blogs

Blogs, short for weblogs, provide an easy-to-use tool for publishing commentary or engaging others in discourse in the format of a personal Web site [34]. In simple words, it is a way for distributing information and getting feedback from readers.

Blogs can incorporate text, images, audio, and video. However, a blog is significantly easier to construct and maintain than a typical HTML website. Educators or students can use blogs without previous knowledge about HTML.

According to [35], the blog technology has proven to be an important part of the Web 2.0 phenomenon and can prove a significant role in eLearning. Educators have been experimenting with blog tools to improve student and teacher performance in both classroom and online learning settings. Blogs can provide a convenient method for developing a learner cohort, for fostering peer interactions, and for documenting an historical record, such as in a journal or other observations [36]. Blogs also provide a method of collecting student work into an electronic portfolio, with the benefit of allowing students to comment and reflect on their work [37].

C. RSS

RSS is the shorthand for Really Simple Syndication. It allows internet users to subscribe to the pure content of many websites without receiving the additional ballast of layout information and without having to visit each of the sites that the user is interested in and checking it for updates. This concept allowed users to create their personal alerting services from different information channels and sources.

In education, RSS can be used to get up-to-date information related to the learners’ interests such as creating journal alerts covering current publications in information science, filtered by the search key words such as “Web 2.0“ and “social software” then immediately displayed in the learning environment. Moreover, it can be used to let learners updated with any changes in the online course and the learning environment.

D. Podcasts

One of the major Web 2.0 benefits to education is leveraging the use of podcasts to access the lecture in audio or video format [8]. Students may access and listen to course lectures or any audiovisual materials whenever and whenever they want. According to the literature, students particularly favored the timing of access, because they are not limited to only accessing course content during class time.

E. Bookmarking

Bookmarking systems can emerge useful system characteristics and information about system entries if sufficient number of database entries and users are available [6]. Bookmarking systems allow its users to enter a bookmark relating to any kind of web resource and store it in a database. The entries (the bookmarks) can be indexed by any other user of the system with any keyword, hence the individual entries in a database are tagged. For example, the frequency of index terms (tags) indicates the topical focus of the resource collection. Moreover, as each source tagged by users, the system can generate relevant information as to the individuals or groups working on the same topic in order to discover and setup virtual communities of interest.

F. Virtual environments

Virtual environments provide a platform in which to construct compelling experiences not possible within the material and temporal constraints of the physical world. One of the most engaging features of virtual worlds is their ability to represent our physicality in a three-dimensional specialized environment. Objects can be created and manipulated within the virtual world, and fully visualized locations can be created where individuals can interact with each other, with objects, or with the environment.

Virtual environments are an immersive and interactive virtual world; all of the content is user-generated; and communication is synchronous. Through the use of in-world text chat and voice chat, students and instructors can meet and interact. It also supports assets commonly used in education including static text, documents, video and audio presentations, and learning management systems [8].

Researchers find that virtual classrooms, can be used in distance education and virtual field trips to simulations of cities or museums allow for experiential or situated learning.

IV. METHODOLOGY

The literature review conducted in this research, answered the first research question and six tools were identified as the most common Web 2.0 applications and tools used towards eLearning 2.0 (see Table 1).

The second research question of this study was to find how LMSs are ready for eLearning 2.0. Therefore, an evaluation model of two steps was developed in order to evaluate and rate LMSs towards eLearning 2.0 (Fig 1). At the first step, the existence of each tool as LMS built-in tool was examined.

![FIGURE 1: Evaluation model](image-url)
Then, according to the existence or absences of the tool, either the ease of use or the ease of integration was examined. Academic members with experience with specific LMS were asked to rate the tool in terms of how easy to use if LMS have the tool as built in tool. On the other case, if the LMS does not have the tool as built in tool, specific LMS administrators were asked to rate the tool in terms of how easy to integrate it to the system. The questions that were asked for each tool are presented in Table II. A likert scales (1-7) ranging from “Strongly disagree” to “Strongly agree” were used with all questions. Finally, rate out of 10 was calculated for each tool. Five points assigned to the LMS at step 1 based on the existence or absences of the tool. The other five points were assigned to LMS in the step 2 of the evaluation based on the path taken on step 1 (see table III).

Finally, the total score was calculated for each LMS to indicate its eLearning 2.0 readiness according to the evaluation model. The maximum mark for the evaluation were 60.

The focus of eLearning 2.0 readiness testing and evaluation was on evaluating the latest public version of the respective LMS. Two LMSs were selected one commercial system, Blackboard; and one open source system MOODLE. A full testing environment for each system was built and latest version of each system was installed. The specific versions of the systems used in this evaluation were:

1. BlackBoard 9.1
2. MOODLE 2.4

V. Results

According to evaluation model and identified six tools, both BlackBoard and MOODLE LMSs were evaluated and points (out of 60) was assigned to each system. At the first stage of the evaluation, the existence of five tools was observed for MOODLE. Only virtual environment tool was missing from it but according to MOODLE administrators, virtual environment can be integrated to MOODLE using SLOODLE project. On the other hand, the absence of three tools - RSS, bookmarking and virtual environment - was observed for BlackBoard. Moreover, the integration of them to BlackBoard is difficult, as indicated by BlackBoard administrators. The ease of use examination for the existing tools indicates that the use of MOODLE tools is easier than BlackBoard tools. However, overall points assigned to MOODLE were 49.97 points and overall points assigned to BlackBoard are 32.83 points. Table IV summarizes the evaluation results and the points assigned for each tool. Anyhow, following sections discuss the results in detail.

A. Wikis

1) BlackBoard: Wiki tool is supported by BlackBoard system. Within the course, instructor can open a wiki for course members then they can create, comment on and edit wiki pages. History management and version comparison of edited paged are supported by the system as well. User should handle the creation of interlinked pages manually by creating the pages first then manually edit the original page to link the new one.

2) MOODLE: MOODLE supports wiki tool too. As BlackBoard, same concept applied and instructor should open a wiki for course members before they can create, comment on and edit wiki pages. Same features are available, such as history management and version comparison. However, the creation of pages and interlinked pages are encapsulated into one-step. User can directly add the link and create new page while editing page content.

B. Blogs

1) BlackBoard: BlackBoard supports blogs in course level only. Course members can use blog tool when it enabled by course instructor in one of three ways (1) anyone can add blog entries and comments (2) only instructor can add blog entries and other can comment only (3) group of course members can add blog entries and others can comment only. Non-course members cannot interact with blog entries.

2) MOODLE: Blogs are supported by MOODLE but with different philosophy. MOODLE blog is a user centered one. Every user has only one blog on the system where he can add blog entries. The other users of the system can comment on a blog entry. Any blog entry can be associated to any blog entry. Any blog entry can be linked to any blog entry. Any blog entry can be commented by any user. The user can link his/her external blogs to include external blogs entries to MOODLE blog automatically.

C. RSS

1) BlackBoard: RSS is not supported by BlackBoard. As indicated by BlackBoard administrators, allowing users to receive RSS feeds from BlackBoard is difficult. The system should support this functionality within its design and architecture, but RSS feeds from external sources can be received into BlackBoard if BlackBoard Community module is installed to the system.

2) MOODLE: MOODLE users can receive RSS feeds from blogs, databases, forums and glossaries tools. A user

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<th>Variable</th>
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<td>Ease of use</td>
<td>The Wiki tool in MOODLE learning management system is easy to use</td>
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<tr>
<td>Ease of integration</td>
<td>It is easy to integrate Virtual environments tool to BlackBoard learning management system</td>
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</tbody>
</table>

| Tool | Ease of Availability | Ease of Use | Ease of integration |
|-----------------|-----------------|-----------------|
| Yes (5 points) | 5 points | N/A |
| No (0 points) | N/A | 5 points |
should subscribe to specific tool RSS feed using any RSS reader, then he/she will receive information regarding any updates happening within the tool. Moreover, under the management of course instructor, RSS feeds from external sources can be shown to course users.

D. Podcasts

1) BlackBoard: Audio and video can be added into a course though three ways. First, audio or video file can be uploaded to the course then the user can download it to play it. Second, audio or video file can be embedded in any course content and played online using embedded player. The third way is to link to other audio or video repository on the internet like YouTube.

2) MOODLE: Like BlackBoard, MOODLE supports the same three ways of audio and video sharing.

E. Bookmarking

1) BlackBoard: Only discussion boards entries can be tagged in BlackBoard. The tagging technique that used allows users to group posts within the same forum only. Therefore, in this discussion I will not consider this as a support for bookmarking tool. To gain full support for bookmarking, external bookmarking tools should be used to integrate bookmarking with BlackBoard as indicated by administrators.

2) MOODLE: Users of MOODLE can add their tags to themselves, courses and blog entries. The tags describe users’ interests, courses and blog entries. Each tag then has its own page that shows all links, activities and entries related to this tag as well as users tagged themselves with that tag.

F. Virtual environments

1) BlackBoard: The support for virtual environment is not provided by BlackBoard. But, there are couple of tries to provide the integration in the market. Open source plugin is available to do such integration between Blackboard and Second Life virtual environment. Ball State University’s Institute for Digital Intermedia Arts developed the plugin in 2009 and it designed for BlackBoard 9. Anyhow, no update is provided for the plugin since that.

2) MOODLE: Simulation Linked Object Oriented Dynamic Learning (SLOODLE) is the name of open source project that provides the integration between MOODLE and virtual environments Second Life and/or OpenSim. SLOODLE is continued project and it provide up to date MOODLE version support.

VI. Conclusion

This research was conducted to evaluate the readiness of learning management systems to support eLearning 2.0. A literature review was conducted to identify the most common web 2.0 tools used in eLearning 2.0 environment. Wikis, blogs, RSS, podcasts, bookmarking and virtual environments are the six tools identified. Then an evaluation model was developed, and two respective learning management systems, BlackBoard and MOODLE, were selected for evaluation. The results of readiness evaluation shows that MOODLE is more ready for eLearning 2.0 than BlackBoard.

The findings of this study provide several important implications for learning management system research and management. Universities can easily use the developed model and with its six tools items in the process of LMS selection toward the adaption of eLearning 2.0. Learning management system providers can use the model to evaluate their products readiness toward eLearning 2.0 and take necessary actions to improve their products. Researchers can also use the study results as the foundation for development of comprehensive eLearning 2.0 readiness models, measures and theories.

This study has several limitations, which could be addressed in future research. First, the identified tools were the common web 2.0 tools used in education. Other tools that were used in education but not commonly used were not addressed. Thus, as these tools can enhance the learning environment, a future evaluation effort should consider these tools. The existence of the tool was the major measure of this study and tool features were not considered. Tool features can vary from system to another. One system may have elementary basic features of a tool while the other may have advanced features for the same tool. In this research,
both systems considered in a same level. Thus, the consideration of tool features should be handled in further evaluation of eLearning 2.0 readiness. Moreover, the study merely measured the ease of use construct from instructor perspective. Thus, developing ease of use measures from students perspective are useful directions for further evaluation effort. Finally, this paper addressed the integration of Web 2.0 with the learning process, but it is not addressing the Web 3.0 issues in that context. Thus, future research should investigate the Web 3.0 and what it might have brought to the education process.

REFERENCES


