CHAPTER THIRTY-THREE

OPEN SOURCE AND PROPRIETARY LEARNING MANAGEMENT SYSTEM: CHALLENGES AND OPPORTUNITIES FOR NIGERIAN TERTIARY INSTITUTIONS

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Objectives

At the end of this chapter, you should be able to;

i. Describe Learning Management System (LMS)
ii. Explain Open Source and its benefits to higher education institutions
iii. Exemplify the categories of proprietary LMS used in tertiary institutions
iv. Enumerate the challenges of using proprietary and open source LMS in tertiary institutions
v. Discuss the opportunities available in the use of LMS

Introduction

Digital learning tools supported by the internet can be difficult to itemize let alone characterize their ability to support electronic teaching and learning. This situation made a number of pedagogical innovators to identify which of the technological tools is devoted to student learning, give teachers the opportunities to develop pedagogical situations with added-value learning that covers; (a) lecturers, (b) students and (c) the institutions' administration. Few of these tools; Edmodo, Claroline, goggle, classroom and blackboard are available for use with features similar to generic classrooms accommodating both lecturers, students and institutional administrators' needs. However, the application of these tools are not widely found in most Nigerian higher institutions.

It is worthy to note that these tools are developed and released as proprietary (commercial basis) and as open source software. All the proprietary and open source manage teaching, learning, result compilation and students' record system and are generally called learning management system (LMS). The LMS as an umbrella term provides opportunities for supporting electronic teaching and learning including e-learning, e-assessment and distance learning. Despite the opportunities, the challenges to LMS are bound. For open source, lack of responsive software development community and quick response query system may discourage users from engaging with the platform. For proprietary LMS, the cost for the procurement and annual license renewal of the software coupled with the need for update, patches and debugging might dampen the interest of the users.

Meaning of Learning Management System

LMS is a web based software consisting of courses that contain electronic tools including a discussion board, files, grade book, electronic mail, announcements, assessments, and multimedia elements. Being a useful content distribution system hosted online, teachers use it to distribute course materials and interact with students at a distance mode. This is possible due

to its ability to facilitate access to remote learning resources and foster collaboration among teachers and students. Additionally, opportunities for continuos learning through collaboration with experts outside the classroom to encourage students to be active learners through the platforms, as open classrooms is also possible (Williams & Whiting, 2016). An important feature of LMS is to plan, implement, and assess a specific learning process for the administration, documentation, tracking, reporting, and delivery of educational courses, training programs, or learning and development programs.

Typically, an LMS provides an instructor with a way to create and deliver content, monitor student participation, and assess student performance. It also provides students with the ability to use interactive features such as threaded discussions, video conferencing, and discussion forums.Simin and Wan (2015) opined that with the application of learning management system, students can independently progress in mastering teaching materials, choose the pace of work, repeat the material that is not sufficiently understood, and get results of their performance and track down their progress. With this development, feedback between the teachers and the students is timely and that timely feedback is both the prompt action of teachers as supported by the instructional resources used.

Tertiary education institutions that provide higher level teaching and training often referred to as post-secondary education are now moving towards technologically supported teaching and learning. Beyond teaching and learning is the development of electronic record systems where students' admissions, course outlines, examinations and result compilations are managed through software. The adoption of technology to support teaching, learning and management of students' records was to ease the teachers' workload, minimize errors and close chances for students' record losses. Additionally, learning management system tools stand a better chance to facilitate instructions as it provide an avenue for interaction beyond the classroom extending well outside the university. These development accord students an opening for proper participation in the process of teaching and learning.

Open Source Software (OSS)

The term "open source software" refers to a software written in a computer language before it is compiled into binary code that computers can run. The human readable text originally written by programmers in a computer language is the *source code* of a program and is made available for modification or enhancement by anyone. The source code is the derived binary code that most computer users never see; it's the code computer programmers manipulate to change how a piece of software program or application works. Its documentation is protected by *intellectual property rights* (IPRs). Only the owner of the IPR is entitled to change the code or the documentation, and only the owner of the copyright is entitled to copy and distribute these. Programmers who have access to a computer program's source code can improve that program by adding features to it or fixing parts that do not suit their demand.

Open source software is sometimes referred to as free software, implying the freedom of all users to run, copy, distribute, study, change and improve software. The term *free software* has developed some negative connotations, especially in industry. This is the reason why a group of developers prefer to use the term *open source software* instead of *free software*. The idea behind open source is to facilitate innovation by embracing open exchange, collaborative participation, rapid prototyping, transparency and community development. For example, OSS developers have identified some characteristics that distinguish it from other software to include;

(1) globally distributed communities of developers collaborating primarily through the Internet,
(2) developers working in parallel,
(3) developers exploiting the power of peer review for debugging and requirements analysis,
(4) rapid and incremental release schedules, and
(5) projects with pools of experienced and esteemed professional developers (Feller and Fitzgerald, 2002).

Based on these characteristics, specific educational applications were developed in line with open source technology. This development led to the emergence of learning management systems (LMSs) including Moodle, Blackboard, Sakai, Claroline, ATutor, and Dokeos, among others. The growth of these LMSs at the moment paved way for new generation technologies, such as the use of;

1. Online based development software such as open office impress for online presentation; open office suite for word processing, spreadsheet and presentation; audacity for voice recording and editing and avidemux for video editing.
2. Social software (Edmodo, pinterest, telegram, youtube and whatsapp)
3. Shared, self-created multimedia files (e.g., podcasts)
4. Mobile technologies for learning such as google classroom, google drive, and google chrome.

Although some of these software are sometimes perceived as new, but the principle of sharing software code and co-developing has been a common practice among academics from the early days of computer programming. Additionally, in the early 1960s, many fundamental software programs (operating systems, computer languages, etc.) were developed in universities such as the Massachusetts Institute of Technology and the University of California at Berkeley, and in company laboratories such as Xerox's Palo Alto Research Center. They were developed because of their significant benefit to education.

Significant benefits of OSS to higher education institutions

1. OSS can be used as a server operating system, as a desktop operating system, and for applications used in the classroom or for administration (BECTA, 2005).
2. It was a way to achieve value for the money spent by reducing the licensing costs and overall cost of ownership and that extend the ICT network and facilities.
3. OSS provides opportunity for the use of education tools anywhere, anytime with a broader experience of operating systems and software.
4. OSS is transparent and flexible which made it possible to alter the software according to needs of the user.
5. Increase innovation and collaboration as stakeholders (students, lecturers, parents and administrators) interact freely and evaluate each other.

Researchers have recognized the benefits of sharing ideas as an academic practice, that is why they embrace the principle of sharing code to allow others inspect, use, and improve it. This mode of working was analogous to how researchers shared ideas through publications, reports, notes, and conferences. However, the approach to sharing code to co-researchers was considered informal and lack economic advantage and was therefore challenged by many profit oriented corporate organizations. This led to the introduction of IPRs on software and triggers the development of general public license and proprietary software generally.

Proprietary LMS (Closed Source Software)

Proprietary LMS also called 'close source software' are developed and owned by an individual or a company usually the one that developed it. Because of its sole ownership, there are restrictions placed on its usage, modification, copying or distributing modified versions of the software (BECTA, 2005). Furthermore, subscription and license fees are required for access and its *source code* is always kept secret because it is the property of its original authors, who are the only ones legally allowed to copy or modify it.

Source codeis the form in which a program is originally written by a human using a programming language and prior to being converted to machine code which is directly readable by a computer's CPU (central processing unit). One significant benefit of proprietary LMS is the degree of external support. The platform is managed and maintained by the provider and a technical team are ready to offer support. The most popular proprietary LMS widely used by educators are (i) Blackboard learn (ii) Desire2learn (iii) Edmodo (iv) EduNxt (v) Global scholar (vi) APIXEL Comet and (vii) Aura Bright (Aura Software).

Challenges of using Proprietary and Open Source LMS in Tertiary Institutions

1. Proprietary LMS software can be expensive as it entails an annual license fee, which seems to keep rising, while the cost of obtaining many open-source LMSs is negligible. However, the costs of maintaining proprietary and open-source software could be about the same one that is purchased or leased to users. Thus, for the reason of cost and related financial challenges attached to proprietary software, tertiary institutions can opt for open source LMS as an alternative.

2. Users and their institutions cannot access the underlying source code of proprietary LMS software and thus cannot adjust it to their needs, add features, or correct bugs immediately. Users instead must make a request to the proprietary software company and hope that the company will respond in a timely manner. The company might respond quickly, but it might not make the change immediately, as it must ensure that the suggested change does not adversely affect other users of the software. For open source LMS, the source code is available and accessible and so, changes can be made to suit users' needs without seeking prior permission from the initial developers.

3. Proprietary software might not be kept current. It might be designed to address the basic needs of some institutions, but other institutions that are exploring various ways to engage students might have more advanced needs. Note, however, that open-source software might not be kept current either, as it depends upon an active community of software users, some of whom write code only when they have the time. Whether proprietary or open source, the software must evolve by taking into account new instructional methods, enhanced security features, hardware, and computing architectures.

4. As proprietary software companies develop new software, they might decide to discontinue an LMS because, it is difficult to allocate funds to keep the previous software. Additionally, as the current LMS market of the newly developed software increases, the old software is likely to gradually disappear. For open source LMS, their existence depends on the commitment of an active community around either the old or the new one. Thus, the active users of open source having the source code can conserve its originality and security of the LMS. They can equally modify it to meet their feature needs.

5. Proprietary software is restrictive to developers' features which might not serve the diverse needs of users. To serve diverse needs, the LMS must be flexible and host a variety of features that some users might not use. Some instructors might require social media and spell checker to be integrated in the LMS, others might not. Also, institutions might require software that ensures the privacy and security of personal data and let them track the educational activities of students. The open source LMS do not seem to have such challenges as it is open for modification at all times. Users can customize it to their needs.

6. The license agreement that accompanies proprietary software might constrain how the software is implemented, distributed, and administered. Proprietary license agreements might prohibit institutions from distributing the software to students with limited financial resources unless an additional fee is paid. Thus, students of lower socio-economic status might not have the ability to obtain proprietary software. The institutional purchase of this type of software may increase the digital divide, that is, the gap between those who have access to information technology and those who do not. In the case of open source LMS, every user is free to join with little or no restriction and fees could not be a barrier to its access.

In spite of the aforementioned challenges of using LMS in tertiary institutions, there are opportunities open for the institutions, lecturers, parents and students.

Opportunities of using LMS

LMS is part of the e-learning design and development process, especially if a large audience and a great deal of subject matter has to be involved. In discussing opportunities for proprietary and open source LMS, the two share the same opportunities as they are all hosted and used online. Though, they differ in terms of acquisition, maintenance and timely response to queries.

1. LMS allows the integration of social learning as part of e-learning strategy. This is possible because LMS is hosted online, as such links to Facebook and Twitter pages, and online forums that may be beneficial to students.
2. LMS supports remote services that may be offered online by lecturers like external examination, vetting of examination questions, manuscript review and any other job in which the physical presence may not be necessary. In doing these, the experts do not need to travel physically as such, boarding and lodging charges are eliminated.
3. LMS promotes green computing practices among tertiary institution workers which help to conserve their natural ecosystem. With this development, tertiary institutions can do away with printing out admission letters, brochures, manuals and lecture notes. Alternatively, these can be developed electronically and posted online.
4. In LMS, lecturers can track and report students' performance, give assignment, collaborate with students online and provide feedback to parents and students alike. In doing that, weak students' progress can be tracked, records can be reviewed, and students can register for more than one course. Additionally, the institutional administration can access the records and calculate which area needs improvement.
5. LMS provides an opportunity for course lecturers to update their course contents and related teaching resources and publish these resources within a shortest possible time.
6. LMS provides an unlimited access to e-learning materials for students. Once these materials are developed and uploaded onto the LMS, students have unlimited access to the information they need. Even those who are on the go can login to the platform via

their smartphones and tablets to learn. This is one of the main reasons why a LMS is essential for global audiences in different time zones.

7. LMS provides a medium for a synchronized electronic examination where students use their login details to access examination questions, answer the questions within specified time frame and submit. As the scripts are submitted, they are automatically collated and scored.
8. The use of LMS for e-learning appeal to a number of different learning styles and is more stimulating especially if media are carefully mixed together to elucidate a concept in a presentation. For example, a teacher can incorporate more sophisticated visual and auditory media (graphics, pictures, sounds, narrations, videos and animations) into presentations.
9. LMS also allows for media to be incorporated directly from within the programme or, by adding a hyperlink to a media reference file name within the system memory; or linking to external media DVD player, television broadcast, MP3, MP4 players.

Conclusion

Conclusions arising from this chapter might point to the fact thatboth proprietary and open source LMS are important in Nigerian tertiary institutions. However, the selection of which LMS to use remain a prerogative of the institution. For proper guidance, educational technology and information technology experts play a key role in the LMS selection process. In deciding which LMS to adopt, considerations of students needs is supreme. In snelecting LMS for use in tertiary institutions, factors such as; LMS customer experience, support services available, pricing options, availability of features relevant to institutional needs, response to software update and tracked record of the software are important. In addition to these factors, institutions must;

i. Become familiar with the challenges of a particular LMS to be used and opportunities available for such LMS.
ii. Establish an LMS selection committee to develop a selection criterion that is suitable for the institutions.
iii. Apply these criteria to determine the most appropriate LMS, given the characteristics of each institution.

Furthermore, institutions should be guided whether to select proprietary LMS which are owned by individuals or company (usually the one that developed it) that has restrictions on its use, and its ***source code*** always kept secret because it is the property of its original authors. Alternatively, institutions can also opt for open source LMS that make its source code available for modification or enhancement by anyone.

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