ABSTRACT

Increasingly, educators are implementing course development and delivery platforms to place their distance courses online in order to expand accessibility to educational opportunities, make use of multimedia capabilities, and provide effective management of the teaching and learning experience. These platforms are also referred to as course management systems (CMS), learning management systems (LMS), learning portals, or e-learning platforms. They are integrated, comprehensive software packages that support the development, delivery, evaluation, and administration of online courses. They can be used in both traditional face-to-face instruction and in an online environment. The decision to obtain such software is frequently made by administrators and computer managers. However, academics should play a significant role in this decision process, as they must create and manage a user-friendly, enticing, and interactive learning environment that is easy for the instructors and learners to use. This paper focuses primarily on the instructor and learner perspectives of online course management systems, but also considers administrative factors such as student record keeping, technical requirements, and the cost of ownership. It is intended to meet the needs of educators who are contemplating the acquisition of this type of software or want to change from one platform to another, especially from a proprietary to an open-source platform.

INTRODUCTION

Perhaps you have considered that distance education has the potential to:
- allow students, including on-campus students, greater flexibility in completing their programs of study;
- increase access to educational opportunities, especially for those who have job and family responsibilities;
- meet the needs of students who live a substantial distance from major educational centres or in sparsely populated areas; and
- achieve national educational goals with fewer expenditures than a traditional education system would require (Wright, 2001).

Increasingly, educators in both industrialized and developing countries are using distance education to resolve problems associated with resources, access, quality, and the need to educate more people (Perraton, 2000, p. 2).

One of the most recent innovations in distance education has been the implementation of course management or learning management systems that allow educators to develop and deliver instruction and learning opportunities in an organized and collaborative manner. These systems can incorporate a wide variety of materials, including text and multimedia resources such as learning objects obtained from sources such as MERLOT. They can offer a variety of assignments that students can complete at a time that is convenient to them working alone or with other students. Learners can collaborate on projects and mentor each other. Instructors can provide timely and constructive feedback. Through the use of course management systems, educators are able to deliver the same quality learning experiences to students who are on campus and students who are many kilometers away. This paper focuses on factors involved in selecting a system that meets the needs of instructors and learners, especially distance learners.
WHAT ARE LEARNING MANAGEMENT SYSTEMS AND OPEN-SOURCE SOFTWARE?

A course development and delivery platform is also referred to as a course management system (CMS), a learning management system (LMS), a learning portal, or an e-learning platform. It is an integrated and comprehensive software package that supports the development, delivery, evaluation, and administration of online courses. The software has features that allow for synchronous and asynchronous educational activities such as online chat and discussions. It can be used to supplement traditional face-to-face instruction or as a fully-online learning environment.

Open-source software is based on the following premise: “When programmers can read, redistribute, and modify the source code for a piece of software, the software evolves. People improve it, people adapt it, (and) people fix bugs…this rapid evolutionary process produces better software than the traditional closed model, in which only a very few programmers can see the source (code).” (Retrieved from http://www.opensource.org/ on July 12, 2006) Open-source software provides users with the actual source code that the courses will run on. In most cases, users can adapt this code to meet their requirements and participate in open-source communities that aim to improve and advance features of the software. However, the software may be encumbered with a licensing agreement that may limit what can be done with the code. Note also that open-source does not necessarily mean “free”. You may still have to pay a fee to obtain it, but the fee is often minimal.

Educators can choose from several hundred CMS and LMS products. Below are examples of several well-known open-source course delivery platforms.

- **Accessible Tutor or ATutor** is a web-based learning content management system that was initially developed by the Adaptive Technology Resource Centre, University of Toronto to offer maximum flexibility regarding accessibility and adaptability of online courses. It can be accessed by learners with disabilities who have access to assistive technologies.

- **Knowledge Environment for Web-based Learning (KEWL)** was originally developed by a team at the University of the Western Cape in South Africa and is currently being developed by five African institutions as KEWL.NextGen. It has been designed to function in a low-bandwidth environment.

- **Moodle** is a CMS that is guided by the social constructivist learning philosophy, i.e., learners construct new knowledge as they interact with their environment; when working with others, they can develop a shared meaning. The software comprises various modules that include assignments, chats, forums, glossaries, lessons, journals, quizzes, and resources. It has been translated into more than 40 languages.

- **Sakai** is an open-source collaborative learning environment that was originally developed by the University of Michigan, Indiana University, Massachusetts Institute of Technology, Stanford University, the uPortal Consortium, and the Open Knowledge Initiative (OKI).

WHY DO EDUCATORS SWITCH FROM PROPRIETARY SOFTWARE TO OPEN SOURCE SOFTWARE?

Usually, institutions consider changing their CMS or LMS as the renewal date of their license expires or when they have been informed that the current version of their software will no longer be supported. Thus, as part of their evaluation strategy of online learning, institutions consider their options and may decide to switch from proprietary software such as Blackboard/WebCT, Desire2Learn, eCollege, or Lotus LearningSpace to open-source software such as ATutor, Moodle, or Sakai. A few of the reasons that may be given for the switch are provided below.
• The cost of the annual license for proprietary software keeps rising each year, while the cost of obtaining many open-source CMS and LMS is negligible. It is estimated that proprietary licensing fees may represent 20-25 percent of the total cost of software ownership (Wheeler, 2004, p. 14). Note, however, that the cost of maintaining a proprietary or an open-source software may be about the same.

• Since users do not have access to the source code that supports proprietary software, they cannot make structural changes or add features to it. They cannot correct software bugs immediately. They can forward their request to the copyright owner, who may or may not make the suggested changes. Revisions can take considerable time and the requestor may be charged for the service.

• Proprietary software may not be kept current. It may be designed to address the basic needs of some institutions, but not the more advanced needs of other institutions. Note, however, that open-source software depends upon an active community of software users to keep the software current. Successful educational software must be adapted to take into account new instructional methods, hardware, and computing architectures. The software, must evolve.

• The license agreement that accompanies proprietary software may constrain how the software is implemented, distributed, and administered. If institutions want to distribute the software to students who have limited financial resources, the proprietary license agreement may prohibit this distribution unless an additional fee is paid. Thus, students in certain socio-economic areas may not have the financial capacity to obtain proprietary software. The institutional purchase of this type of software may increase the digital divide—the gap between those who have access and can use information technology and those who cannot. This is a significant issue for many developing countries.

Open-source software may first appear to be less expensive than proprietary software. However over time, “free” open-source software may be more costly if it is not robust and if it does not have the features students and instructors need. It must also be flexible, reliable, capable, and scaleable. A software is robust if it can handle numerous and varied transactions at the same time. The robustness of software, such as Moodle, will be tested by the Open University of the United Kingdom and Athabasca University in Canada, as both of these institutions plan to deploy it on a large scale. If they are successful, it is likely that additional institutions in developing countries will take the leap to free or comparatively free, open-source software. Note that the move to open-source software has begun in many developing countries: the African Virtual University uses Moodle and the National Open University of Nigeria selected ATutor.

WHAT SHOULD BE CONSIDERED WHEN SELECTING AN ONLINE COURSE DEVELOPMENT PLATFORM?

The questions below can serve as guidelines for selecting online course development and delivery platforms regardless of whether they are proprietary or open-source systems.

General

• Is the software proprietary or open-source?

• How long has the software been available?
• Is the software produced by a known and reputable institution or company?

• Are independent reviews of the software available? If so, how is the software rated relative to other options?

• What educational institutions currently use the software? Are software reviews available from these institutions?

• Is the software available for a trial period at no or minimal cost? What are the conditions for this trial?

• What languages will the software support?

• What kind of user and technical support is available for the software? Is the company that produced the software committed to friendly, quick, helpful, and accurate support? What proof is available from other institutions about the quality of the support that is provided?

Instructor Perspective

• Is the software intuitive, or do faculty require a lot of training to use it?

• Can an instructor easily establish and modify a course profile and calendar?

• Does the software provide authoring tools for course development?

• Does the platform provide or accommodate a variety of learning strategies?

• Are instructional templates available?

• Can instructors edit or modify course material without knowing programming languages? Can they easily add links to a course?

• Does the software easily accept OpenOffice.org files or Microsoft Word, PowerPoint, and Excel files? Does it accept any other software files such as those that are based on Linux, Mac OS, and Solaris?

• Can existing or future instructional materials, such as those that can be produced by Macromedia's Authorware, Dreamweaver, and Flash, be incorporated into the course development software?

• Can the online software accommodate publisher-produced software, sometimes referred to as course cartridges?

• Does the system easily support different media, such as audio and video files?

• Are presentations or synchronous communication tools, such as an electronic whiteboard, available?

• Are collaborative tools, such as discussion forums and chat, available? Can users exchange files easily?

• Can e-mail be sent to an individual student or groups of students registered in a particular course or program?
• Can the instructor provide learners with a variety of evaluation tools such as student self-tests, summative tests, and course evaluations?

• Can publisher-produced testbanks be uploaded into the software?

• Can some assignments and tests be marked automatically and the grades posted?

• Can instructors change marks or grades once they have been entered?

• Is it possible for instructors to change how the grades are displayed and to export the grades into other software, such as Excel?

• Can instructors track and show students’ progress graphically?

• Can instructors adjust the style of the course presentation? For example, can the course banner or header be modified easily?

• Will instructors be importing or adapting courses from other institutions? If so, are these courses mounted on compatible software?

• Do faculty have access to online help?

Learner Perspective

• Is the learner interface easy to use? Can learners navigate the software easily?

• What basic computer skills will students need in order to use the system competently?

• What are the browser requirements? Note that students may use a variety of browsers and different versions of a browser to access the software.

• Does the e-mail system support attachments?

• Can students send e-mails to other students using an e-mail address within the platform?

• Can students submit their assignments easily? Can they modify or withdraw an assignment once it has been submitted?

• Can students access their marks online?

• Are students able to track their progress?

• Are features such as bulletin boards and chat or discussion forums available? Can learners easily follow the discussion threads?

• Can students register, pay for a course, and receive their final grade online?

Student Record Keeping

• What student data can be recorded?

• What reports can be generated?

• Is the student database searchable via a variety of parameters?
• What levels of security are provided? Can the security system be customized? Is it password protected?

• Can instructors enroll and withdraw students in particular courses?

• What student tracking functions are available? Does the software record when students sign on to the system, what they do while they are on the system, and when they sign-off?

• What type of statistical reports can be produced?

• What administrative software will integrate seamlessly with the course delivery software or platform?

Technical

Academics who are not technical experts should seek assistance from their computer service department when seeking answers to the questions below.

• What are the hardware, software, and network requirements of the platform? What server platform is required?

• Does the software or platform comply with recognized standards? For example, does it comply with the Sharable Content Object Reference Model (SCORM) that promotes accessibility, interoperability, and reusability of learning content or the Instructional Management Systems (IMS) standards for locating content, reporting performance, and exchanging information between administrative systems? This latter standard is important if data from the course delivery software must be transferred to a student record system. Both of these standards allow for the development of content that can be exchanged between different software.

• Can information from the new software, such as student grades or marks, be transferred seamlessly to existing institutional software?

• Do current staff have experience with this hardware and software? If not, what type of training do they need? Is this training accessible?

• What are the minimum hardware, software, and network requirements for the learner?

• Can the technical requirements be met at study centres? If not, what changes are required at study centres?

• Will the software automatically adjust to the network speed of those trying to connect with it?

• Does the current software allow for text messaging and/or podcasting, or will these features be included in the future?

• Does the software have security features that prevent unauthorized access to information?

• Is this platform scaleable? Can it be expanded easily to accommodate a larger number of students and instructors?

• What backup features, if any, are provided? Can backup be done automatically?

• Can the platform be customized? What procedures must be followed in order to customize the software? What programming language is required to accomplish this customization?
• Can the software be administered easily?

• What type of support is available? When is the support available, and what is the cost of same-day or next-day support?

• What training will be provided by the software distributor?

**Cost of Ownership**

• What is the purchase or lease cost of the software? What are the incremental costs as the number of student registrations and courses increase?

• What are the maintenance costs?

• What are the training costs?

• What is the total cost of ownership?

• Are the purchase, lease, and maintenance costs sustainable?

**NOW THAT YOU HAVE ANSWERED THE ABOVE QUESTIONS, WHAT SHOULD YOU DO NEXT?**

Take the time to compare the software to similar products and to pilot it. You can use the Commonwealth of Learning (COL) *Learning Management Systems Evaluation Tool* (http://www.col.org/colweb/site/pid/3107) and the Western Interstate Commission for Higher Education (WCET) *EduTools* (http://www.edutools.info) to review the features of various software and place a specific weight or emphasis on a particular feature when you are summarizing the results of your comparisons. Do not take the vendors words that the software has the features you want and that these features are user-friendly. Ask novice and experienced instructors and some students to use the software. Involve computer and technical service personnel in your pilot. The software may have all the features you want, but may be difficult to use. The only real test is to use it in your instructional/learning environment and ensure that it meets your functionality needs and technical requirements. If you already have a CMS or LMS, then you must also ensure that you can transfer your existing course material to the new software. The actual users of the software, the academics and learners, should have significant input into the selection of any LMS or CMS.

Finally, the software selected should be aligned to the educational plan of the organization and there must be proper project management to ensure that the implementation is successful.

By using CMS and LMS, you could provide an accessible and quality distance learning experience that addresses “the hunger for learning felt by those who have been denied it for generations” (Dhanarajan, 2001, p. 61).

**REFERENCES**


**EDUCATIONAL RESOURCES**

ATutor – An open-source web-based learning content management system, [http://www.atutor.ca](http://www.atutor.ca)

Carnegie Mellon University Open Learning Initiative – Source of online material and courses designed for postsecondary learners, [http://www.cmu.edu/oli](http://www.cmu.edu/oli)

Connexions – A collection of free scholarly material and software, [http://cnx.org](http://cnx.org)


Knowledge Environment for Web-based Learning (KEWL) – [http://kewl.uwc.ac.za/](http://kewl.uwc.ac.za/)


Massachusetts Institute of Technology’s (MIT) OpenCourseWare Project—Free, searchable access to MIT’s university-level course material, [http://ocw.mit.edu/](http://ocw.mit.edu/)

Moodle – An open-source course management system, [http://moodle.com](http://moodle.com)

Multimedia Educational Resource (MERLOT) – Collection of free and open educational resources primarily for higher education, [http://www.merlot.org](http://www.merlot.org)


Open Source – A non-profit corporation that is dedicated to managing and promoting the definition of open-source software and its application, [http://www.opensource.org/](http://www.opensource.org/)


Sakai – An open-source online learning and collaborative tool, [http://www.sakaiproject.org](http://www.sakaiproject.org)

UNESCO Portal to Free and Open Software – [http://www.unesco.org/cgi-bin/webworld/portal_freesoftware/cgi/page.cgi?id=1](http://www.unesco.org/cgi-bin/webworld/portal_freesoftware/cgi/page.cgi?id=1)

uPortal – A free, sharable portal being developed by various postsecondary institutions, [http://www.uportal.org/](http://www.uportal.org/)
Western Interstate Commission for Higher Education (WCET) EduTools – Provides reviews and side-by-side comparisons of selected course management systems as well as a decision tool that will help you select a system that meets your needs, http://www.edutools.info

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