

## A Review of LMS Platforms: Usability, Adaptability, and Implementation Considerations

Central to the practice of online distance education is the use of a formal learning management system (LMS); LMSs are increasingly being included in F2F education as well. While the term “LMS” can be defined in many ways, the most basic definition is “an information system that administers instructor-led and e-learning courses and keeps track of student progress” (The Computer Language Company Inc., 2010), and such a definition encompasses capabilities to help manage both synchronous and asynchronous courses.

Two types of LMSs exist: proprietary systems, which are copyrighted and owned by the companies which develop them and for which use is restricted to those institutions purchasing a license, and open source systems, which are freely distributed, non-copyrighted software programs for which the source code is also freely distributed, with users encouraged to modify the code for use by themselves and others. Proprietary systems include Blackboard, Angel (acquired by Blackboard in 2009), and Desire2Learn, while open source alternatives include Moodle, Sakai, and Dokeos, among others.

Although each software platform is set up differently, most LMSs share a common core set of features, including tools to facilitate and enhance communication, productivity, student involvement, course and program administration, content development, and course delivery (EduTools, 2010a). This paper seeks to highlight the benefits and drawbacks, as noted from the user perspective, of five of the most popular LMSs – Blackboard, Desire2Learn, Moodle, Sakai, and Dokeos – and also review two immediate concerns when deciding to implement an LMS.

### Blackboard

Blackboard is the “granddaddy of them all,” as Keith Jackson would say, the biggest of the proprietary LMS solutions available. Started in 1997 by a pair of education consultants, the company has grown both organically and through acquisitions to serve users in the K-12, higher education, and corporate learning markets.

Blackboard offers numerous benefits from the learner perspective. Since so much of online education is dependent upon communication, favorite features of learners are the announcement, discussion, and email features. Using the announcement feature, which is a strength of Blackboard’s offering, the instructor can help learners to “keep current” with course developments and minimize the “chasing down” of students that is often necessary in non-LMS online environments (Bradford, Porciello, Balkon, & Backus, 2007). Additionally, the feedback, assessment, and tracking capabilities are perhaps the best of any LMS; learners can submit assignments from any internet connection, check to see if assignments have been graded, and view grades confidentially. For tracking purposes, learners can use the student view of the gradebook to track the course progress throughout the semester, and can also use the calendar feature to build their own schedule to keep themselves on track throughout the semester (Blackboard Inc., 2007). Finally, the ability of Blackboard to serve as a content repository for

prior coursework cannot be understated, since it provides learners the ability to go back and review course discussions, assignments, and other materials from all courses they have taken using the Blackboard platform.

With a system so large, there are undoubtedly drawbacks in its use. Learner complaints are generally low, though, and center around the high bandwidth demands of the Java runtime components and inconsistencies in course setup among different instructors (Ragsdale, 2009). One other learner challenge is that in some Blackboard instances, learners are unable to view course materials via a link – most materials must be downloaded from within the application to be reviewed. The bulk of the challenges with Blackboard come from the institutional perspective, and are related primarily to costs; initial implementation and ongoing support costs are high, which poses a barrier to both entry and exit for users. Potential adopters could also be turned off by Blackboard’s monopolistic tendencies, as the company aggressively “protects” what it sees as its position in the LMS hierarchy by using the legal system, and also has silenced its competitors by acquiring them (Smart & Meyer, 2005).

### Desire2Learn

Desire2Learn, a proprietary LMS, markets itself to the K-12, higher education, corporate and continuing education, and healthcare and government learning environments. Scant literature or user reviews are available for this system, as it falls squarely in Blackboard’s shadow. With a strong focus on group work, the platform provide support for group “drop ins” both within the context of a course and in a more general portal-type environment. Based on its relationship with government entities, the LMS is also highly SCORM-compliant, and as such, has been designed to easily share resources and course materials across course sections within the same LMS instance (Desire2Learn Incorporated, 2010).

On the downside, Desire2Learn instructor and learner users note that the platform’s initial usability learning curve is steep and not particularly intuitive (Smart & Meyer, 2005). In terms of name recognition, Desire2Learn has little; it competes in the proprietary LMS space, and succumbs to name recognition pressure as a later entrant into this competitive market already dominated by Blackboard. As if that isn’t enough Blackboard-generated pressure on the platform and its developers, Blackboard has sued Desire2Learn more than once, claiming patent infringement as well as other illegal use of proprietary technology, and has initially prevailed in court, although the decisions are under appeal.

### Moodle

Moodle is the most popular of the open source LMSs, with more than 900,000 users in 211 countries (Moodle.org, 2010). Its main benefit is one external to the LMS itself, in that there is an active online presence at [www.moodle.org](http://www.moodle.org) that includes user and developer forums, with more than 630 application plug-ins and additional modules available for community use. Also, there are numerous third party developer resources available, including a commercial arm of Moodle found at [www.moodle.com](http://www.moodle.com), to assist with implementations and customizations. Learners appreciate that the Moodle structure requires courses to be “built” in a sequence

similar to that found in a normal F2F class, with modules pertaining to each week or section to be covered, allowing them to remain organized in their work, and that the LMS itself can serve as a repository of all the work done throughout the course so as to aid in building a portfolio when the time comes (Chao, 2008).

The main drawback of Moodle is that it is built such that a user, whether in an instructor or a learner role, must register for each individual course rather than having an LMS-wide login from which all course enrollments can be accessed. Although a single Moodle instance can house multiple courses from multiple instructors, the requirement to log in to each individual course is a “time stealer” and makes it painful to switch back and forth between classes (Ragsdale, 2009).

### Sakai

Sakai, an open source LMS developed collaboratively by the University of Michigan, Indiana University, MIT, and Stanford University, bills itself as a “collaboration and learning environment” rather than a traditional LMS. Designed and built by academia for academia, the platform makes online learning an extremely constructivist endeavor, transforming the instructor into more of a facilitator role and requiring significant student participation to produce a valuable course outcome (Berg & Korcuska, 2009). Central to this philosophy is an enhanced emphasis on collaboration and group work, and Sakai offers various functionalities to foster group work, including group-specific discussions, a “drop box” for private collaboration between learners and instructors or among groups of learners, and the ability to include sub-sites within a course site for groups to use (Pacific Lutheran University, 2010). The Java-based platform lends itself well to scalability, and the Sakai Foundation’s rolling 30-month development “roadmap” helps institutions to know whether or not desired enhancements need to be completed using in-house resources or if the Sakai core developer base is already working on enhancements.

From the instructor’s perspective, using Sakai is challenging at best. There is no one-click functionality to summarize a learner’s participation in a course, so grade must be cobbled together through back-and-forth review of postings, assignments, and other work. Of similar difficulty is the fact that a course gradebook cannot be customized to include different grading scales for different assignments within the same course; if assignment A is being graded on a 90-100, 80-90, etc. type of scale, so is every other assignment given during the course.

### Dokeos

Dokeos is another open source LMS solution, with a customer base focused on the corporate, governmental, and medical research markets. The system’s developers call it an “open source professional learning suite,” and the name is appropriate, as the core product installation includes an LMS, a suite of rapid e-learning authoring tools, and most impressively, videoconferencing capabilities embedded within the application itself. It is written in PHP and uses MySQL as the database structure on the back end, so developer resources are plentiful and readily available to assist in platform customization, with the bonus that they will not have to be conversant in the nuance of education-related programming. The LMS itself is tightly

integrated with Microsoft Office, allowing for rapid uploading and presentation of both instructional units and learner assignments created within Office (Dokeos, 2008).

Dokeos' limited educational user base, combined with its Euro-centric developer base, presents a challenge to its wider adoption. Very few instances are installed outside of Europe, so development work might entail features and functionality different from that expected in the US higher education marketplace. Aside from that, the technical structure of the platform itself tends to create storage headaches for institutions choosing to implement it; each course has its own unique database, rather than using one main schema for the entire instance, leading to significantly increased storage demands and questionable linkage of material across courses, as "one course, one database" offers no reusability of content between courses.

### Implementation Considerations

As has been shown, each LMS has its share of pros and cons to be considered when making a choice for a campus- or enterprise-wide adoption. Proprietary systems often offer a more polished, professional presentation of content, but at a higher initial and ongoing cost; open source systems offer the expertise of thousands of users across the globe in terms of customizations and enhancements, but are generally challenging to integrate with other information systems in the organization. Recent research indicates that "in reality, market standardization has alleviated much of the institutional discomfort in [the LMS] decision" (Black, Beck, Dawson, Jinks, & DiPietro, 2007). Since a comparison of more than 26 LMSs in the marketplace shows that all include the same general functionality (EduTools, 2010b), an institution's decision on which LMS to adopt often is based on factors external to the LMS itself.

Not surprisingly, one of the most important factors in the choice of an LMS is cost. This challenge is compounded by the fact that an LMS is part of the infrastructure wherever it is implemented, and as such, is often taken for granted – regardless of the "front end" or GUI, instructors and learners alike know what an LMS is and what it does, and will generally be accepting of any solution provided its use is relatively intuitive.

Proprietary LMSs require prospective adopters to make a significant investment in licensing and maintenance contracts, not to mention hardware or hosting services to actually run the platform, before an implementation can ever take place. Such high costs are often a barrier to entry for institutions, but in today's ultra-competitive student recruitment environment, institutions often believe the costs are justifiable in terms of potential return in the form of increased enrollments. Once an institution adopts a proprietary LMS, though, the same high costs also serve as a barrier to migrating to a different, lower cost platform; attempting to do so is often seen as "throwing good money after bad," and since there is rarely a point in an academic year where there can be downtime to make a clean break from one system to another, carrying costs are incurred for two LMSs, not just one. In this same scenario, another argument to stay on the existing system is the value of the investment already made, as campus IT staff don't want to be on the hook for what will likely be seen as a flawed implementation, so even though it might be best to sever ties with the proprietary system, doing so is challenging. For these reasons, institutions cannot afford to look at an LMS investment as a single event with a short lifespan; they must complete their due diligence and

commit themselves to a single system for a longer period of time in order for there to be any chance of a reasonable per-user and per-course cost capitalization (Edutools, 2010b).

The same issue of cost exists when institutions consider open source software, although often not to the same extent. Open source software is referred to in numerous sites on the internet as “free like a puppy, not free like a beer” (see <http://teachlearntech.com/blog/?p=52>, <http://interwovenblog.com/2008/11/19/open-source-is-free-like-a-free-puppy-is-free/>, or <http://www.codinghorror.com/blog/2006/08/open-source-free-as-in-free.html>, among others). The implication is that “free,” in reality, isn’t; there are often significant developer hours spent in engineering and maintaining an institution’s desired customizations, so there can only be no cost if developers’ time is worthless and if they are not paid for their work.

However important the cost factor is in the LMS selection process, one common failing of those charged with deciding which LMS to implement is the exclusion of one of the most important groups of stakeholders – learners themselves (Ragsdale, 2009). Although many studies have identified features important to learners, they have done so in the isolated instance of a single institution’s LMS choice. In the process of formulating a recommendation for the adoption of a common LMS throughout its 64 campuses, the State University of New York (SUNY) took the remarkable step of analyzing LMS use within the state’s K-12 institutions (SUNY-Delhi, 2010a). While it is generally thought that the familiarity and comfort level with technology of this generation’s undergrads provides them the advantage of rapid adaptability to new technologies (Smith, Salaway, & Caruso, 2009), the SUNY group’s research is perhaps the first to consider the advantages of continuity in LMS use between the K-12 and higher education environments.

Survey results from New York’s 38 Boards of Cooperative Educational Resources (similar to Ohio’s county ESCs) and 12 Regional Information Centers showed that in the 2008-2009 academic year, 28 (56%) of the K-12 organizations used Moodle as their LMS, while only 13 (26%) used Blackboard (SUNY-Delhi, 2010a). Within the SUNY system, though, the results were even more drastically opposite; 47 campuses (76%) utilized Angel, Blackboard, or a combination of both, while only two campuses (3%) had a Moodle instance (SUNY-Delhi, 2010a). Coupling results from The Campus Computing Project’s 2008 survey of member institutions, which indicated that 24.4% of respondents noted the likelihood of migrating to an open source LMS as “high” with the cost comparison, with the actual SUNY-wide Angel/Blackboard annual licensing and hosting costs of over \$5 million as compared to projected annual licensing and hosting costs of \$446,000 for a system-wide Moodle implementation, the interests of providing a familiar (read “continuous”) experience to its learner population through a system-wide Moodle implementation become much more compelling.

The cost and continuity factors are compelling decision points for institutions considering the adoption of a new LMS. Given survey results from The Campus Computing Project that almost a quarter of institutions expect to implement an open source LMS solution by 2013, it will be interesting to watch the interactions between the proprietary software market and the open source market; in fact, Blackboard has announced that its most recent release offers support for importing course material from both Moodle and Sakai (Blankenhorn and Rooney, 2009). Will we see a convergence of the two? Can Blackboard find a way to swallow its biggest open source competitor? Only time will tell, but change in this highly competitive and valuable market is certain.

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