Learning Management Systems Review

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Executive Summary
Beginning in early 2007, SUNY implemented a large scale adoption of the ANGEL Learning Management System (LMS). In 2009, the greater educational community was informed that Blackboard (Bb) had acquired ANGEL Learning, Inc. Blackboard has since announced that support for the ANGEL product line will continue through 2014. In early 2010, the SUNY Learning Network (SLN) asked the Directors of Online and Distance Learning Environments (DOODLE) to undertake a Learning Management System evaluation to address the concerns of the SUNY community regarding the future directions of SUNY supported learning management systems as the current State University of New York ANGEL contract will end in December 2011.

The following report discusses the selection methodology for the systems reviewed. Analysis of the unique characteristics of the four systems evaluated follows in this report. This report summarizes the project’s overall impressions of the systems under review, and provides guidance as to which systems DOODLE believes should be supported by SUNY System Administration (via SLN, ITEC and SICAS) going forward.

Introduction
Under the direction of the SUNY Office of the Provost, SLN provides services to SUNY institutions in the arena of online learning. These services include application hosting and administration of the ANGEL software, end-user support via help desk services, professional development for faculty, and instructional design expertise. Each SUNY institution operates independently; students register for and receive credit from individual campuses, and courses and degree programs are maintained by each institution. Currently, 27 out of 64 SUNY units subscribe to some combination of the described SLN services.

DOODLE was formed as a SUNY-wide association of distance learning administrators, with the mission of fostering knowledge-sharing and best practices for the development and support of online learning programs. The 37 DOODLE member campuses encompass the full scope of SUNY's engagement in distance learning: SLN-affiliated institutions and independent institutions that self-manage or outsource their LMS application and user support. Key to DOODLE’s premise is that it is an LMS-neutral organization focused on the creation, implementation and operation of distance learning degrees, programs and courses.

Online learning, as defined by the spectrum of use from a supplement to classroom based courses, through hybrid/blended courses, to fully online asynchronous learning, continues to grow dramatically for SUNY colleges. Online learning provides opportunities to improve the teaching and learning experience, reach more learners, and lower infrastructure expenses. Coupled with the fact that the current State University of New York ANGEL contract will end in December 2011, the director of SLN asked DOODLE to undertake an LMS evaluation to address the concerns of the SUNY community. With Blackboard's announcement that support for the ANGEL product line (ANGEL 7.4 and the future release of ANGEL 8.0) will continue through October 2014, this evaluation will allow SUNY to position itself to make an informed decision with ample time for each campus to undertake a migration.
The overall adoption rate of Blackboard family products (Blackboard, WebCT, and ANGEL) comprises over 87% of SUNY’s total usage of learning management systems. Recognizing the scope and importance of the business relationship between Blackboard and SUNY, SUNY via SLN continues ongoing negotiations for a SUNY-wide contract.

The goal of this project will be to evaluate selected alternatives to Blackboard Learn. Periodic evaluation of all information technology resources on a regular basis is a prudent action by any organization. In this particular case, there are several overarching reasons that contribute to the need for this project:

The requirement to reevaluate:
Given the expiration of the state-wide contract with Blackboard for the ANGEL LMS in 2011, combined with end of life (EOL) for the ANGEL 7.4 and 8.0 releases in October 2014, SUNY should reevaluate all relevant and viable LMS options.

The opportunity to reevaluate:
The market space for learning management systems has changed dramatically since the inception of online learning offerings within SUNY. The commercial sector products have been drastically consolidated via Blackboard's acquisition of WebCT and ANGEL. In parallel, open source platforms such as Moodle and Sakai have gained significant user share in higher education as acceptance of open source software grows and product capabilities mature.

The mandate to reevaluate:
Online learning, via the OpenSUNY concept in Chancellor Zimpher's strategic plan, "has the potential to be America's most extensive distance learning network". SUNY's future LMS selection needs to align with this goal, and must be able to integrate with social and emerging technologies as part of the portfolio of online learning tools. We see this as an opportunity to select an LMS platform that has the ability to scale and support growth at a non-linear rate, and to determine if current LMS platforms have the flexibility to incorporate current and yet to be imagined Web 2.0 integration.

The LMS Market Space

State of the LMS market
The 2010 Campus Computing Project recently described the LMS market space as “a market in transition”. Several factors can be seen as contributing to change in market share between (Blackboard), and its open source and commercial competitors. One obvious marker is market consolidation: Blackboard’s total market share has grown via the acquisition of WebCT in 2005, and the subsequent acquisition of ANGEL in 2009. During this time frame, acceptance and adoption of open source alternatives (primarily Moodle, with Sakai holding a minority share of open source implementations) has grown.
Flux in market space
The Campus Computing Report (http://www.campuscomputing.net/sites/www.campuscomputing.net/files/Green-CampusComputing2010.pdf) notes that Blackboard’s total market share has decreased from 71 percent in 2005 to 57.1 percent in 2010. Open source alternatives Moodle and Sakai gained 1.6 percent in market share. This raises the question: if colleges and universities are selecting an alternative to Blackboard, why isn’t there a corresponding proportional rise in open source adoption? Interestingly, Desire2Learn, as possibly the only large-scale alternative commercial LMS vendor, has seen an 8 percent increase in adoption since 2005, bringing their market share to 10.1% - slightly larger than the combined open source segment. A varying interpretation from analyst Michael Feldstein agrees with the shift in the market away from Blackboard; Feldstein notes that the combined market share of Desire2Learn, Moodle and Sakai equals 30% of the total installed LMS base. Feldstein provides further breakdown of the data: Desire2Learn’s greatest gains are in the 2 year community college sector, while Moodle seems to the preferred transition platform for 4 year colleges. Anecdotal evidence suggests that many ANGEL campuses specifically chose ANGEL as a viable commercial alternative to Blackboard. It is extremely likely that other institutions using ANGEL today are performing similar evaluations and weighing their possible migration options.

As further evidence of the rapidly changing nature of the LMS landscape, Instructure’s Canvas LMS was not considered for in-depth evaluation for this report due to the relative immaturity of the product and the company. Since that time, Instructure has signed the Utah Educational Network (UEN) as its first major consortium client, and announced (on February 1, 2011) that it would now provide an open source version of its Canvas application.

Product Evaluation
Product Evaluation Selection
The Committee investigated and examined various proprietary and open source LMSs and identified the following products to be formally evaluated:

- Blackboard Learn
- Desire2Learn
- Moodle
- Sakai

The above LMS applications were selected for evaluation based upon the following criteria:

- **Viability/vibrancy/health**: the above platforms demonstrate continued adoption by higher ed institutions as well as ongoing, sustained product development and support, either via the parent company (Blackboard, Desire2Learn), or via community development (Moodle, Sakai Foundation) or commercialized supported releases of open source community software (Moodlerooms, rSmart).
- **Similar scale**: although SUNY is particularly unique in terms of its highly distributed and campus-centric approach to managing online learning, each of the above-named applications
generally has several current adopters that are at least similar in terms of numbers of users and course volume.

- **Maturity**: each of the above-named applications has been in existence for several years in production usage. A proven track record of sustained, successful usage by similar-sized colleges and universities is a baseline requirement for being considered in this evaluation. The mission-criticality of distance learning for SUNY is such that "start-up" applications or those with low market penetration are not a viable alternative.

In order to provide the meaningful cost comparisons that appear later in this report, a basic assumption was made to restrict our costing data to outsourced hosting, rather than self-hosting using campus personnel and technical resources. This approach is consistent with current pricing structures for ANGEL hosting provided by SLN to its consortium subscribers. Campuses may, if they have adequate resources, opt to self-host any of the platforms reviewed in this project. No cost projections for local operation are included in this summary. Outside vendors were sought for quotation primarily because ITEC does not have fully developed product offerings (and pricing) for platforms other than ANGEL at this date. All pricing data, therefore, is provided to benchmark possible outsourced hosting costs against current ANGEL license and ITEC hosting fees. No further assumptions are made regarding any contract or pricing agreements between SUNY and the vendors reviewed in this report.

**Product and Vendor Profiles**

Following is a brief overview of each LMS:

**Blackboard Learn** - The market share leader in higher education LMS, Blackboard (Bb) offers a proprietary product with a number of social learning and teaching tools. Started in 1997, the recent acquisitions of WebCT and ANGEL (and Prometheus years earlier) have increased Bb’s dominance of enterprise-level LMS solutions. Blackboard software is used by over 3700 educational institutions in more than 60 countries.

Bb Learn includes a wiki, visual content mash-up capability, and lecture capture capabilities. A learning module tool intended to provide an intuitive online structure and content management enhancements are intended to increase ease of use for students, faculty and designers.

Blackboard offers an integrated suite of products that provide synchronous communication and sharing, collaboration, identity management, and mobile device access to the LMS. This suite of services can potentially provide end-to-end coverage for campus’ online learning needs.

**Desire2 Learn** (D2L) is a Toronto-based commercial alternative to Bb that offers a learning suite tailored to higher education, and specifically to asynchronous online learning. Founded in 1999, the company was once a litigation ‘target’ of Bb over patent issues. A 2007 report by the Instructional Technology Council showed D2L as having less than a 5% market share in the surveyed community colleges. Since that time, and since the resolution of the patent infringement action with Blackboard, D2L’s market share has grown to 10% for 2010.
The higher education suite includes synchronous tools such as live chat, multi-point videos and an interactive whiteboard. E-mail, a blog tool, ePortfolios, and instant messaging are also included. Clients include The University of Wisconsin System, The Montana State University System, The Colorado Community College System, SUNY Suffolk, New York Chiropractic College and Rochester Institute of Technology, as well as a number of institutions ranging from community colleges to research universities both in the United States and abroad.

The "single instance/multi-domain" (hardware layer + application layer) model of aggregated hosting (that was ultimately unsuccessful in ANGEL) appears to successfully support consortium systems such as the University of Wisconsin. In such an environment, campuses can share computing resources in a cost-effective manner while still retaining local branding and a level of administrative control.

**Moodle** is open source software provided with no licensing fees. By October 2010, Moodle had over 36 million users in 210 countries. Moodle was originally an acronym for Modular Object-Oriented Dynamic Learning Environment. Development on the product started in the late 1990’s and was copyrighted in 1999. According to the aforementioned Campus Computing Project, the Moodle market share rose from 4.2 percent in 2006 to 16.4 percent in Fall 2010.

Moodle has a list of features similar to any commercial LMS. The user community has also developed a comprehensive list of “modules, hacks and plugins” that can be installed or modified to fill the particular needs of any campus. The Moodle community is very active and provides robust technical support.

Moodle can support a wide range of applications ranging from several courses running on a desktop computer or several hundred courses in a self-hosted server environment; hosting and other support can also be out-sourced to third party vendors. Total costs of ownership can influence the decision to self-host or go to a third party vendor or Moodle partner. Moodle Partners are a group of service companies that provide optional commercial services for users including hosting, custom code development, and consulting. Two Moodle partners with customers within New York are Remote-Learner USA and Moodlerooms. Moodlerooms provides “value added” solutions including joule, an exclusive enhancement to standard Moodle tools. Remote-Learner provides additional types of services, including support only (for locally run instances) up to full remote hosting and support.

**Sakai** is distributed as free and open source software that is “built by educators for educators”. The development of Sakai was funded by the Mellon Foundation in 2004 and created by a consortium that included the University of Michigan, which contributed its CHEF course management system. ‘Sakai’ refers to “Iron Chef” Hiryuki Sakai.

Sakai includes all of the features common to LMSs but is also intended as a collaboration tool for research and group projects. Continued development of Sakai is overseen by a foundation funded by voluntary partner contributions. A 2006 publication by the Alliance for Higher Education Competitiveness estimates Sakai as having a 4% market share.

Like the other LMSs under consideration, Sakai can either be self-hosted or hosted and supported by a third party vendor. One such vendor is rSmart, which positions their product as a smoother, enhanced
version of Sakai which is rigorously tested and comes with documentation and tutorials. rSmart offers a range of services including data migration, training and hosting.

Feature Comparisons

Access to test systems was provided by both commercial resellers of open source services (MoodleRooms and rSmart) and by peer institutions where available (Blackboard from JCC and SUNY Upstate; D2L from SUNY Suffolk, and Sakai from American Public University). Public demonstrations using the above resources were conducted for the SLN community of Directors of distance learning and instructional designers.

Teaching and Learning Functionality

Investigation focused on core teaching and learning functionality, namely:

1. Quizzes
2. Discussion Forums
3. Drop Boxes (collectors of written assignments)
4. Grade Book
5. Web 2.0 Integration

The team of instructional designers on this project presented this framework to their peers in the SLN consortium, and it was confirmed by the majority of instructional designers as an appropriate model.

A comparative matrix of functionality was developed; the end result was that for the most part, the four systems offer largely comparable teaching and learning tools, with major variations in capability. Where significant gaps exist currently, such as Blackboard 9's inability to provide individual discussion post scores (a key component of online pedagogy propagated by SLN faculty development services), it is anticipated that these features may change in the near future.

Accessibility

Standards for accessibility for people with disabilities are defined by the Federal section 508 standards and by New York state’s Web Accessibility Policy. As an arm of New York State services, SUNY should be aware of the current levels of compliance within the four LMS platforms under review. Currently, Penn State is facing a lawsuit that argues that many of the university’s information systems, and especially the ANGEL LMS, do not meet guidelines for accessibility. ANGEL uses a 508 viewing option to unframe course content and make it accessible for screen reading technology. By doing so, this accessible version of ANGEL provides limited functionality that is not directly equivalent to what sighted users receive. In 2008, CalState found that Moodle met the stringent California state accessibility guidelines.

The National Federation for the Blind (pursuing the lawsuit against Penn State) currently certify the following learning management systems at their “gold” level:

- Desire2Learn 9.1.0
- Blackboard Learn 9

Moodle and Sakai do not currently carry NFB certification. However, both open source initiatives have accessibility working groups that focus on documentation of current accessibility problems and develop plans to resolve significant issues.
LMS Feature Integration Technologies

SIS Integration
Desire2Learn and Moodle (via Moodlerooms’ “Conduit” product) offer the greatest flexibility with respect to Student Information Systems (SIS) integration by campuses, SLN, ITEC and/or SICAS, due to the availability of multiple integration options, as well as vendor partnerships and support. Blackboard and Sakai were determined to be not as flexible, but do offer acceptable means of course and student data transfer from Student Information Systems via flat files. In particular, Blackboard in its current release has reduced capabilities in this area as compared to ANGEL with XEI.

Application Development and Customization Environment
All evaluated systems offered some degree of flexibility in terms of supported programming languages. Blackboard and Desire2Learn do not allow clients to modify the underlying application source code; instead, they rely on feature and enhancement requests. Modifications to the presentation, and select functionality, of both applications by clients are conducted via the exposed APIs. Blackboard is written in Java, and Desire2Learn is written in C# and other .Net languages. As the current ANGEL platform is also written in .Net languages, modifications to D2L are more easily realizable given the current skillset offered by SLN and ITEC. The hosted versions of Moodle, which is written in PHP, and Sakai, written in Java, allow for feature enhancements and alterations from their respective service providers. As such, end customers cannot make modifications to this code. If Moodle or Sakai were hosted locally by SLN/ITEC, access to the entire source code would be possible for full customization. Regardless of whether a commercial or open source environment is ultimately provisioned for consortium use, version control and issues of “mass customization” vs. a uniform, stable environment for all users will continue to be a topic of discussion between ITEC, SLN and the consortium campuses.

Cost Comparisons
Four campuses that were the subject of an earlier Blackboard performance analysis project were selected for comparative cost modeling. Each campus is a “high use” campus, though the characteristics and nature of use vary greatly from campus to campus.

Pricing is based on the premise of existing ANGEL contract pricing as currently in place with Blackboard, which is then compared to the other 3 platforms. Even though there is a “zero” license cost for the open source Moodle and Sakai applications, there obviously are ongoing costs to support, host, and maintain such systems, which are reflected in the vendor pricing below.

<table>
<thead>
<tr>
<th>Campus</th>
<th>ANGEL (FTE)</th>
<th>ANGEL Annual Cost</th>
<th>ANGEL One Time Cost</th>
<th>Blackboard (FTE)</th>
<th>Blackboard Annual Cost</th>
<th>Blackboard One Time Cost</th>
<th>D2L (Consortium)</th>
<th>D2L (Independent)</th>
<th>Moodle (Independent)</th>
<th>rSmart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canton</td>
<td>2,487</td>
<td>$57,325</td>
<td>$10,351</td>
<td>$24,774</td>
<td>$23,500</td>
<td></td>
<td>$59,214</td>
<td>$25,850</td>
<td>$43,240</td>
<td>$44,534</td>
</tr>
<tr>
<td>FIT</td>
<td>8,784</td>
<td>$78,884</td>
<td>$198,205</td>
<td>$74,076</td>
<td>$28,500</td>
<td></td>
<td>$139,956</td>
<td>$30,850</td>
<td>$61,401</td>
<td>$79,198</td>
</tr>
<tr>
<td>FLCC</td>
<td>4,124</td>
<td>$59,184</td>
<td>$159,561</td>
<td>$37,601</td>
<td>$23,500</td>
<td></td>
<td>$82,127</td>
<td>$25,850</td>
<td>$58,395</td>
<td>$44,534</td>
</tr>
<tr>
<td>Oswego</td>
<td>7,472</td>
<td>$92,203</td>
<td>$185,110</td>
<td>$63,909</td>
<td>$28,500</td>
<td></td>
<td>$119,948</td>
<td>$30,850</td>
<td>$59,455</td>
<td>$62,717</td>
</tr>
</tbody>
</table>

Note: Hosting costs for Blackboard and Moodlerooms are determined by Active Users; D2L and rSmart determine these costs by FTE. The definition of an Active User is “one unique ID enrolled in at least one active course”.

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Content Migration

Perhaps the most important decision point when evaluating LMSs for SUNY is the ability to migrate existing content from ANGEL 7.4/8 to a new LMS. While ANGEL 7.4 does support content export into IMS Common Cartridge, not all features of the IMS specification are supported (e.g. the IMS Question and Test Interoperability specification - QTI). Since all features may not translate to other LMSs, migration could be problematic. Below is a comparison of content migration capabilities of the LMSs undergoing this evaluation.

<table>
<thead>
<tr>
<th>LMS</th>
<th>Content Migration Capabilities</th>
<th>Links / Supporting Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackboard Learn</td>
<td>In development</td>
<td>Blackboard support staff have indicated a direct migration path from ANGEL 7.4 and 8.x into Blackboard Learn / NG</td>
</tr>
<tr>
<td>Moodle</td>
<td>No Moodle-native tools exist for migrating content from ANGEL 7.4, however the Conversion Thingy software can convert ANGEL courses to Moodle 1.9 or 2.0 and has been used by SUNY Plattsburgh for their migration from ANGEL to Moodle.</td>
<td><a href="http://www.conversionthingy.net/">http://www.conversionthingy.net/</a> <a href="http://docs.moodle.org/en/Import_questions">http://docs.moodle.org/en/Import_questions</a></td>
</tr>
<tr>
<td>Desire2Learn</td>
<td>In development</td>
<td><a href="http://www.desire2learn.com/news/newsdetails_100.asp">http://www.desire2learn.com/news/newsdetails_100.asp</a></td>
</tr>
</tbody>
</table>

Blackboard has begun to implement changes via the latest Blackboard service pack that will conform content structure differences between ANGEL and Blackboard. It is anticipated that future service pack releases for Blackboard and ANGEL will continue to align the data structures in both systems for content import and migration.

Desire2Learn, while not able to commit to a specific availability time frame for ANGEL-to-D2L content migration tools, is currently working with a major university system to pilot prototype migration and conversion tools. D2L has indicated that, if desired, SUNY could be made a part of this tool development.
Overall Recommendations
The members of DOODLE strongly believe that online learning offers educational opportunity to a far wider constituency than can be reached via the traditional campus-based model of higher education. DOODLE also recognizes and supports the vision of broad, easy access to education via online learning. In order to fully realize the potential of SUNY’s combined capabilities, we recognize the need for the following:

A unified choice in an online learning system
SUNY System Administration should seek to create a system-wide contract for all interested campuses for one LMS. SUNY, via SLN, SICAS and ITEC should leverage shared resources to provide a package for outsourced hosting and support at a preferred rate for campuses that opt in to the SLN consortium. Aside from clear cost savings via aggregated buying power and services that benefit both the system as a whole and its constituent campuses, the project members believe that consistency of choice and use of one LMS will greatly benefit online students. A uniform interface for teaching and learning means that both faculty and students will spend less time on learning the interface and can then focus on engaging with the instructional content.

Road maps
As noted above, the committee believes that a single, unified LMS for the SUNY system would be advantageous for several reasons: reduced cost to support and maintain systems for multiple campuses; a common knowledge base for support and education for faculty and students; and a common learning experience for faculty and students, in line with the guiding principles of student portability as a component of OpenSUNY.

However, the committee recognizes that campus autonomy is an inherent characteristic of SUNY as a whole. This is reflected in the current diversity of LMS usage across the system. We fully anticipate that campuses may opt to select an LMS that aligns with the specific needs and concerns of their institution; the following set of considerations is presented with the intent to offer campuses guidance on potential systems to deploy.

Desire2Learn
D2L is endorsed by the committee as the recommended commercial LMS alternative to Blackboard for several reasons:

- Established successful deployment and ongoing usage by SUNY Suffolk. Prior to the deployment of ANGEL in 2007, statistics collected by SLN noted that Suffolk was the highest volume online institution in terms of sheer number of users. This suggests that D2L has scaled well under sustained use.
- Faculty development expertise from SUNY Suffolk that can be leveraged for consortium use.
- An active user community that shares knowledge and expertise via an online portal.
- D2L provides a content structure that is similar to (and therefore familiar to) ANGEL. This mitigates the time spent by faculty and students adjusting to a new interface. This close
resemblance to the ANGEL content structure was cited by the majority of Directors of distance learning and instructional designers on the project as their primary reason for preferring D2L.

- Course content creation within D2L offers a drag and drop interface for fairly rapid prototyping and development.
- D2L asserts that its architecture was developed explicitly for fully online asynchronous learning. While this claim is almost impossible to prove or disprove, it does indicate that D2L understands SUNY’s online learning mission and believes there is an alignment of intent between our respective organizations.
- D2L has successfully demonstrated deployment and ongoing usage of the single instance, multi-domain hosting model. While the committee was initially skeptical of such an assertion, it is evident that the Wisconsin and Tennessee university systems currently in this deployment model closely resemble SUNY in terms of the multi-unit campus model as well as differing levels of usage across their respective systems. Based on this, the technical team within the committee (comprised of SLN Application Services personnel) believes that D2L’s architecture is viable and could meet SUNY’s needs. Particularly in the context of consortium services (such as current SLN member campuses receive), D2L could provide a particularly cost-effective method of hosting for multiple SUNY campuses. It is also conceivable that this type of deployment could provide secondary benefits: the ability to mine data and continue global research on online learning (where SLN has been actively engaged in the recent past); and the potential for student portability between campuses in a unified hosting system. It is likely that the latter objective is not easily attainable without a major commitment of time, effort and resources by SLN, ITEC and SICAS to research and develop. Such portability, if it can be accomplished, aligns well with the concepts of OpenSUNY – providing easy access to a diversity of courses, instructors, and content for online SUNY students.

Further, if this type of consortium hosting is desirable, then the committee suggests that the SLN community revisit the assumptions of shared system administration. Currently there are gaps in terms of expectations of knowledge and responsibility for ongoing operation between local campus administration and SLN/ITEC system level support. Definitions of service level agreements, required campus skill-sets, and overall definition of ownership (i.e.; responsibility for operation) need to be clearly defined and understood by both system administration and consortium member campuses.

**Moodle**

The minority opinion of the committee recommended that Moodle be offered as the open source alternative to Blackboard via consortium hosting for the following reasons:

- Moodle has already been successfully deployed at a number of SUNY campuses (Delhi, Optometry, Purchase, Plattsburgh, and Potsdam), and that number is anticipated to grow over the next year and a half. Both self-hosting and vendor-hosting models are in use among the existing Moodle campuses. There is therefore expertise within the system that can be drawn on by campuses that opt for migration to Moodle from their current LMS, as well as by ITEC as they develop Moodle hosting services. Our committee recommends establishing more formalized collaboration mechanisms for both system administrators and for instructional
technologists / instructional designers across existing Moodle campuses and those additional campuses that are newly adopting Moodle, to promote SUNY-specific Moodle support.

- When polled last year, 22 out of 38 BOCES in New York state were using Moodle as their primary LMS. For students within New York state coming from our high schools, of the 4 LMS options this group has looked at, Moodle is the one students are most likely to have previously used.
- Moodle is noted as the primary LMS utilized by the SUNY Global COIL Center when working with international partners.
- Because Moodle is open source, developers and institutions who contribute to the project, contribute to the educational/software community itself, rather than a for-profit entity.
- Moodle via Moodlerooms supports a multi-tenancy hardware model (similar to the ITEC + ANGEL model currently in use for SLN member campuses), but this model does not extend to the application layer. Campuses can choose to run Moodle on a continuum from locally self-hosted to fully outsourced models.
- Faculty development will be an important component of any successful LMS transition, and the migration to Moodle is no exception. The feature set of Moodle maps well to the tool set found in ANGEL, but there are some tools in Moodle not found in ANGEL, a different course organization model, and some difference in how specific tools are configured and used. The LMS and its tools can support a variety of instructional philosophies (such as social construction of knowledge), and matches well the Community of Inquiry model favored by SLN. Ideally, faculty development programming would address campus issues of instructional philosophy as well as teaching the mechanics of the instructional tool set in Moodle, in order to turn the LMS transition into an opportunity to renew teaching and learning on campus. Given that the variety of Moodle hosting options allows for extended LMS transition depending on the pathway that the campus opts for (as described above), there is the option with Moodle to provide thorough faculty development programming in advance of the actual switch away from the legacy LMS.
- Standard Moodle (either 1.9.x or 2.0) provides a robust suite of tools to support instruction, as described in the feature comparisons section above. This functionality can be extended by the addition of community supported modules, which are cataloged at the moodle.org community site. Campuses which decide to host Moodle in-house should think about the extent to which they want to extend standard Moodle with third party modules, and how decisions about Moodle enhancements will be made.

Blackboard
Aside from ANGEL, Blackboard and legacy WebCT campuses account for the next largest LMS share within SUNY (13 campuses). Historically, the university centers have not been participants in the SLN consortium, and have self-hosted Blackboard at their respective campuses. The committee anticipates that this may continue. Given the overall combined system use of Blackboard products, the committee has previously in this report noted the advantages of negotiating a system-wide agreement with Blackboard to provide reasonable and equitable pricing for all campuses. Campuses considering Blackboard should note the following:
● Blackboard has publicly stated that the Bb Learn product line will evolve over time as the “NG (Next Generation) platform.
● Extensive faculty development materials for Blackboard have been previously developed by SLN and are in use.
● Faculty development programs focusing on the application of Blackboard currently exist in several peer SUNY colleges (GCC, HVCC, Upstate, and Albany) and could be leveraged for consortium use.
● Blackboard offers a suite of applications (such as delivery to mobile devices, learning outcomes management, and an audio/video conferencing suite) that promise close integration and inter-operation.
● In a migration from ANGEL, campuses will need the Learn LMS, Content Collection and Community Engagement components of the e-learning suite to approximate the bundle of features afforded by ANGEL.
● Integrated into Bb9.1 is SafeAssign, a tool that performs much like TurnItIn.com.
● Bb has acquired Presidium, which provided online student services.
● Textbook publishers’ instructional materials are widely available for use in the Bb environment.
● Many companion services use Bb as the back end of their online services (Smart Thinking tutoring services, in use at several SUNY campuses).
● e-portfolio, e-reserves and other institutional level resources are part of the e-learning suite in Bb9.1 and offer a robust interface across the institution, and across the years.
● Blackboard has a responsibility to the existing ANGEL customer base to provide a migration path going forward. As noted in the section discussing content migration, Blackboard has a product road map and timetable for conformation of legacy and current systems to provide content compatibility (and thus migration). Blackboard shared the specifics of this plan with the committee under a non-disclosure agreement.
● Issues surrounding data flow from the campus Student Information System (SIS) to Blackboard are a major concern at this point, as Blackboard lacks the equivalent functionality in creating courses, students and faculty within the LMS. These issues need to be addressed by Blackboard prior to any full-scale commitment by ANGEL campuses to migrate to Blackboard Learn.
● Given the above point, ANGEL campuses that are concerned with the ongoing stability of ANGEL 7.4 and the upcoming ANGEL 8.0, and who are focused on a near-term migration, may derive a benefit in selecting Blackboard as their successor system in terms of the relative project timeline of campus content migration.

Sakai
The next release of Sakai (3.0) incorporates a pedagogical framework that was developed collaboratively with IT personnel, application developers, as well as instructional designers, which is unique in the LMS landscape. The current release, as reviewed by the committee, presented some challenges for use, namely:
● A relatively small existing user community as compared to moodle. While Sakai adoption continues to grow, it still lags notably behind Moodle as the open source platform of choice for colleges and universities.
● No peer campus usage within the SUNY system to leverage or expertise and knowledge sharing.
● No immediately available content migration tools to facilitate migration from ANGEL to Sakai.
● A linear approach to developing course content. This constraint is somewhat cumbersome compared to the flexibility of the other systems under review.

Primarily because of the first two issues, the committee does not recommend Sakai for wide scale adoption across SUNY at this time. One of the benefits of selecting ANGEL as the successor LMS was the existing campus usage at that point in time. Significant knowledge transfer from the installed ANGEL SUNY user base occurred, which undoubtedly aided in the speed of adoption.

Conclusion

In alignment with the goal of this project, the committee recommends D2L as the commercial alternative to Blackboard and Moodle as the open-source alternative to Blackboard. D2L and Moodle (via Moodlerooms) offer flexibility as each offer pricing models for both consortium and independent hosting and support.

The selection and adoption of one unified LMS for all SUNY campuses could aid in unifying what is currently a diverse environment for students and faculty. Other elements relating to student registration, a unified access portal to all SUNY online courses, and administrative issues such as credit transfer, while outside the scope of this committee’s task, clearly would contribute to student portability in online learning.

Based on overall SUNY System Administration goals for online learning, the committee recommends that careful consideration is given to the selection of System supported and provisioned Learning Management Systems. The system, or systems ultimately adopted by SUNY System Administration for consortium use should be selected in terms of their functionality, scalability, and alignment with established online pedagogy. Cost, while obviously an area of concern for all campuses, should not be the primary factor in system selection.