Learning Management Systems Futures Report
Duke Center for Instructional Technology

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Participants

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Purpose and Approach

We examined Duke University's Learning Management System (LMS) needs and options to make recommendations for the next 3 to 5 years. We considered two questions:

1) Are Duke's functional needs[1] for a learning management system best met by Blackboard, an alternate LMS, or another kind of system or strategy?

2) What is CIT's vision for an LMS of the future?

We investigated five options, including three LMSs. The LMSs included Blackboard and two popular open source learning management systems, Moodle and Sakai. We also considered replacing an LMS with either a suite of Duke-supported tools, or a 'Smörgåsbord' model that leverages both Duke-supported and Web 2.0 tools.

With each scenario, we began by considering the tool(s) or model against the set of functional needs identified in the e-Learning Report (Appendix A). We looked at each of the tools to see how it worked, and investigated publications and help documentation, and consulted with staff from UNC-CH for Sakai, and NCSU for Moodle. We received a demo of Sakai from a UNC-CH instructor and we installed our own version of Moodle to explore. UNC-TLT also provided the group access to their current research documenting explorations of Moodle and Sakai within the UNC system.

To answer the second question, we held regular meetings (during Spring 2008) to discuss the current climate and future direction of educational technology, both at Duke and in general[2]. These discussions were supported by an ongoing review of the current literature (in blog posts, journal articles, etc) regarding Web 2.0, e-learning, and education. We've included a brief bibliography of these resources at the end of this report.

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[1] These functional needs were defined as 'Functional Requirements' in the eLearning Report, created by the e-Learning Roadmap committee in Summer 2007. These needs are attached in the Appendix.

[2] Our analysis did not include student and faculty input, which is crucial for planning the next stages. We strongly recommend that discussions be initiated with faculty and students about the issues we've outlined.

Analysis

Blackboard, Sakai, Moodle - The three Learning Management Systems (LMSs)

Blackboard is currently in use at Duke, and Moodle and Sakai are open source systems that provide much of the same functionality. All three systems respectably addressed most of the functional requirements with some shared gaps.

Each LMS included a standard set of tools for collaboration, feedback and communication among members of a course. In addition, all three include options for integrating with campus information systems, can scale for large numbers of users (upwards of 100,000), and actively support accessibility standards[3]. All three LMSs facilitate student privacy and protection of intellectual property. We characterized each LMS as having a 'low barrier of entry' (e.g. fast learning curve, minimal steps to set up a course site and manage the roster, etc) and a typically deep integration between course functions and tools (e.g. assignments that integrate with the gradebook seamlessly, etc). Moodle was particularly strong in its use of context sensitive help that not only provides technical assistance, but also in many cases explains the purpose or nature of a tool. In terms of adding new functionality, each LMS can be extended with plug-in modules, though Moodle and Blackboard appear to better meet SCORM standards. All three LMSs have active development communities, so we expect, in general, that each tool will continue to evolve and better meet user needs with improved functionality.

Though strong security measures are generally viewed as a strength for LMSs, we felt that each LMS ran the risk of 'data lock-in' – meaning that data can be easily added to the system, but not necessarily easily taken out in a shareable format. We see an increasing need to involve non-Duke participants in courses, and none of the LMSs appeared to address this need, which is listed in the Functional Requirements[4]. None of the LMSs adequately addressed the need of engagement of people outside of Duke or included an easy way to share content between institutions; Sakai did the best job by providing the ability to expose portions of a site to the public non-selectively, but did not allow selective interaction, or contributions by others. In general, this need is currently met by providing guest access privileges or temporary accounts to users outside of Duke, as needed and is not under the control of the instructor. Though each LMS offered significant (and improving) tools for collaboration, these tools again were mostly restricted to users within the course. Finally, we felt that a key weakness of using any LMS lies in Duke's dependency on a single company or community in terms of development cycle and overall direction.

Neither of the open source LMSs offered advantages that significantly outweighed the cost of a transition from Blackboard (training time for users, user inconvenience, content migration issues, among others). Therefore, we recommend keeping the Blackboard Learning System for the immediate future and upgrading it to take advantage of new improvements in collaborative tools and the gradebook.

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[3] It should be noted that we did not do a thorough assessment of accessibility features or standards for each LMS and that this statement is the result of a review of policies and general feature sets

[4] Listed under A. Collaboration, and D. Engagement of people inside and outside of Duke

We acknowledge that LMSs are evolving, but it is unclear if they can or will be able to provide the collaborative functionality currently available in other web-based tools and technologies. In addition, even open source LMSs cannot adapt quickly to new needs, nor can they provide readily open access under the instructor's control, much less the individual student's. Perhaps in the interest of preparing our students for 'real world' experiences, their energies would be better-spent using tools that will serve them now, and after graduation, than spending their time learning how to navigate an LMS system. Therefore, an LMS may not be the best model to meet Duke's institutional, instructional and individual user needs.

- Continue to use Blackboard as Duke's LMS
- Upgrade Blackboard to the most recent version
- Strongly consider alternatives to the LMS model as a solution for teaching and learning at Duke

Duke Supported Tools

As an alternative to the traditional LMS model, we considered a model wherein users would choose combinations of Duke tools to support teaching and learning efforts. For purposes of this exploration, we considered 'Duke Tools' to be any tools/technologies that Duke has officially decided to either support or recommend, currently including the following:

- **Duke Wiki** facilitates collaborative web page editing and document sharing.
- **Webfiles** allows Duke affiliates to easily store and share documents, store simple webpages, and access streaming server capabilities.
- **iTunes U** offers a shared space for digital media content.
- **Viewsflash** is a survey tool.
- **Sympa** allows simple set up of email groups.
- Video/web conferencing tools like **Elluminate** or **Adobe Connect** *(coming soon?)*
- a **text messaging tool** that would work with mobile devices *(coming soon?)*

In this model, instructors would choose among the tools, choosing on those that suit their individual course needs. These tools are ultimately controlled by Duke, which addresses privacy and content ownership issues, as well as providing options for customization (depending on the individual vendor/source for a tool). Each tool can be upgraded independently, allowing for more flexibility and freedom from external sources. In addition, Duke faculty, staff and students may already be familiar with several of these tools as they often are used outside the classroom for research, etc.

In terms of the functional requirements, the above collection of tools addressed some of the function requirements that we used to assess the LMSs, but not most of them. More tools would be needed to address the need for collaboration and feedback, including a blog, a discussion board, an easy way to share documents and URL links, a homework/assignment management tool, quizzing tools and a way to manage grades. In addition, Duke would need a system for group management so that the group or class could be defined and reused across the tools. The tools are not currently aggregated such that the instructor can go to one site and choose tools needed for a course. Likewise, students should able to log in to one site and see all course tools, regardless of technologies employed.

Similar to our LMS exploration, we found that Duke tools do not usually enable collaboration with people from outside Duke, as they almost always require a netID (available only to Duke affiliates), despite the increasing importance of collaboration with others beyond the Duke community. Despite some attempts to resolve permissions and access management (Grouper,etc), we found that, for the most part, the netID controlled environment differed very little from the 'walled garden' of a typical LMS. We also recognized that, despite the flexibility in upgrading opportunities, Duke cannot be expected to keep pace with the greater web community in terms of adapting to and adoption of new solutions, especially in terms of continually re-training support staff and re-issuing support documentation and policies.

- Several Duke tools can support some aspects of teaching and learning.
- Available tools need to be expanded and integrated with each other to be more useful to faculty and students.
- Group and team management is improving, but still missing in many tools (or under-developed)
- Duke tools, either individually or through a group setting, need to be modified to better support collaboration and sharing with others outside of Duke.

The Smörgåsbord Model

Part of the appeal of Web 2.0 tools involves user-created (student-created) content or engagement with groups often built around 'authentic' social networks, therefore access to groups and people outside of Duke is essential. The Smörgåsbord model builds on the idea of using a suite of Duke supported tools, with the addition of other, non-Duke supported, web-based tools (see ***Figure 1***). We envision this model as having Duke maintain a form of user/role management for grades and internal grouping activities, but otherwise offering freedom for faculty and students to self-manage access to content and communication activities.

When we approached this model in terms of the functional requirements, we ran into several difficulties, since new web tools frequently become available, or constantly change. Certainly, we could use the functional requirements to see that some tools, like those facilitating collaboration (blogs, wikis), are obviously easier to use and offer more functionality than similar tools within LMSs, but in the end, we realized that the functional requirements were written to assess LMSs, and that this new model suggested something altogether different. The Smörgåsbord model's main advantages are in the opportunity for groups to self-organize, distributed decision making to occur, and resources to be shared more readily.

During our hypothetical investigation, we also realized that some of the basic needs met by an LMS might be missed. Specifically, many of these tools would not be integrated with campus services, nor would, for example, assignments be efficiently managed with a gradebook. In addition, there are risks in using web-based tools for teaching. Privacy, copyright, and content ownership issues must be addressed. Tools can disappear quickly and features can change. Using more open tools would require a higher level of tolerance for risk (compared with LMSs or Duke-supported tools) but increased opportunities for learning, student engagement, and increased flexibility may very well outweigh the risks. We also considered that using these tools would create issues with documentation and support, though we realize that many tools have abundant and readily available online documentation and help communities. A much larger issue would involve attempting to integrate any of these tools with other campus resources as necessary.

The Smörgåsbord model addresses a cultural shift in the way people form groups and work together; in the way people gather information and learn. For example, though a blog can simply replace a discussion board, a blog is also a publicly available document, a conversation, and a statement that is open to interpretation, linking, reinterpretation, etc. - so much more than just a discussion board. Asking what kinds of assignments take advantage of a blog in the 'true' sense of the term requires a shift in thinking about instructor-student, student-student, and content-student relationships. What we're seeing happen in the culture now not only involves a closed loop of instructors-content-students, but also involves the entire content, community and technology available on the web through tools and applications both social and scholarly.

Overall, the Smörgåsbord model is best positioned to connect with the Duke University Strategic Plan. Duke Strategic Plan connections include helping students become active learners and involved citizens, supporting Duke's libraries and information technology infrastructure to remain nimble and responsive to the changing needs of faculty and students, and strengthening the engagement of the University in real world issues.

Recommended Actions

Authentication and Integration: We see a need for something like a light integration layer across all the tools (authentication via Shibboleth and NetID, authorization management via Grouper, and accessibility via a common portal like DukePass), or at the very least, across Duke supported tools. There is also a need for deeper functional integration (for example, add an assignment and have it appear in the right place in a syllabus calendar, have a discussion forum for that assignment be automatically linked, e-mails go out to the relevant set of people, etc). This model is diagramed in ***Figure 2***.

Policy: We suggest that Duke work on the policy issues involved with the integration of existing network-level tools[5]. In addition, Duke should collaborate with other universities to produce a set of standards to facilitate communication between the tools themselves and between the tools and campus services; web tools that comply with the standards can be more easily adopted as appropriate ***(Figure 2 "Standards")***. Standards can also help address privacy and intellectual property issues. We envision a consortium of universities that can leverage their power and user base to encourage the providers of network-level services to implement standards that would allow the tools to be used in an academic environment. Providers may want access to the academic market, but likely do not understand the needs and policies. A consortium of universities could adapt standards which would be made publicly available. Any new tool that conforms to these standards could be used in teaching and learning.

That's Great, What About Blackboard?: As the collection of Smörgåsbord tools better meet faculty and student needs, the expectation would be that the LMS use would decrease (which then might provide a more realistic opportunity to change LMSs or decommission the LMS entirely, etc). In the meantime, it would still be necessary to maintain a stable platform with a set of functionality (re: LMS). (This transition is diagramed in ***Figure 3***). In addition, we suggest building connections, when appropriate, into Blackboard to external, or Duke supported, tools to make it easy for faculty using Blackboard to leverage the new model of tool delivery.

A Community for Innovation: We suggest further aligning the goals of a Smörgåsbord model with strategic Duke initiatives, following the general trend to be more experimental and innovative in meeting strategic needs. We also strongly suggest tapping into the energy and innovation in our larger community (beyond just Duke) to see what cutting edge faculty and students are doing, and begin to figure out how we can support approaches these early adopters have found successful. In other words, new ideas and approaches don't need to come just from one centralized "authority". To help foster an atmosphere of experimentation, CIT might consider presenting more options for faculty to experiment with tools that would not have significant Duke integration, similar to Georgetown University's Digital Commons and others.

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[5] We see this as a general move away from most of our energies being spent on maintaining and supporting local, proprietary or licensed tools.

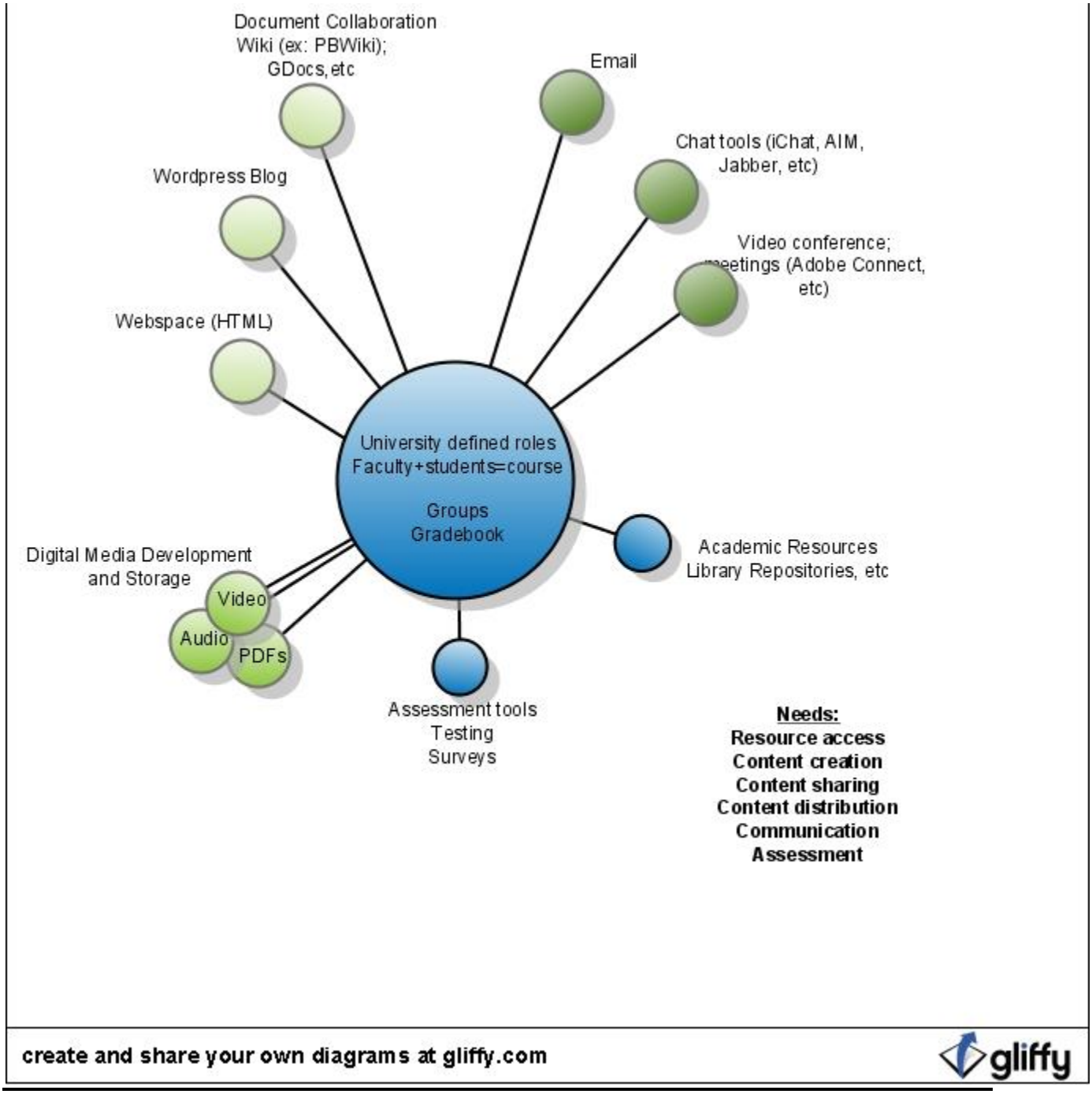

Figure 1: The Smörgåsbord model: using Duke supported tools plus Web 2.0 tools.

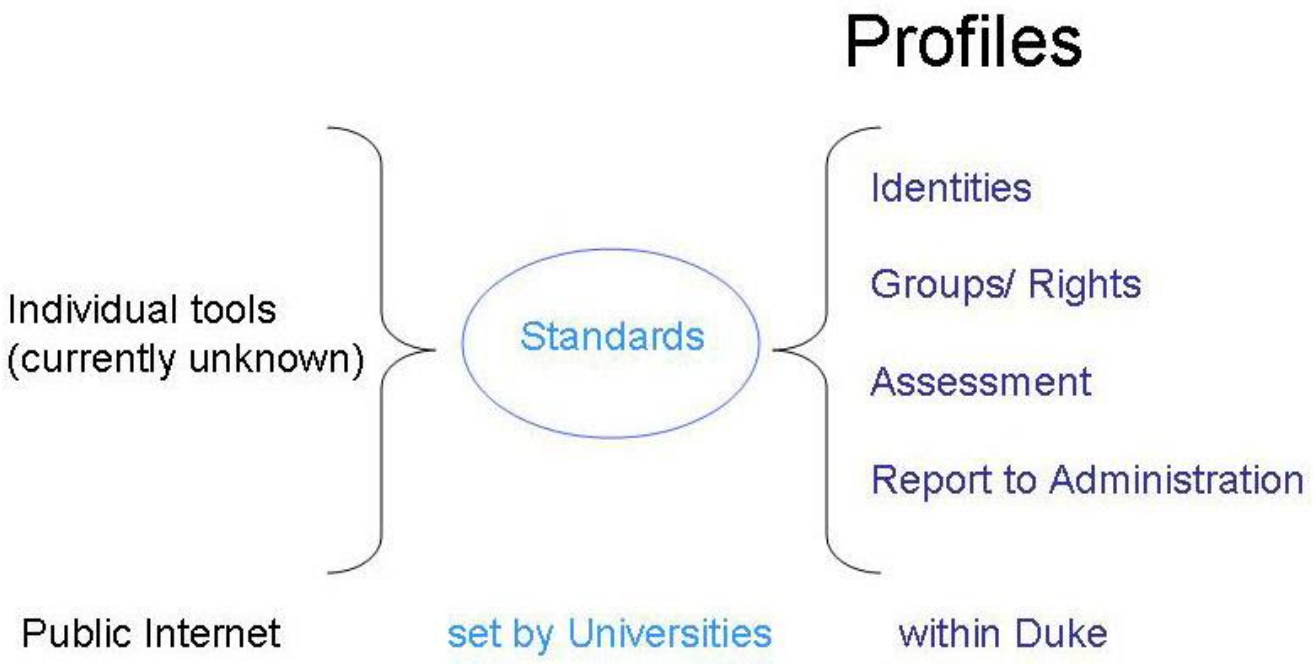

Figure 2: Smörgåsbord model with requirements for standards

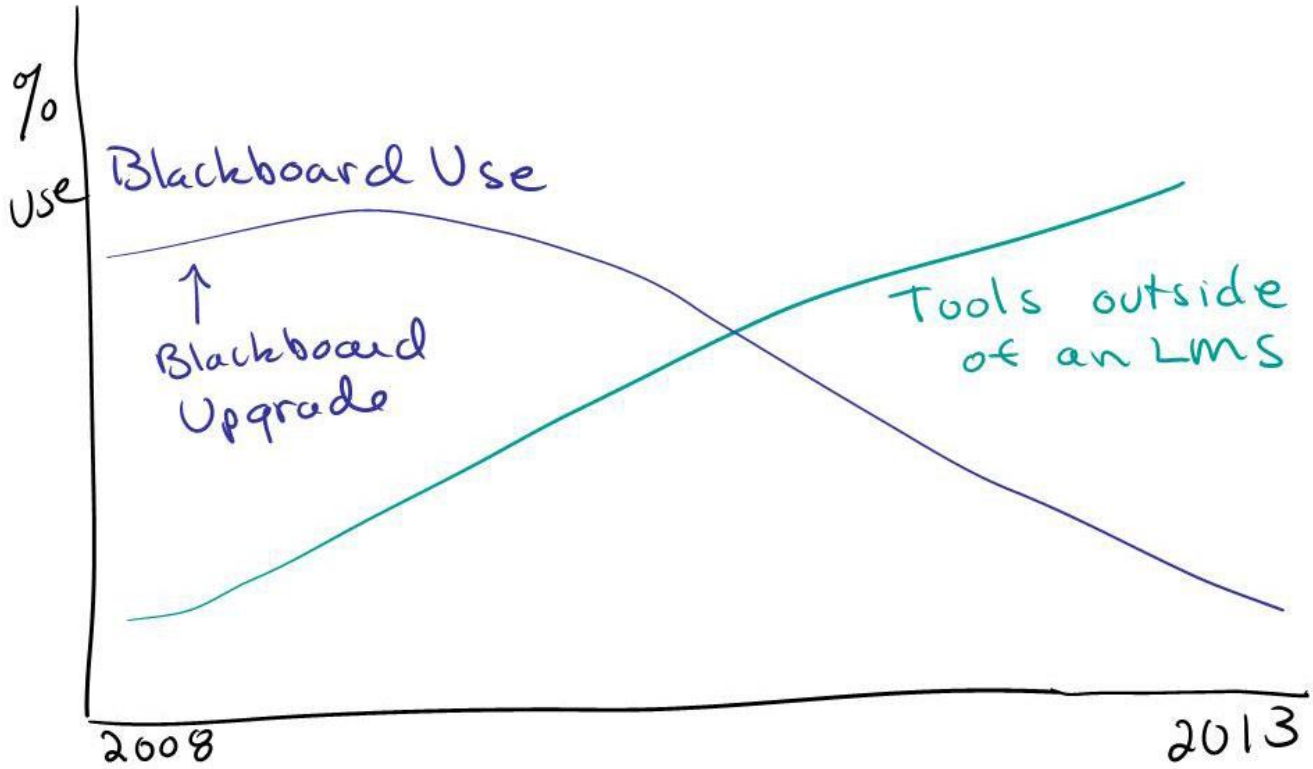

Figure 3: Recommendation: maintain Blackboard with upgrades, while introducing a suite of useful tools; instructors will adopt tools as needed, and as functionality of available tools increases, we hypothesis that the use of Blackboard will decrease.

Annotated Bibliography
(A brief survey of the current conversation(s) on LMSs and/or Web 2.0 trends in Higher Education)

Allison, Debra, et. al. (2008). Top-Ten IT Issues, 2008. *Educause Review, vol.43, no. 3: 36-61*. Retrieved at: http://connect.educause.edu/Library/EDUCAUSE+Review/TopTenITIssues2008/46605

A summary of the top ten issues facing IT in 2008-2009 according to the 2008 Educause Current Issues Committee. Issue #9: E-Learning/Distributed Teaching and Learning is of special interest to the LMS Futures group, as it acknowledges the Web 2.0 impact on educational technology, and calls for changes to university strategies to engage learners:

> "Through strategic dialogue with campus stakeholders, CIOs are responsible for adopting and implementing new technologies to support teaching and learning. However, the rapid rise of Web 2.0 technologies to support user-generated content, build collective intelligence, and share information across a participatory community of learners internal and external to the campus has altered the pace of adoption, the points of entry for adoption, and the configuration of leaders who should be discussing resulting issues. As faculty and students self-select and adopt emerging social networking tools and applications residing outside the local IT environment, campus dialogue must focus on the impact to the underlying IT infrastructure, content retention, and protection of user (and content) rights.
>
> With the need to balance ongoing support of enterprise-level technologies, the natural state of emerging technologies can dissuade CIOs from investing significant resources in these technologies. As institutions experienced in the early years of learning management systems, a roadmap must be created for turning the emerging technologies into productive tools for supporting the next-generation e-learning environment. Examples include e-portfolios, wikis, blogs, podcasts, e-learning repositories, and virtual worlds."

Brown, Malcolm (2007). Mashing up the Once and Future CMS. *Educause Review, vol. 42, no. 2): 8-9.* Retrieved at http://connect.educause.edu/Library/EDUCAUSE+Review/MashinguptheOnceandFuture/40696

Brown is the Director of Academic Computing at Dartmouth College. Brown suggests something of a comprimise between new Web 2.0 tools and the traditional university LMS/CMS systems.

> "The goal is not to replace the CMS 1.0 with the CMS 2.0 entirely, any more than it would be prudent to abandon authoritative resources (e.g., Encyclopedia Britannica) entirely and use only Web 2.0 social resources (e.g., Wikipedia). Rather, the trick will be to construct the CMS 2.0 utilizing the best and most useful aspects of the CMS 1.0 while adding those aspects of the Web 2.0 that address and support the grand adventure of learning."

Caulfield, M (2008, May 5). A short explanation from a terminal smasher (or, Blackboard as an access control company). *Mike Caulfield's weblog*. Retrieved from http://mikecaulfield.com/2008/05/31/a-short-explanation-from-a-terminal-smasher/

Mike Caulfield is currently Director of Online Communications for Keene State College. The following excerpt is from a blog post that Caulfield wrote to clarify the concept of

'EduPunk'. In the piece, Caulfield clearly separates educational technology from institutional/informational technologies. In other words, he proposes that there's nothing wrong with centralizing core IT resources within a university, but that tools used for educational purposes need to not reflect those tools, but be freer and more innovative:

> "Look here's the deal in a nutshell. If you believe there's not much difference between the business model and mission of your Dining Commons, and the business model and mission of your university or college, by all means, give your vendor the keys. Let their feature set determine what you do in your classroom. Get excited about all the people you can keep out of your academic endeavor. Tie your roster and your building access into the same central database.
> Seriously, go ahead. From a student service perspective, it may be exactly what you want. Go with God.
>
> Just don't confuse that with education. Keep your education EDUPUNK.
>
> We've seen the future. And we're not going to put it back in the box."

Groom, Jim (2008, May 25). The Glass Bees. Weblog bavatuesdays. Retrieved on 2008-05-30. http://bavatuesdays.com/the-glass-bees/

In this blog post, Groom, an Instructional Technology Specialist at UMW, coins the term 'EduPunk', which refers to a DIY culture that supports innovative uses of technology in education not necessarily tied to corporate and/or institutionally provided solution(s). Following, is a brief excerpt from Groom's original post that captures the overall 'feel' for the concept of EduPunk:

> "BlackBoard makes an inferior product and charges a ton for it, but if we reduce the conversation to technology, and not really think hard about technology as an instantiation of capital's will to power, than anything resembling an EdTech movement towards a vision of liberation and relevance is lost. For within those ideas is not a technology, but a group of people, who argue, disagree, and bicker, but also believe that education is fundamentally about the exchange of ideas and possibilities of thinking the world anew again and again, it is not about a corporate mandate to compete—however inanely or nefariously—for market share and/or power. I don't believe in technology, I believe in people. And that's why I don't think our struggle is over the future of technology, it is over the struggle for the future of our culture that is assailed from all corners by the vultures of capital. Corporations are selling us back our ideas, innovations, and visions for an exorbitant price. I want them all back, and I want them now!"

Jenkins, Henry (2006, Octoer 20). Confronting the Challenges of Participatory Culture: Media Education for the 21st Century (Part One). Weblog Confessions of an Aca-Fan. Retrieved 2008-05-08 from http://henryjenkins.org/2006/10/confronting_the_challenges_of.html

Jenkins is the Director of the MIT Comparative Media Studies Program and a well-known speaker and author. He has devoted increasing attention to the concept of 'participatory culture', and essentially suggests that it is the changing culture that dictates and creates a need for newer, more flexible technologies, and not simply changes in technology that do so:

> "Rather than dealing with each technology in isolation, we would do better to take an ecological approach, thinking about the interrelationship among all of these different communication technologies, the cultural communities that grow up around them, and the activities they support. Media systems consist of communication technologies and the social, cultural, legal, political, and economic institutions, practices, and protocols that shape and surround them. The same task can be performed with a range of different technologies, and the same technology can be deployed toward a variety of different ends. Some tasks may be easier with some technologies than with others, and thus the introduction of a new technology may inspire certain uses. Yet, these activities become widespread only if the culture also supports them, if they fill recurring needs at a particular historical juncture. It matters what tools are available to a culture, but it matters more what that culture chooses to do with those tools."

Weller, Martin (2008, June 16). SocialLearn: Bridging the Gap Between Web 2.0 and Higher Education. Weblog *e-Literate*. Retrieved http://mfeldstein.com/sociallearn-bridging-the-gap-between-web-20-and-higher-education/

Weller is Professor of Educational Technology at the Open University (UK). Weller is working on a project called 'SocialLearn', which provides centralized profiles systems for students, but also connects them with any other learning tool via an open API. Weller draws on Clay Shirky's recent writing about the way people form groups to support the idea that universities need to do more than just provide a place for students to find other 'like-minded' students (or form communities), since the internet already provides an easier way to do this.

> "In my article I will expand on this relationship between the technology and related educational framework, using the SocialLearn project as my main example. I would suggest that the reason the centralised LMS is not the answer to the 'web 2.0 problem' for education is because in its software DNA it embodies the wrong metaphor. It seeks to realise the principles of hierarchy, control and centralisation – the traditional classroom made virtual. This approach won't help educators understand the new challenges and opportunities they are now facing."