LEARNING MANAGEMENT SYSTEM RECOMMENDATION FOR MIZZOU

Original Document – January 2015
Updated January 2016
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LMS Recommendation for Mizzou
Changes from Original Document dated January 14th, 2015;

Due to the new data that was collected, this document has been updated in the following areas for the January 2016 version;

- Executive Summary
- Added additional findings from the summer and fall pilot results and responses to chief academic officers April 2015 memo (Appendix 5).
- Timeline
- Cost Analysis
- Recommendations
- Added Appendix 5 – Original chief academic officers memo

Executive Summary

In the original recommendation, the Technology Evaluation Subcommittee recommended that the University of Missouri move the hosting of their campus learning management system (LMS) from locally hosted to a cloud-based model. The committee also recommended conducting a limited summer pilot, followed immediately by an expanded fall pilot, of Instructure Canvas, which, if successful, should continue into an eventual full implementation and complete migration from Blackboard.

After conducting the Canvas pilot in the summer and fall of 2015, the pilot was determined to be a success according to the data contained in this report. Therefore, the committee recommends the campus proceed with a migration from Blackboard Learn to Instructure Canvas by the end of 2017. The budget and timelines for doing so are contained in this document. Due to upcoming changes in the Canvas pricing structure (see Budget), it is recommended that a contract with Canvas be in place by May 2016 in order to receive the most savings.

Background

Since February of 2014, the MU campus has been formally evaluating the learning management system (LMS) tools that support teaching and learning at MU. Because it is critical that this is a community wide decision, Mizzou faculty, staff, and students have had multiple opportunities for input and feedback. The campus undertook this project not just because of our recent technical challenges with Blackboard Learn, but because it was time.

The LMS market has changed significantly in the past few years, and we would like to ensure we are using the best tools possible to support teaching and learning at Mizzou. Several of our Internet2 peer institutions have also joined the Unizin Consortium, which is a federation of universities that are coming together to acquire shared cloud-based infrastructure based on open-technology standards, including Canvas as a shared LMS.

In addition, all of the campuses within the UM System are in various stages of change with their learning management system. Missouri S&T completed a similar evaluation process and is currently piloting Instructure Canvas. University of Missouri-St. Louis is in the early stages of
piloting Instructure Canvas. University of Missouri-Kansas City has moved to Blackboard Learn managed hosting.

**Process**

A small, faculty-based working group directed the evaluation process. (See Appendix 1 & 2 for a full member list and calendar of events.) The group was composed of faculty members from multiple disciplines, as well as a representative from Faculty Council. The working group compiled this report from the collected data and submitted it to the Technology Evaluation Subcommittee, which endorsed it. The report was presented to the MU Information Technology Committee, which was intended to present it to the Provost for further action (See Fig. 1). The Faculty Council was also informed of the progress by their representative on the working group.

As an overall timeline, the working group started this process in February 2014, and plans to have a final recommendation to the chancellor in December 2014. The review process focused on the three market-leading LMS’s:

- Blackboard Learn (current provider)
- D2L Brightspace
- Instructure Canvas

These are likely the only learning management systems that can reasonably handle a campus of our size and complexity.

![Figure 1: Evaluation Process](http://lmsreview.missouri.edu)

The working group provided many opportunities for the campus community to submit input through departmental and campus wide focus groups, surveys, vendor presentations, and test drives. These opportunities were marketed through mass media such as the LMS review web site (http://lmsreview.missouri.edu), MU Info mass emails, numerous e-mail distribution lists, the campus online calendar, and word of mouth. The working group collected multiple streams of quantitative and qualitative data and weighed each of the data sources based on sample
size, depth of participant’s level of engagement with the activity, the source of the input, and balancing qualitative and quantitative types.

Instructor and Staff Feedback

Needs Analysis Survey
Based on data from the initial teaching and learning surveys in 2014, all three LMSs met the basic teaching and learning needs of the campus, which were for the following tools identified as vital to teaching and learning (See Fig. 2).

Figure 2: Tools Vital to Teaching and Learning
These tools represent the following pedagogical needs:

- Assignment submission
- Having quizzes that are easily gradable
• Communication
• Grade management
• Group management
• Providing content in multiple forms
• Plagiarism checking
• Student performance tracking

In the open comments portion of the initial teaching and learning survey, twenty (20) respondents stated that they would like their course material and their students to be more interactive and engaging. Instructors wrote that they wanted the experience to be “more interesting for the students, not just feed them data.” One simply stated, “More social media.” Another wrote, “I’d be interested in trying Twitter.”

Twenty-four (24) responses indicated that instructors did not know what tools would support the type of change they wanted in their teaching. Most simply answered, “I don’t know”, “N/A,” or “Not sure.”

Fourteen (14) respondents stated that they needed a system that was reliable and easy to use. Specific phrases included, “less outages,” and “user-friendly”.

Twelve (12) respondents wrote that they would like more audio and/or video in their course. Some specific ideas included recording lectures, adding video assignments to the course, and adding audio to PowerPoint slides.

After looking at the tools available in each system, the working group concluded that all three systems under consideration would meet the basic teaching and learning needs of the campus. Knowing this, the working group turned its focus to the preferences, technical aspects, and other factors to consider in choosing an LMS.

Focus Groups
The LMS Review included 25 scheduled focus groups in which 153 instructors and instructional support staff attended and provided feedback. The sessions focused on current uses, teaching needs, and the types of tools that would support those needs.

The top needs identified in the focus groups were;

• Tools that are common to all three platforms, such as lecture capture (through Tegrity), grade books, discussion board, tests and quizzes, etc.
• Ease of use/better user interface
• Group facilitation and collaboration – particularly something like Google Docs
• Mobile apps

There was a significant number of participants in the focus groups that identified reliability and stability of the LMS platform as the key factor in any decision. This group of faculty members would vote to stay with Blackboard Learn if stability and reliability could be assured because the cost of change could be fairly high, particularly for divisions that heavily employ Blackboard Learn such as the College of Veterinary Medicine and the Sinclair School of Nursing.
Vendor Demonstrations
Representatives from each of the three LMS vendors were invited to present multiple one-hour demonstrations to faculty, staff and students during the month of October 2014 (see Appendix 2). Attendees were presented with both a paper and electronic version of the evaluation that had been previously approved by the working group.

Thirty-one (31) instructors completed post session evaluations. Unfortunately, only two of the evaluations for Blackboard Learn were completed. The working group noted that several people left the Blackboard Learn demonstrations early. Attendees overall thought that D2L Brightspace had better tools, although Instructure Canvas had more of the needed features for teaching and learning, and was deemed to be easier to use overall.

Test Drives
The evaluation process offered sample sites on all three LMS platforms for anyone to test. No one asked for a Blackboard Learn site because the version was the same as our current installation rather than the Ultra version that was previewed in the vendor demonstration. Seventy-four (74) faculty and staff members completed a set of tasks on one or more platforms, and then rated their experiences on a scale of 1-4 where 1= not at all met expectations and 4=greatly exceeded expectations. Canvas was rated higher in all of the categories (See Fig. 3).

![Figure 3: LMS Test Drive](image-url)
Instructor Preference Survey
After gathering the other types of data, a survey asking about LMS preference was deployed to all instructors, and 77 in total responded. The survey asked what type of classes the instructors taught (see Fig. 4), and the preference was even between Blackboard and Canvas for those who taught large lectures, but Canvas was preferred by faculty who taught online courses. Of all 77 respondents, 25 selected Blackboard Learn as their LMS, 41 selected Instructure Canvas, and 6 selected D2L Brightspace.

![Figure 4: LMS choice by class type](image)

Student Feedback
Focus Groups
Students were invited to “stop-in” for focus groups in the student center where they could take a survey. See Appendix 2 for schedule. Students reported the following three tools were the most important to them:

- Quizzes/tests
- Course documents
- Assignments

They disliked the following tools in Blackboard the most:

- Discussion board
Quizzes/tests
Assignments

An additional two hours of formal focus groups were scheduled, with the offer of free pizza for attendees, but no students signed up, so they were canceled.

Student Preference Survey
Students were also given the opportunity to take the survey on LMS preference. In it, they indicated that they preferred Blackboard Learn over Instructure Canvas and D2L Brightspace. This finding is tempered by the fact that an overwhelming majority of students who took the survey had never actually seen any of the other systems. Of those students who preferred something else, there was a slight preference for Canvas over Brightspace.

In the open comments many students stated that lack of reliability was a notable experience with the current LMS. Specific terms respondents used to describe this issue were: "down" (20), "crash" (9), "glitch" (3).

Respondents noted that the maintenance windows (7) were an issue in regard to time and communication about outages. One respondent stated, "Sunday morning from 8-12 is prime study time for me, but it is also a blackboard maintenance window. ..."

Positive comments about receiving system reminders and notifications about due dates and course activity was mentioned eight (8) times. There were eight (8) additional positive comments about Blackboard, "Blackboard is very helpful. I check mine every day for announcements and grades." Another respondent wrote, "I just wish it wouldn't crash so much but as someone who is an organization leader that also uses it, I think it's set up pretty well and efficiently. My favorite thing about it is the emails and the fact that it makes it so easy to find things."

Technical and Expert Analysis
Educational Technologies at Missouri (ET@MO) Staff Research
After deeply investigating each of the systems and speaking with each of the company representatives, fifteen (15) staff members from Educational Technologies at Missouri (ET@MO) provided their overall recommendation. Seven staff members selected Blackboard Learn, with four of those votes as the first choice. Seven staff members selected Instructure Canvas, with six of those votes as the first choice. Five staff selected D2L Brightspace, with four of those votes as their first choice. One staff member was confident that any of the three systems would meet campus needs, and therefore voted “No Preference.” (See Fig. 5).
Each staff member’s recommendation included the factors they considered to be most important in making their decision.

**Recommendations for Blackboard Learn** emphasized the need to move to a cloud-hosted environment in order to regain stability and reliability. They also identified Blackboard Learn as having the most robust feature set of the three systems. One comment stated, “Some of Blackboard’s specific strengths are: depth of features, variety of test question types, and excellent assignment tool, and complexity of its grade book.” The e-Portfolio tool and learning analytics were considered to meet basic campus needs.

**Concerns about Blackboard Learn** were that Ultra (the newest version) is only an interface update that sits on top of old programming. Ultra is not yet available to customers, and the company is only starting to provide cloud hosting to its customers. One comment stated, “I have no confidence in Blackboard’s ability to deliver on the product they demonstrated for us. We’ve been burned there before.”

**Recommendations for Instructure Canvas** emphasized the intuitive user interface and a simple feature set that is easy to use. Comments also indicated strength in communication tools, and powerful mobile apps. One comment stated, “… it has and easy UI with built-in mechanisms to encourage accessibility features, clear organizational tools for content, and decent tools for teacher-to-student and student-to-student communication.”

**Concerns about Instructure Canvas** included a lack of features (especially in the grade book) for advanced users, and potential privacy issues with the e-Portfolio tool. The ease with which users can enable third-party tools raises concerns about the campus’ FERPA policy. Staff also raised concerns that the company’s upgrade schedule may be too aggressive.
staff member wrote, “I'm uneasy about pushing upgrades every 3 weeks with little time to evaluate the consequences.”

**Recommendations for D2L Brightspace** emphasized a robust ePortfolio tool, strong learning analytics package, and a straightforward course migration from Blackboard. They also indicated a strong corporate-level focus on education and a hands-on approach to institutional adoption.

**Concerns about D2L Brightspace** were its lack of functionality in mobile apps, little distinction from Blackboard Learn, and perceived complexity of adopting the product. One person wrote, “I am very uncomfortable with the perception I have of D2L’s over involvement in installing and setting up their software, especially the hierarchy part. Although they may have been indicating they will support us well during the installation, it came across as if they need to do the setup work instead of including us. It makes me wonder about the cost of change orders if we want to change something.”

**Financial Analysis**
Canvas is the least expensive at $12.16 per student, followed by Brightspace at $13.62 per student, and then Blackboard at $17.17 per student (see Appendix 3). Without including conversion costs, moving to any of the options will likely save us money over our current locally hosted instance of Blackboard, with Canvas possibly saving us the most over a five-year period.

Canvas and Brightspace would require a Request for Proposal (RFP) to submit to the procurement process. We have a current master contract with Blackboard, and they plan to offer their cloud hosting as part of the initiative in the future.

**Accessibility**
The Adaptive Computing Technology Center investigated each of the systems. Little is known about Blackboard Ultra at this time as we were unable to participate in the test drive with Ultra and did not receive accessibility information from the company. D2L Brightspace and Instructure Canvas do not appear to be fully accessible based on the information provided or end-user experience. Brightspace was slightly more accessible and has a close partnership with the National Federation for the Blind. D2L clearly outlined the parts of their system that would not be accessible to keyboard and screen reader users and provided alternatives for users. On the other hand, Instructure Canvas claims to be completely accessible. However the Adaptive Computing Technology Center found this to be untrue in their investigation, and when they asked others for their experiences. See Appendix 4 for the full accessibility report.

**Digital Citizenship**
The Digital Citizenship Work Group reviewed Canvas, Brightspace, and Blackboard for potential issues related to privacy, academic integrity, and intellectual property. Many of the issues this group explored are independent of the Learning Management System (LMS) and instead require users to make informed decisions around the constructs and limitations of the systems.
All three platforms have similar privacy policies that protect the personal information of the student and instructor. The main differences appear in their relationship with third parties. Each LMS also offers different options for students and instructors to adjust their privacy settings.

All three systems can be integrated with TurnItIn and Lock Down Browser, but technical solutions to problems of cheating and plagiarizing will only go so far; instructors also need to educate students on what is required and expected of them, model appropriate behavior by documenting sources and copyright information on their own work, and engage in open conversations about the importance of academic integrity.

ePortfolios
The campus currently uses an ePortfolio that is separate from the main LMS. Each of the three systems includes an integrated ePortfolio that faculty and students can utilize to assemble the artifacts they are already creating for courses. D2L Brightspace has the most developed ePortfolio tools, followed by Blackboard Learn, and then Instructure Canvas.

Setting privacy policies aside, it should be noted that the ePortfolio tools in Canvas appear to rely on security through obscurity (i.e., if you have the URL, you can access the student or instructor’s portfolio content). Since Canvas recommends the use of these tools for some coursework functions, the committee feels that this needs to be carefully examined during the pilots, in terms of its effects on general privacy issues, FERPA issues in particular, and in terms of academic integrity (as it might be used to share materials inappropriately).

In addition to privacy policies in regard to the ePortfolio tools, the pilot needs to include a thorough investigation of the impact of the App Tool in Canvas on the Campus’ ADA, FERPA, and third-party software policies and procedures. One of the attractions of Canvas for many instructors appears to be the ease with external applications may be integrated into courses. While some of these must be enabled centrally for all features to work, many of them may be set up by the instructor. This poses a challenge to existing UM and MU policies. Somewhat similar concerns apply to Brightspace, though to a lesser degree.

Miscellaneous Technical and Expert Considerations
- Blackboard Learn does not currently offer cloud hosting, and their newest version which was shown in the vendor demos, Ultra, has not yet been released. Based on current timelines, the company estimates that MU could move to a cloud-hosted version of Ultra in approximately a year. In the meantime, if the campus wanted off-campus hosting, it could take advantage of Blackboard’s managed hosting solution, which hosts the servers at Blackboard, but is not cloud based. In addition, Blackboard is building their newest version as a new user interface on top of their old code base, which, given its age and patched together nature, is also a concern.
- Upgrades – Canvas upgrades it every three weeks and the university has less control over the environment, although they allow you to turn it off for up to three months.
Brightspace also has a continuous delivery model, does let you turn specific features off for up to a year.

- Integrations - Both Brightspace and Canvas have a tight integration with Office 365, which we’re exploring as a campus. Canvas also has a tight integration with Box and Google Docs.

- Survey respondents, focus group participants, and committee members voiced concerns about costs of change. If the campus did move LMS’s, it would incur costs for faculty and staff time, course transfers, third party integrations, and training. The actual cost would depend on the length of the timeline, the degree of difficulty in transferring content (automated vs. manual), the amount of training required, and how much assistance the company would provide.

- While conducting reference checks with present customers of Canvas and Brightspace, most said the transition from Blackboard was fairly easy, with courses mostly transferring automatically.

**Limitations of Project**
The response rate was very low for some of the surveys, and the focus groups and test drives had less participation than desired. Although the data indicates a slight preference for Canvas, the committee is not confident about drawing a firm conclusion based on the small sample sizes.

**Overall Themes**
Instructors and students want speed and stability above all other considerations. A cloud-based architecture would help provide this since you have the ability to spin up servers at need.

Canvas has a simple user interface, and is considered to have more basic features. Brightspace and Blackboard have a wider range of tools and may be more appropriate for advanced users.
Additional Findings from the Summer and Fall 2015 Canvas Pilots - January, 2016

Surveys

Faculty

Faculty volunteered their courses to join the pilot. Overall, 104 faculty participated in the surveys. The most highly rated items were the simple, easy interface with Canvas, and the Speed Grader. They did not notice the updates that Canvas pushes out every three weeks. While we had several questions on the original survey, in the interest of brevity, here are the results of the most salient ones;

1) If you had your choice of what to use for teaching next year, would you choose Blackboard or Canvas?

<table>
<thead>
<tr>
<th>Choice of Preferred LMS</th>
<th>(Instructors Participating in Summer and Fall 2015 Canvas Pilot)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canvas</td>
<td>89%</td>
</tr>
<tr>
<td>Blackboard</td>
<td>10%</td>
</tr>
</tbody>
</table>

LMS Recommendation for Mizzou
2) How long did it take you to get comfortable in the Canvas environment?

![Graph showing Instructor Perception on Time Needed to Get Comfortable Navigating the CANVAS Environment]

- Less than 1 hour: 46%
- 1 - 2 hours: 30%
- 2 - 4 hours: 19%
- 4+ hours: 5%

3) What did you like most about Canvas?

![Graph showing Things Instructors Liked Most About Canvas]

- Usability: 68%
- SpeedGrader: 16%
- Stats/Analytics: 5%
- Stability: 7%
- Mobile: 4%
4) What did you like least about Canvas?
Students

One important factor to note is that students did not get to choose what their instructor used. There were 1121 students who participated in the summer and fall pilot surveys.

1) If you had your choice of what LMS for Mizzou instructors to use next year, would you choose Blackboard or Canvas?

![Choice of Preferred LMS (Students Taking Classes in Canvas Pilots)]
2) How long did it take you to get comfortable in the Canvas Environment?

![Pie chart showing time needed to get comfortable]

3) What did you like most about Canvas?

Looking at some themes and sample student comments, these were among the most common:

- Easy to use
  - “Simple to use. Information is easily accessible.”
  - “Pretty intuitive, great program. I really like the assignment timeline calendar to the right of the homepage. It helps me stay on track. I hope Mizzou keeps using this online tool, it's very useful.”
- Liked the clean, modern interface
  - “Interface is clean and simple. It's not cluttered.”
  - “Clean interface / Not as "buggy" as blackboard”
- Stability
  - “It doesn't crash every week”
  - “Faster and more reliable than blackboard”
- Mobile Friendly
  - “Assignment function seemed to work better with my iPad than blackboard did”
  - “It is easier to access from my phone”
- Functionality (notably the WHAT IF grade feature, and Notifications)
  - “Pretty. Interesting. Weekly email updates. Email when new assignments were graded. Made it easier to keep up with the class.”
“I LOVE how you can try out different grades for an assignment/quiz/project and it will show you how your grade will be affected! Also love the calendar feature that tells you upcoming assignments due and then adds the green check mark when you have completed it.”

4) What did you like least about Canvas?

Looking at some themes and sample student comments, these were among the most common;

- Students did not like having to use multiple LMS platforms in the same semester.
  - “Having to use both blackboard and canvas at the same time has been a hassle switching back and forth.”
  - “The fact that I had to switch between blackboard and canvas for my different classes. I hope we will be back to a singular platform soon.”
- Issues pertaining to a new system, including confusion in navigation, learning curve, etc.
  - “There are MANY, MANY different ways to get to the same thing. Redundancy can be confusing.”
  - “Learning to use a new platform. But it wasn't bad.”
- Preference shown for a particular Blackboard tool/feature over Canvas tool/feature, in particular the discussions and notifications.
  - “I don't like the discussion board format. Because it isn't in a thread format, similar to Blackboard’s, it makes it very disorganized and confusing to read what my classmates have posted.
  - “Canvas emails you for every little thing if you do not change this in settings.”

Feedback on Large Lecture Classes

One of the areas of concern that was raised early on was how well Canvas would handle large lecture courses. Since faculty could opt in voluntarily, there were not as many large lecture classes in the pilots as would have been ideal from a research perspective. For the ones that were included, the following results were found. While none of these are a “show-stopper”, it is good information to have in the event of a conversion.

What is better for large lectures in Canvas than in Blackboard?

- Interface--several faculty who teach larger classes report that the interface is easier to use.
- Showing Course--while you can’t create customized gradebook views (Smart Views), the “Showing Course” feature allows everyone to have Smart Views by section without doing anything.
- Email--The inbox allows instructors to access all sections at once, or email individually, all from one area.
What is better for large lecture courses in Blackboard than Canvas?

- Option to Omit Columns from Total Grade (Points based grading)
- Creating Smart Views for Multiple Discussion/Lab Sections in Grade Center
- Adaptive release for instructor/TA resources
- Creating columns
- Some of the details of creating quizzes, such as doing randomized questions directly in a quiz instead of in a question pool
- Sharing Content across multiple sections

Additional Accessibility Information

The MU ACT Center assessed the Canvas LMS for accessibility in November of 2014 and several issues were discovered during the automated and manual testing process. In order to further evaluate accessibility, they then joined an Access Technology Higher Education Network (ATHEN) group composed of counterparts at other Universities across the nation who are also evaluating the accessibility of Canvas.

Instructure, Inc has implemented a process for reporting accessibility issues with Canvas LMS, and addressing the issues in an agile development cycle. The company has been responsive and works quickly to remediate reported accessibility issues. However, the ACT center still has some concerns. Third party apps and plugins used within Canvas do not have to meet the WCAG standards in order to be available to users, but this is also true of Blackboard. While Canvas as a whole is minimally accessible under WCAG 2.0, these plugins and apps can greatly decrease compliance with standards.

There are a few outstanding issues with Canvas, for example, MathML Support, the Quiz Section, and the Canvas mobile app, that have not yet been corrected by the company. The Canvas mobile app is currently not minimally accessible, and this is a primary access point by students to the Canvas LMS The company is aware of these problems and is beginning to take action, but there is no concrete timeline in place for completion of those improvements, which could lead to barriers for students with disabilities if it is released into the classroom before those changes are made.

The MU ACT Center recommends that action be taken to encourage the use of accessible apps and plugins by our Faculty through the Canvas LMS in the event of conversion. Resources should be allocated to screen the most commonly used plugins to create a list of approved accessible plugins and apps that faculty could use and a list of plugins and apps that faculty should avoid using because of accessibility concerns.

Town Halls

In order to try and gather feedback from faculty members not participating in the pilot, we hosted open town halls on 10/19/15 and 10/22/15, which were well attended, both in person and online. The videos from those town halls can be accessed at
Faculty members who attended either of these town halls had many of the same questions, which are listed below.

**Q: Why are we switching?**

A: We are not switching at the present moment, but are actively engaged in the review. Learning management systems have changed significantly over the last few years, and it was time for us to do a review.

**Q: Will Canvas have third party tools?**

A: Yes, all third party tools we currently license, such as Kaltura, Tegrity, etc. have Canvas hookups. We’re also exploring the LTI integration for ERES and open educational resources.

**Q: What kinds of support will you offer to faculty in converting Canvas? There will need to be a lot of support, particularly for large courses.**

A: We’ve offered some limited support during the pilot, but would offer a much higher level assistance with moving files, setting up courses, etc. in the event of a full conversion. We’re already categorizing the different types of courses we have and can offer specialized conversion help depending on the type of course. If the decision is made to move, we will develop a detailed support plan and communicate that widely to all faculty members.

**Q: If we don’t go to Canvas, what will we do? When would the new Blackboard be available?**

A: We would stay with Blackboard, but knowing that we would need to convert to Blackboard Learn (enterprise cloud version) or Blackboard Ultra (new version of Blackboard), there would still be significant conversion costs. It’s impossible to tell how difficult this would be since neither the enterprise level cloud version or Blackboard Ultra is generally available at the present time for testing with a large institution such as we have. Both are scheduled to be generally available next summer.

**Q: Is this decision being made at the campus or system level? I’ve heard the campuses are at very different places in their reviews.**

A: From where we stand, we think this decision should be made on a campus by campus basis. We won’t realize any contract savings by forcing all the campuses to be the same, and one LMS solution may not fit everyone. Other people feel differently, and think this should be a UM system wide decision. The campuses are presently at different places; UMKC has invested more heavily in Blackboard, UMSL is doing a small Canvas pilot, MS&T is continuing their pilot, and MU is finishing up theirs.

**Q: What kind of timeline might we have if we do decide to convert?**

A: It would be a very gradual timeline, at least 12-18 months. It takes time for everyone to get moved over. Once a course is in Canvas, however, it is extremely easy to copy from semester to semester.
Q: What kind of company is Canvas?  Are they responsive to customers?

A:  They are making a name for themselves with customer service, and the references we checked highly recommended their service.  They also have a clear, open feature request submission where it gets posted to the Canvas community to be voted on.  We’ve seen excellent support during the pilot.

Q: Will there be more help and tutorials available? Both for faculty and students.

A:  In the event of a conversion, we would add tutorials and documentation to what currently Canvas provides since we’ve gotten feedback from several sources that it is inadequate.
Potential Timeline

Spring/Summer 2016
- Procurement processes/Multi-year contract with Canvas
- Marketing
- Faculty training
- Voluntary conversion of summer courses to Canvas
- Voluntary conversion of Fall 2016 courses (approximately 3000)

Fall 2016
- Any additional publisher LTI integrations and MyZou gradebook done
- Voluntary conversion of Spring 2017 courses (approximately 2800)
- All new courses on Canvas
- Faculty training

Summer 2017
- Conversion of Fall 2017 courses (approximately 3050)
- Faculty training

Spring 2017
- Mandatory Conversion of summer/fall 2017 courses
- All new courses on Canvas
- Faculty training

Fall 2017
- Almost all courses on Canvas, Blackboard kept up primarily for archival purposes
- Last conversions
- Blackboard contract ends December, 2017

Ongoing assessment of changing teaching and learning needs at Mizzou
- Rolling reviews of learning technologies on an ongoing basis as needed by an ad-hoc committee including faculty representatives, ET@MO, and DoIT. It is estimated that we will optimally do an LMS review every 5-7 years.
Cost Analysis

ET@MO staff

After doing a time study on how long it takes staff to convert one of three categories of courses (which roughly correspond to Traditional, Blended and Online), we arrived at the following numbers for ET@MO staff to convert courses over:

<table>
<thead>
<tr>
<th>Courses</th>
<th>Staff Hours per Course</th>
<th>Total Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional</td>
<td>1.5</td>
<td>8250</td>
</tr>
<tr>
<td>Blended</td>
<td>3</td>
<td>300</td>
</tr>
<tr>
<td>Online</td>
<td>8</td>
<td>7200</td>
</tr>
</tbody>
</table>

Even taking this estimate across a wider range (12,000-20,000 hours), hiring two full time people temporarily for two years allows us to change over by requiring that 8-12 hours per week be devoted to conversions from 20 members of the present ET@MO staff. We will accommodate this through rearranging our workload as much as possible to give proper priority to conversions. Some of this is work we would have done regardless of the platform, such as improving or updating a course. Having much of the content converted by ET@MO staff members will enable us to continue offer the high level of customer service we normally offer for faculty and to efficiently move much of the content from Blackboard to Canvas for them.

The full time temporary positions would be entry level people who could triage courses and go ahead and convert some of the easier ones, which would involve using the tools to move the content, then checking to make sure it transferred properly. They would also pass along courses to the other ET@MO staff members for more in depth assistance as needed. Given normal staff turnover, it is also likely that we would be able to continue the positions at the end of two years, but that is beyond the scope of this recommendation.

<table>
<thead>
<tr>
<th>Title</th>
<th>Salary</th>
<th>Benefits</th>
<th>Total per year (2 positions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Resource Associate</td>
<td>$39,520</td>
<td>$13,832</td>
<td>$106,704</td>
</tr>
</tbody>
</table>

Faculty time needed for conversion

Based on the results of the Canvas pilot survey, it is estimated that even if ET@MO staff convert their courses for them, faculty members will need 1-2 hours to become comfortable with the Canvas environment. Since we have, on average, 5000 faculty members, we’re looking at about 10,000 hours for faculty to get comfortable within the environment. Since faculty salaries and technical competency with the systems vary widely, the fiscal impact of
this cannot be calculated reliably. Some faculty may also choose to convert their courses themselves, which could lead to more or less time spent in this area by the faculty member.

### Total costs for a conversion

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temporary Additional Staff Members</strong> ET@MO currently has the budget to fund these, so no additional funds would be needed.</td>
<td>$213,408</td>
</tr>
<tr>
<td><strong>Estimated Canvas license and hosting for two years.</strong> This would be in addition to hosting Blackboard during that same time period of conversion, and could be funded out of one time monies available in the MU Information Technology Fund reserve fund.</td>
<td>$789,606</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$1,003,014</td>
</tr>
</tbody>
</table>

### Updated Financial Analysis

Canvas and Blackboard were compared on their ability to provide consistent packages of features and capabilities as well as costs for additional features required by the University of Missouri. While each vendor participates in the Internet2 NET+ licensing initiative, it has been determined that an RFP would still need to be issued in order to meet the state of Missouri procurement requirements. Financial models are based on 5 year agreements. Instructure Canvas is used as the benchmark for basic features since its license delivers the majority of its functionality within the core agreement. Where necessary to compare like features to like, optional components are included in the cost analysis from each vendor. The following table shows a breakdown in cost between the current Canvas Internet 2 price (available to us until May), the Canvas list price, and the Blackboard managed hosting price.
As a comparison, our current cost per FTE for operating Blackboard in our data center at MU is $20.29 per student. The Canvas cost represents the range between current Internet2 pricing (which they are willing to honor for us until May 2016) and Canvas list pricing which is the most we can expect to pay for the software after May 2016. We expect a contract awarded with Internet2 terms and conditions to be flat for up to five years. Blackboard pricing is expected to increase 3% per year.

In addition to the above costs, it has been determined that several existing complementary licenses will be required to give the University desired features in addition to the features delivered by the LMS. These licenses include video repository (Kaltura), lecture capture (Tegrity), asynchronous multimedia discussions (VoiceThread), virtual classroom (Blackboard Collaborate), lockdown browser (Respondus) and plagiarism checking (TurnItIn), and will remain the same regardless of LMS platform.

Note on Blackboard – Blackboard recently presented a quote for a SaaS implementation of their Essentials Bundle. We believe this bundle is not feature comparable to Canvas (the Insights Bundle is the appropriate match but Blackboard did not provide SaaS pricing for it). Also, it is understood that the Blackboard SaaS environment for an institution of our size is not available for general consumption until mid-2016. Blackboard SaaS should not be considered a viable option until it has a proven track record with many users and institutions over an academic calendar.

<table>
<thead>
<tr>
<th></th>
<th>Base System</th>
<th>Premium Implementation Services</th>
<th>24/7/365 Application Support</th>
<th>ePortfolio (5,000 Alumni/Year)</th>
<th>Total</th>
<th>Cost per Student FTE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Instructure Canvas</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost per Student FTE</td>
<td>$11.63</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td></td>
</tr>
<tr>
<td><strong>Internet2 Price</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ePortfolio (5,000 Alumni/Year)</td>
<td>$13,250</td>
<td>$26,500</td>
<td>$39,750</td>
<td>$53,000</td>
<td>$53,000</td>
<td>$185,500</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$388,178</td>
<td>$401,428</td>
<td>$414,678</td>
<td>$427,928</td>
<td>$427,928</td>
<td>$2,060,140</td>
</tr>
<tr>
<td><strong>Cost per Student FTE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$11.63</td>
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</tr>
<tr>
<td><strong>Instructure Canvas</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost per Student FTE</td>
<td>$18.87</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>List Prices</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24/7/265 Application Support</td>
<td>$95,220</td>
<td>$99,981</td>
<td>$104,980</td>
<td>$110,229</td>
<td>$115,740</td>
<td>$526,150</td>
</tr>
<tr>
<td>ePortfolio (5,000 Alumni/Year)</td>
<td>$13,250</td>
<td>$26,500</td>
<td>$39,750</td>
<td>$53,000</td>
<td>$53,000</td>
<td>$185,500</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$584,569</td>
<td>$626,385</td>
<td>$669,629</td>
<td>$714,373</td>
<td>$747,442</td>
<td>$3,342,397</td>
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<tr>
<td><strong>Cost per Student FTE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$18.87</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Blackboard</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard Learning Insight Bundle</td>
<td>$568,652</td>
<td>$585,712</td>
<td>$603,283</td>
<td>$621,381</td>
<td>$640,023</td>
<td>$3,019,051</td>
</tr>
<tr>
<td>Managed Hosting</td>
<td>Content Management Setup</td>
<td>$18,000</td>
<td></td>
<td></td>
<td></td>
<td>$18,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$586,652</td>
<td>$585,712</td>
<td>$603,283</td>
<td>$621,381</td>
<td>$640,023</td>
<td>$3,037,051</td>
</tr>
<tr>
<td><strong>Cost per Student FTE</strong></td>
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<td></td>
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<tr>
<td></td>
<td>$17.15</td>
<td></td>
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</tr>
</tbody>
</table>
Responses to Chief Academic Officers’ Memo

In the UM chief academic officer’s memo of April 30, 2015 (See Appendix 5 for the original memo), we were asked to specifically address the following issues as part of our summer and fall 2015 pilot of Canvas;

1) **A detailed timeline for implementation and transition as well as a timeline for ongoing review and assessment.**

   See above for the potential timeline.

2) **A general scope of work describing that would be required to make any changes.**

   As the timeline above notes, we will need very little in the way of additional programming for PeopleSoft and MU Connect since much of this has already been done during the pilot. There are still a few publisher third party tools we have not yet hooked into Canvas, but which should be fairly simple to do using industry standard LTI integrations. We would also like to have a final grade push to PeopleSoft, but the framework for that is currently being developed by Canvas and should be easily implemented once finished.

   Much of the work that will need to take place will be in faculty development and the conversion of courses. This type of work will likely be required regardless over the next few years, even if the choice is made to stay with Blackboard, since conversion to the Saas offering and/or Blackboard Ultra will require course conversions, faculty development and training.

3) **Assessments of the actual use, application and acceptability by faculty describing advantages and disadvantages.**

   This information is contained throughout this report, in the faculty surveys, and focus group areas.

4) **Seek detailed student input on comparisons of Blackboard versus Canvas.**

   Students were surveyed in both the summer and fall on their use of Canvas vs. Blackboard. Overall, they used mobile devices to access Canvas at a higher rate than faculty, and were largely satisfied with the interface after the initial learning curve. For more details, see the student survey data, above.

5) **Full analysis of costs for converting to Canvas that include programming changes to PeopleSoft, CRI retention software, costs for converting Blackboard courses to Canvas courses, costs and time estimates for training faculty, staff support for converting classes, back-fill of key staff positions while conversion is taking place, and student development.**

   See above for budget. One important factor to note is that we are going to incur some of these costs in the near future, no matter what we do. If we decide not to go to Canvas, and
stay with Blackboard instead, we will still need to go to the SaaS (cloud) version of Blackboard, and eventually, the newest version, Ultra. Both of these are going to require significant course conversions and faculty and student training.

<table>
<thead>
<tr>
<th>Programming changes to PeopleSoft</th>
<th>None – the Canvas to Peoplesoft final grade push that we would need is already being developed by Canvas. We already have the processes needed to load courses and students in place for the pilot.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programming changes to MU Connect (Starfish, our CRI retention software)</td>
<td>None – it is already connected to Canvas, and in use.</td>
</tr>
<tr>
<td>Costs for converting Blackboard courses to Canvas courses</td>
<td>Since we would do this on an individual basis using the tools that are already present in Canvas, this figure is contained in the faculty and staff time needed to do the conversion. No additional funds for software are needed. The only costs we would incur would be in the additional temporary staff members listed in the budget above.</td>
</tr>
<tr>
<td>Back-fill of key staff positions while conversion is taking place</td>
<td>None – key staff members will remain in place to direct and support the activities of full time temporary workers in assisting with conversions.</td>
</tr>
<tr>
<td>Student Development</td>
<td>We will be providing training materials that faculty can use in their courses to provide as needed training for students. We will also be offering open training sessions for students during critical times of the semesters.</td>
</tr>
</tbody>
</table>

6) **Detailed timeline for converting courses including faculty development.**

   See timeline and budget above.

7) **Discussion of impact on “course-sharing’ and collaborative programs like those in nursing, physics, engineering, and potential collaborative programs in data analytics and education.**

   The impact on course sharing and collaborative programs will be minimal, even if each campus ultimately decides on a different LMS. Course sharing presently primarily takes place by enrolling students from each campus on the other campuses’ servers. This takes place through a connection between the student information systems on each campus and could easily be used to load Canvas or Blackboard sites on any of the campuses with students from the other campuses.
If we do need to actually transfer any course sites between the campuses, they can be designed in such a way that they can easily be converted back and forth between the learning management systems by the educational technologies staff members on each campus.

8) Summary and recommendations of suggested next steps based on the above assessment that can be presented to the UM Provosts and Chancellors.

See final recommendation, above.

9) There was consensus that a comprehensive timeline should be developed so that future considerations about adoption and/or changes in technology support systems that affect the four campuses can be put on a regular cycle. The intent would be that input and data analytics can be considered at the time of this review and thoroughly vetted before any decisions are made about software.

See timeline discussion, above.
Original Overall Recommendation

A clear recommendation that can be drawn from the data is to move hosting from the campus into the cloud – the ability to spin up servers in response to load on the Amazon cloud services is very valuable in insuring the speed, reliability and stability of the system. Also, several of the LMS vendors offer a guaranteed uptime, with financial remuneration if it is not met. Several of the institutions we spoke with said they received credit when their system was down longer than the guarantee in the service level agreement.

Based on all of the data there is a slight, but consistent, preference for further exploration of Instructure Canvas. The committee recommends that the campus conduct a limited pilot with Instructure Canvas in summer and a full pilot in the fall of 2015. If these pilots are successful, the campus should then move forward with a full conversion starting in the summer of 2016.

If the pilots reveal issues or do not meet overall needs, the campus will explore re-entering the LMS evaluation process or consider Blackboard Ultra and cloud hosting service, which should be available in 2016.

Post-Pilot Overall Recommendation

Over the summer and fall of 2015, additional data was collected through several means (Addendum 1). These included surveys of instructors and students using Canvas, town halls, and additional research on large lecture courses. Based on the previous recommendation and the additional data, the committee deems the summer and fall pilot to be a success and recommends that the campus moves to Instructure Canvas over the next couple of years.
Appendices
Appendix 1: Working Group Membership

**Kevin Bailey** (co-chair)
Director, Customer Service & Support
Division of Information Technology

**Jenny Bossaller**
Assistant Professor
Information Science and Learning Technologies

**Gejuan Cochran**
Executive Assistant
Division of Information Technology

**Rose Marra**
Professor
Information Science and Learning Technologies

**Kerri McBee-Black**
Instructor
Textile and Apparel Management

**Eric McSwain**
Manager, Customer Service & Support
Division of Information Technology

**Nicole Monnier** (Faculty Council representative)
Associate Teaching Professor
German and Russian Studies

**Tanys Nelson**
Manager, Learning Technologies
Educational Technologies at Missouri

**Bethany Stone**
Associate Teaching Professor
Biological Sciences

**Danna Vessell** (co-chair)
Director
Educational Technologies at Missouri
Appendix 2: LMS Review Calendar of Events

Focus Groups

- September 10, 2014 - School of Journalism
- September 11, 2014 - Truman School of Public Affairs
- September 12, 2014 - College of Human Environmental Science, Physical Therapy
- September 15, 2014 - School of Nursing, College of Arts & Science
- September 16, 2014 - College of Business, College of Arts & Science
- September 17, 2014 - Truman School of Public Affairs, Health Science
- September 18, 2014 - College of Veterinary Medicine
- September 19, 2014 - College of Education
- September 23, 2014 - College of Engineering
- September 24, 2014 - College of Engineering, Human Environmental Sciences, College of Business
- September 25, 2014 – College of Agriculture, Food, and Natural Resources
- September 26, 2014 - College of Veterinary Medicine
- September 30, 2014 - General Campus
- October 1, 2014 - General Campus
- October 7, 2014 - Student "stop-in" LMS feedback session
- October 9, 2014 - Student "stop-in" LMS feedback session
- October 15, 2014 - Student Focus Group
- October 16, 2014 - Student Focus Group

Vendor Demonstrations

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructure Canvas</td>
<td>October 6, 2014, October 7, 2014, October 9, 2014</td>
</tr>
<tr>
<td>Blackboard Learn</td>
<td>October 20, 2014, October 21, 2014, October 22, 2014</td>
</tr>
</tbody>
</table>
Appendix 3: Financial Analysis

The three LMS vendors were compared on their ability to provide consistent packages of features and capabilities as well as costs for additional features required by the University of Missouri. For procurement purposes, each vendor participates in the Internet2 NET+ initiative so there should be no need to do an RFP. Financial models are based on 5-year agreements. Instructure Canvas is used as the benchmark for basic features since its license delivers the majority of its functionality within the core agreement. Where necessary to compare like features to like, optional components are included in the cost analysis from each vendor.

<table>
<thead>
<tr>
<th>Total Student FTE</th>
<th>30865</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vendor</strong></td>
<td><strong>Required Licenses/Services</strong></td>
</tr>
<tr>
<td>Instructure Canvas</td>
<td>Base System</td>
</tr>
<tr>
<td></td>
<td>Premium Implementation Services</td>
</tr>
<tr>
<td></td>
<td>24/7/365 Application Support</td>
</tr>
<tr>
<td></td>
<td>ePortfolio (5,000 Alumni/Year)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td>Cost per Student FTE</td>
</tr>
<tr>
<td>Desire2Learn</td>
<td>Base System</td>
</tr>
<tr>
<td></td>
<td>Year 1 Discount</td>
</tr>
<tr>
<td></td>
<td>Implementation Services</td>
</tr>
<tr>
<td></td>
<td>Advanced SIS Implementation</td>
</tr>
<tr>
<td></td>
<td>ePortfolio (Outcomes based portfolio)</td>
</tr>
<tr>
<td></td>
<td>Learning Objects Repository</td>
</tr>
<tr>
<td></td>
<td>24/7/265 Application Support</td>
</tr>
<tr>
<td></td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td>Cost per Student FTE</td>
</tr>
<tr>
<td>Blackboard</td>
<td>Blackboard Learning Insight Bundle</td>
</tr>
<tr>
<td></td>
<td>Setup - Waived</td>
</tr>
<tr>
<td></td>
<td>Content Management Setup</td>
</tr>
<tr>
<td></td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td>Cost per Student FTE</td>
</tr>
</tbody>
</table>

As a comparison, our current cost per FTE for operating Blackboard in our data center is $19.03 per student. Any of the above options would lead to costs savings for the University, Canvas being the greatest.

In addition to the above costs, it has been determined that several existing complementary licenses will be required to give the University desired features in addition to the features delivered by the LMS. These licenses include video repository (Kaltura), lecture capture (Tegrity), asynchronous multimedia discussions (VoiceThread), virtual classroom (Blackboard Collaborate), lockdown browser (Respondus) and plagiarism checking (TurnItIn).
Appendix 4: Accessibility Report
Prepared by Carmen Schaefer, Adaptive Computing Technology Center

Executive Summary
The University of Missouri has a legal obligation to provide academic tools to all students, including the members of the academic community with disabilities. The Division of IT strives for a higher standard, providing educational tools universally designed for all students, faculty and staff with no discrimination of disability. This expectation must be considered when evaluating the accessibility of a Learning Management Systems (LMS). The Division of IT-ACT Center staff then evaluate the vendor statements, utilize the Accessibility Management Platform (AMP) automated scanning tool as well as free accessibility testing tools and incorporate human testing with adaptive software (such as JAWS, etc.) to create an analysis and provide guidance. It is important to note, as with all technology, as companies release products at an increasingly rapid rate, accessibility findings may change in a fashion that affects and/or alters the accuracy of our findings.

There are three components to accessibility that must be considered when evaluating the Learning Management Systems (LMS). The first is the software application itself; second, the content that faculty administer within the application; and third, the plugins or third party additions to the main application. All of these items must be considered in the accessibility of a LMS.

There are three LMS products which will be considered – Canvas, Brightspace, and Blackboard. Each product has accessibility issues to contend with. All three companies have accessibility interest groups. Responses from other institutions indicate that all three companies appear to make accessibility a high priority and address issues in a timely manner. Through the testing conducted, Brightspace emerged ahead of Canvas due to the vendor documentation and hands on testing. Blackboard could not be evaluated therefore could not be ranked.

Legal
The University of Missouri is committed to purchasing electronic and information technology (EIT) that provides comparable access to information and data for individuals with disabilities, except when it is technically unfeasible to do so. The University requires that vendors must demonstrate compliance with the accessibility criteria stated in the Voluntary Product Accessibility Templates (VPAT). The University requires compliance with the accessibility requirements of Section 508 of the Rehabilitation Act of 1973 as amended (29 U.S.C. 794d), and its implementing regulations set forth at Title 36, Code of Federal Regulations, Part 1194., and all other applicable state, local and federal laws and regulations. Missouri state law RSMO 191.863 requires state agencies to develop and procure accessible information technology unless an undue burden would be imposed and developed access standards. MU has an accessibility policy BPPM 1.025.
Background
We currently have Blackboard Learn 9.1, SP11. Blackboard measures and evaluates accessibility using two sets of standards: the WCAG 2.0 standards issued by the World Wide Web Consortium (W3C) and Section 508 of the Rehabilitation Act issued in the United States federal government. Similar to the products being evaluated, Blackboard has an Accessibility Interest Group and Partners. Blackboard provides online accessibility documentation and has a dedicated accessibility support team.

Issue
Ensuring that our campus chooses an LMS platform that will be accessible to all students is an important first step to guaranteeing students with disabilities an equal learning experience in the classroom. But we must also consider the content that will be uploaded, connected to, and associated with these systems. University faculty and staff should not only operate with the understanding that the LMS will be accessible to students, but they should also be aware that content added to an LMS can impact the experience for students with disabilities. Throughout our testing, we did not investigate the features of each system that would assist instructors in creating an accessible learning environment, such as the ability to add alternative text to images. We will continue to educate about accessible content and continue learning about the possible features of the system we choose.

Considerations
How is accessibility determined?
- The following tasks were performed to gather information regarding the accessibility of three LMS products that are under evaluation:
  - Reviewed the product VPATs that are available.
  - Performed automated accessibility testing using AMP.
  - Conducted human testing with JAWS.
  - Performed manual testing with free online tools.
  - Participated in the LMS test drive (Canvas and Brightspace).
  - Contacted other Universities and reviewed posts on the Access Technology Higher Education Network (ATHEN) mailing list.

What is a VPAT?
The Voluntary Product Accessibility Template (VPAT) is an industry standard template for recording how a product or service conforms to Section 508 of the United States Rehabilitation Act. The Adaptive Computing Technology (ACT) Center has reviewed product VPATs for Canvas and Brightspace. (See Attachment 6) Blackboard Ultra’s VPAT is not available yet. Blackboard is completing accessibility testing, and will have an updated VPAT closer to release of Ultra.

After reviewing the VPATs, we obtained the following information:

Canvas
The online VPAT skips provision: 1194.22 (p) When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required.

The 1194.31 (a) provision states that Canvas have been optimized to work well with screen readers such as JAWS for Windows or Apple VoiceOver.

Canvas does not have a WCAG 2.0 VPAT currently, but intends to add one in the future.

**Brightspace**
- Filled only 1194.22, did not fill out:
- Section 1194.21 Software Applications and Operating Systems
- Section 1194.24 Video and Multimedia Products
- Section 1194.31 Functional Performance Criteria
- Section 1194.41 Information, Documentation and Support
- We created scorecards for each VPAT. A scorecard is a quick indication of how the product complies with Section 508 and Web Content Accessibility Guidelines (WCAG) 2.0 provision and areas of concern. (See attachment 8)

**Automated Accessibility Testing**
The University of Missouri uses SSB Bart Group’s AMP (Accessibility Management Platform) enterprise accessibility checker. AMP is able to perform automated accessibility testing on Canvas and Brightspace LMS platforms (i.e. test drive courses) and checked them against the Section 508 and Web Content Accessibility Guidelines (WCAG) 2.0 provisions, in addition to providing a checklist for manual testing. At this time, Blackboard Ultra was not available for testing.

**Top Violations Identified by AMP**

<table>
<thead>
<tr>
<th></th>
<th>Canvas</th>
<th></th>
<th>Brightspace</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Student View</td>
<td>Instructor View</td>
<td>Student View</td>
<td>Instructor View</td>
</tr>
<tr>
<td><strong>Provide valid labels for form fields</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>Ensure frame titles are meaningful</strong></td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Provide alternative text for images</strong></td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>Provide valid, concise and meaningful alternative text for image buttons</strong></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The examples of violations are based on our preliminary testing and might be an indication of some violations present or best practices that are not being implemented. The issues specific to inbuilt vs. added features which can also cause accessibility issues are not differentiated. In order to differentiate issues to such a level, we need more thorough testing of each LMS for
extended periods of time. Since reports generated from AMP’s automated testing are extensive, it is practically impossible to cover all the accessibility violations AMP identified concerning each LMS.

User Experience - LMS Test Drive

Julie McGinnity, a graduate student, who works for the Adaptive Computing Technology (ACT) Center participated in the LMS test drive. Julie has a visual impairment and uses a screen reader, JAWS 15 for Windows Professional, to provide an audible representation of what is on the computer screen. The following is an overview of her user experience with each LMS and the Internet Explorer browser:

<table>
<thead>
<tr>
<th></th>
<th>Canvas</th>
<th>Brightspace</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Communication</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Reply to a discussion post</em></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td><strong>Creating assignments and quizzes</strong></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td><em>Add a question to a quiz</em></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td><strong>Grading student work</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Grade an assignment or discussion post and give feedback</em></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Creating content</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Create a new place for content</em></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td><strong>General</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Create an event that appears on the course calendar</em></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><em>Access the student view</em></td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Canvas Test Drive Review

Based on the user test drive, Canvas was partially accessible with the JAWS 15 screen reader. Boxes, buttons, and links were clear, and easy to use. The user was able to use the content editor and navigate the pages successfully. However, some elements of the page were not user friendly. For example, when selecting items with check boxes all throughout Canvas, the response of the box was conflicting. The screen reader indicated that the box was selected, however the box was still unchecked. The user also had difficulties accessing alerts, such as those that tell users they have successfully posted a comment. The user was unable to accomplish any tasks on the modules page. Although the instructions said to click on a link to access the accessible menu, the user struggled to gain keyboard access within the menu. Editing, adding and moving the modules require the use of a mouse for dragging and dropping. As the user was unable to gain mouse control to accomplish these tasks, thus could not continue on that page.
Brightspace Test Drive Review

Based on the user test drive, Brightspace was accessible with the JAWS 15 screen reader. Although the user was unable to complete all the tasks due to a limited amount of time, the site was found to be accessible and usable. The user was able to use the content editor, locate buttons and links, and accessibly handle dragging and dropping items. The layout was difficult due to the large amount of information on each page, but the user was confident that with regular use, familiarity and navigation would be easy to master.

Blackboard Ultra

Blackboard Ultra was not available for the test drive.

Options

Option 1: Canvas

Based on the VPAT and different end user experiences, the findings can be summed up from this quote by John Paul Harris a member of the ATHEN listserv, “It falls in the category of accessible, but not fully ‘simple and intuitive’ for a screen reader user.”

Dana Danger, a Project Manager with Instructure, stated that Canvas conforms to the W3C's Web Accessibility Initiative Web Content Accessibility Guidelines (WAI WCAG) 2.0 AA and Section 508 guidelines.

Accessibility expert Terrill Thompson, stated “with each new release there are dozens of accessibility fixes” and “Instructure is very responsive to our feedback.” (Complete response Attachment 5).

At this time, Canvas provided a 508 VPAT. They stated that they will be adding a WCAG 2.0 VPAT in the future.

Areas of concerns are:

- Non-accessible third-party integrations and Learning Tools Interoperability (LTI).
- Lack of documentation regarding the accessibility and usability issues, since there are “dozens of accessibility fixes” with each release.

In summary, if the University of Missouri purchases Canvas, we need to be prepared to support the faculty and students who have visual impairments and use a screen reader as Instructure continues to improve the accessibility and usability of the Canvas LMS platform. Initially, supporting our students with disabilities will take more time and effort during implementation. Prior to implementation we need to identify non-accessible third-party integrations that are required for course participation and Learning Tool Interoperability (LTI) by providing equivalent alternatives or an equally affective access plan.

Option 2: Brightspace

D2L states that Brightspace conforms with the W3C’s Web Accessibility Initiative Web Content Accessibility Guidelines (WAI WCAG) 2.0 AA and Section 508 guidelines (1194.22).
Based on the manual testing with JAWS for Windows software, our tester found the interface easy to access, easy to understand, and was able to complete the list of tasks provided in the table above. A post on the ATHEN open communication forum (July 2014) indicated that D2L is inaccessible in Safari when using Apple VoiceOver. Ken Petri, a Program Director in the Web Accessibility Center at The Ohio State University, replied “I would definitely contact D2L directly with any specific issues. They have staff dedicated to accessibility. ” (See Attachment 5).

The Brightspace 508 & WCAG 2.0 VPAT provided detailed information regarding the provisions that are marked with “supports with exceptions”. They provided specific configuration settings for those who use screen readers.

Areas of concerns are:
A few exceptions in the VPAT and the configuration settings that need to be considered to better support our faculty and students with visual impairments who use a screen reader.

In summary, there will be a learning curve associated with the transition to a new LMS. The users will need to make initial configuration changes to create a more accessible learning environment. The faculty and students need to be aware of the interface elements that are not accessible. Configuration changes, interface elements that are not accessible and available workarounds will need to be thoroughly documented. Prior to implementation, non-accessible third-party integrations, that are required for course participation and Learning Tool Interoperability (LTI), need to be identified and equivalent alternatives or an equally affective access plan need to be provided.

Option 3: Maintain Blackboard
We currently have Blackboard Learn 9.1, SP11. Blackboard measures and evaluates accessibility using two sets of standards: the WCAG 2.0 standards issued by the World Wide Web Consortium (W3C) and Section 508 of the Rehabilitation Act issued in the United States federal government.

Like Canvas and Brightspace, Blackboard also has an Accessibility Interest Group and Partners. Blackboard provides online accessibility documentation and has a responsive support team.

Andy Jacobson, Senior Director of Operations, with Blackboard informed us that the new user interface, called Ultra, has some new built-in accessibility features. For example, the drag and drop items can be accomplished with the keyboard as well as the mouse. He said that Blackboard is performing accessibility testing and will provide an updated VPAT once it is officially released.

That was the only accessibility information that we were able to obtain regarding Ultra. Unfortunately we do not have firsthand testing experience.
Conclusion

Students with disabilities encounter barriers on the web that prevent them from learning and participating in the classroom at their full capacity. It is our job to minimize these barriers as much as possible by understanding accessibility as well as the standards that govern the creation and development of websites and applications. We do this by increasing our knowledge of the standards, but we also reach beyond them into the reality of accessibility. This reality is formed mainly from the user experiences and company documentation of a product, in this case, each LMS review resulted in its own user experience, and each VPAT gave us valuable information on the products under consideration.

What did we learn? We have three learning management systems from which to choose. Little is known about Blackboard Ultra at this time as we were unable to participate in the test drive and did not receive a VPAT from the company. The other two systems, Brightspace and Canvas, do not appear to be fully accessible based on the VPATs or end user experience. Although both of them seem to be technically accessible for the most part, their accessibility issues were communicated to us differently. All three companies have accessibility interest or collaboration groups, and responses from other institutions indicate that all three companies appear to make accessibility a high priority and respond quickly to accessibility issues.

With the information we were able to gather during automated testing, manual testing, and user experience, ACT Center recommends that we move forward with Brightspace. Not only did Brightspace have the best user experience, the company understands the importance of accessibility and offers support to prove it. Although the product does have some weak areas, the company seems eager to improve those areas and is able to provide valuable workarounds until a long term solution has been found.

It is likely we will find accessibility issues regardless of the LMS system that we choose to implement. Brightspace clearly outlined the parts of their system that would not be accessible to keyboard and screen reader users and provided alternatives for users. On the other hand, Canvas claims to be totally accessible, which we found to be untrue when our student reviewed it and when we asked others for their experiences. It is important that vendors communicate the issues within an LMS so we can work together to overcome them and find solutions for our students, faculty, and staff.

We will continue to gather accessibility information on all three LMS platforms in order to proactively support our end users who have disabilities.
Appendix 5: Memo from UM Chief Academic Officers

Plan for Analyses of LMS software
Based on agreement by UM provosts
April 9, 2015

Background:
S&T has been piloting Canvas as a potential replacement for Blackboard as their LMS. MU has also looked at different products and is running a pilot of Canvas in the summer and fall of 2015 to determine if they are interested in pursuing an alternative to Blackboard. The provosts have had several conversations about this topic and there are a number of issues that should be considered into making any decisions. Below is a short list of the issues, as well as a plan for moving forward.

Context and issues to consider:

- In the past – all campuses have used the same LMS software.
- The president and chancellors have recently indicated their desire for all campuses to adopt common software applications across a variety of areas and a need to control the rising costs of IT.
- UM IT just completed a system-wide look at the future of the ERP with an eye on simplifying our installations including using single instances of specific pillars (e.g., PeopleSoft Student). Changes are likely in the next couple of years.
- The UM campuses are ramping up in the course-sharing initiative with the potential of having as many as 50 courses per year shared across the system.
- Although some preliminary work has been done on the costs of switching LMS software, it has not included a full and detailed financial analysis – which needs to be completed before changing.
- The Blackboard system has been unreliable during the past year and has caused some faculty to question the viability of using Blackboard. Blackboard has indicated if they are hosting it, the system is more stable.
- “Transaction costs ” need to be evaluated including such items as faculty development, connecting any new LMS software to the PeopleSoft Student pillar, CRI retention software, converting existing courses from Blackboard to Canvas, etc.
- While input has been received from some faculty and IT staff, by in large students have not been in on the discussion.
- The decision to change LMS software has “symbolic meaning”, with implications on whether we act as a system or as a collection of individual campuses. It also likely has implications on future software and IT actions as well.
- At this point, UMSL and UMKC appear to have little or no interest in changing from Blackboard to Canvas – regardless of what S&T and MU decide.
Action plan moving forward:

- After some discussion, the UM provosts decided there is a need for a more thorough examination before any final decisions are made about LMS software. Starting the summer of 2015 – they are recommending the following steps:
  - S&T will continue with expanded testing of Canvas.
  - MU will move forward with their planned pilots for summer and fall of 2015.
  - UMSL will plan a small pilot.
  - UMKC will have Blackboard host their application, moving away from having it hosted in house. Their analyses - of the effort and cost associated with the change - will be shared with the other campuses. Blackboard will host the entire suite of courses and UMKC will not run courses through the existing set up they are using now.

Each campus considering changes will do a thorough analysis of the following as part of their pilots/changes:

1. A detailed timeline for implementation and transition as well as a timeline for ongoing review and assessment.
2. A general scope of work describing what would be required to make any changes.
3. Assessment of the actual use, application, and acceptability by faculty describing advantages and disadvantages.
4. Seek detailed student input on comparisons of Blackboard versus Canvas.
5. Full analysis of costs for converting to Canvas that include programming changes to PeopleSoft, CRI retention software, costs for converting Blackboard courses to Canvas courses, costs and time estimates for training faculty, staff support for converting classes, back-fill of key staff positions while conversion is taking place, and student development.
6. Detailed timeline for converting courses including faculty development.
7. Discussion of impact on “course-sharing” and collaborative programs like those in nursing, physics, engineering, and potential collaborative programs in data analytics and education.
8. Summary and recommendations of suggested next steps based on the above assessment that can be presented to the UM Provosts and Chancellors.
9. There was consensus that a comprehensive timeline should be developed so that future considerations about adoption and/or changes in technology support systems that affect the four campuses can be put on a regular cycle. The intent would be that input and data analytics can be considered at the time of this review and thoroughly vetted before any decisions are made about software.

At the conclusion of these reviews – by May of 2016, the UM Provosts will make a final decision on the next course of action. At that time they will also prepare a general timeline for implementation and for future reviews of LMS software and a consistent process and guidelines for reviewing learning management systems for the future.