

# Canvas Pilot Spring 2015: Summary of End-Term Survey Results

Penn State Information Technology Services and Outreach and Online Education

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## Section 1: Executive Summary

### Executive Summary

Information Technology Services (ITS) and Outreach and Online Education piloted the Canvas learning management system (LMS) during the 2015 spring semester as a potential replacement for ANGEL. Feedback throughout the pilot from faculty, staff, and students was very positive. As with any enterprise service, there are technical concerns, mitigation strategies are in place or proposed. Additionally, Instructure Inc., the parent company of Canvas, is actively working with Penn State to alleviate some of these concerns. Canvas is a viable choice to replace ANGEL and become the next LMS at Penn State.

The pilot group consisted of 62 faculty members, 81 individual course sections, and 2,415 student enrollments. For the end of semester report, faculty, student, and staff surveys were administered, which focused on system functionality, ease of use and available tools. **Over 55% of faculty involved in the pilot participated in the end of semester survey.** Faculty responses were also positive with regard to usability and functionality; **90% of faculty survey respondents agreed that Canvas would be a suitable replacement for ANGEL.** **Close to 14% of students involved in the pilot participated in the end of semester survey.** The student survey responses showed generally positive results in usability and functionality. **Nearly 70% of students surveyed agreed that Canvas would be a suitable replacement for ANGEL.** **Over 37% of staff involved in the pilot participated in the end of semester survey.** **Staff responses were also positive with regard to usability and functionality; 85% of staff surveyed agreed that Canvas would be a suitable replacement for ANGEL.** Internal reviews were also conducted on accessibility, mobile, and technical/infrastructure capabilities.

Overall, Canvas is an accessible platform. Canvas recently received Accessibility in Mind (WebAIM) certification (<http://webaim.org/services/certification/canvas>), which means it conforms with international standard Web Content Accessibility Guidelines 2.0 Level AA Conformance. Instructure is also pursuing the Gold Standard certification from the National Federation of the Blind. The benefit of this WebAIM certification is that it addresses not just blind users, but also users with other disabilities such as color blindness as well as keyboard-only (motor impaired) users. One outstanding accessibility issue is MathML support to provide accessible mathematical equations. Instructure

actively worked to include support for the MathML standard by August 24, 2015. A few other minor accessibility issues remain, but Instructure has a roadmap to address them.

The Canvas platform has one of the best LMS mobile applications we have seen to date. It is easy to use and has many great student- and instructor-focused features that work on both iOS and Android devices.

The Canvas platform is a true cloud-native architecture. Canvas is hosted on the state-of-the-technology cloud infrastructure provided by Amazon Web Services. The infrastructure is elastic, and additional web servers can be provisioned on demand. Auto Scaling is well suited for LMS applications such as Canvas that experience hourly, daily, or weekly variability in usage. Canvas has over 160 certified third-party learning tool integrations, a simple user interface, typically no scheduled downtime for maintenance, and is easily adaptable for instructor use. The process to approve and administer (i.e., licensing and implementation) these third-party integrations may be resource-intensive at our scale. Also, integrating systems and/or extending functionality may require us to rethink how to design and develop these integrations due to restrictions on the number of data requests through the platform's application programmable interfaces (APIs).

As a hosted cloud-based solution, product innovation occurs much faster. However, we cannot control timing of feature releases, introduce core changes and bug fixes, back up (offline), or restore courses with student content into production. Instructure has been transparent about outages and issues and guarantees 99.9% uptime in the Service Level Agreement. There are no performance guarantees for application responsiveness as a component of the availability calculation. At full production, we will be larger than any currently hosted higher education customer so this does introduce an unknown that Instructure must be prepared to address. Instructure recognizes high performance is critical to their business success and is committed to work with Penn State in a proactive manner to address any scalability concerns. This is not to say Instructure will commit to 100% availability. It's highly unlikely any LMS vendor would.

It is recommended that Penn State adopt Canvas as a replacement for ANGEL with a continued commitment to active collaboration with Instructure and Unizin to ensure the technology supports the teaching and learning needs and expectations of Penn State.

## Background

In October 2014, Blackboard informed Penn State of an end-of-life date for ANGEL, Penn State's current LMS. As a result of Blackboard's decision, most instances of ANGEL will no longer be supported beginning on October 15, 2016. Penn State has a contract for the course management system through December 2017 and will continue to receive operational support until that time.

The LMS Team was asked to pilot the Canvas LMS during the 2015 spring semester. Students, faculty, and staff throughout Penn State were invited to participate in the pilot and will help guide future decisions and recommendations of the LMS Team.

The LMS Team has developed a comprehensive assessment strategy including faculty, staff, and student surveys, focus groups, individual interviews, and the LMS requirements document. The Canvas Pilot 2015: Summary of End-Term Survey Results report includes the results from selected parts of the mid-semester faculty and student surveys, as well as end of semester faculty, staff, and student surveys.

This report highlights the key findings of the seven (7) most critical parts of the assessment of Canvas. The first three pieces are based on the feedback received from faculty, staff, and students in the mid-semester and end of semester evaluation.

- *Suitability of Canvas as a replacement for ANGEL*
- *Ease of use*
- *Core functionality*

*The final four pieces include an internal evaluation of the Canvas system based on:*

- *LMS Requirements Document*
- *Accessibility review*
- *Mobile review*
- *Technical/Infrastructure functionality*

## Section 2: Summary of Faculty Survey Results

### Summary of Results

Feedback throughout the pilot from faculty has been very positive; 90% of faculty indicated that Canvas would be a suitable replacement for ANGEL. While most found Canvas easy to use, there were a few issues that faculty noted.

While, the import tool did a very good job of migrating content from ANGEL to Canvas, there was a minor issue with assessment feedback not being included in the migration. Penn State is working with Instructure to resolve this as well as on documentation to make this process easier. We will also provide migration services through Instructure, if instructors wish to utilize the service for course migration.

Canvas includes multiple tools for faculty to communicate with students. The email feature (conversations) does not include a HTML editor, which limits its functionality. There are also no carbon copy (CC) or blind carbon copy (BCC) features in communication. Many instructors in the pilot used their Penn State email for all communications, without issue. A more robust feature set should be implemented, or an alternative identified (Instructure could not provide an alternative).

The Conferences tool was used widely during the pilot. At this time, the Conferences tool does not work on mobile devices, but there are alternatives, e.g., Adobe Connect or Blackboard Collaborate (for World Campus) that can be used.

### Statistical Data

**The faculty response rate for the end-semester survey was 55.9%.** The overall faculty experience in Canvas, much like the student experience, has been excellent. **Nearly 90% believed Canvas would be a suitable replacement for ANGEL. Below are responses from faculty.**

Statistical Data (Faculty)	
Total number of respondents	33
Total number of surveys sent	59
Response rate	55.9%
Maximum scale	5

Table 2.1: Statistical Data (Faculty)

## Faculty Feedback on Suitability of Canvas as a Replacement for ANGEL

**90% of faculty agreed or strongly agreed that Canvas will be a sufficient replacement for ANGEL.**

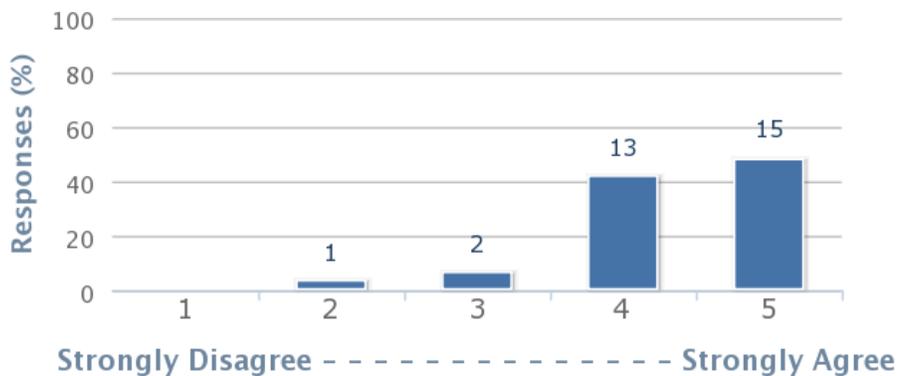


Figure 2.1: Canvas as the Replacement for ANGEL by Faculty

## Selected Responses from Faculty on Suitability of Canvas as a Replacement for ANGEL (End-Term Survey)

1. *I hope the decision is made to move to Canvas soon as I am not interested in teaching in ANGEL any more.*
2. *Overall I find Canvas much more intuitive than ANGEL—which seems so outdated and requires many more clicks and steps. Canvas is much more efficient to both grade and maintain course materials.*

3. *I think it is generally more user friendly. As an instructor, it was wonderful, and I expect students will get used to it when it's the only game in town.*
4. *I think Canvas is intuitive to the natural flow and structure of college courses. Having used ANGEL and D2L extensively previously, I find Canvas having everything I need and more. I also love the future integration possible, as an Education professor, for Turnitin and Taskstream (which we use for accreditation). I think Canvas is so easy to use for both instructor and students.*

Because the overwhelming majority of pilot participants had prior experience using ANGEL, comparisons with it were unavoidable.

## Faculty Feedback on Ease of Use

A critical success factor for the adoption of any new technology is in its ease of use, defined here as the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use. Of the entire assessment criteria applied to the pilot, ease of use and user interface (covered in the next section) is the most subjective and most critical to successful adoption. Simply put, the easier it is to figure out and manipulate a device, the more likely that device is to be successfully incorporated into the lives of the community.

**87% of faculty surveyed agreed or strongly agreed that Canvas was easy to use and 88% agreed or strongly agreed that Canvas was easy to navigate.**

## Selected Responses from Faculty on Ease of Use

### Importing/exporting content

- *There are several difficulties importing content from ANGEL to Canvas. However, I don't think that's a key reason to not adopt this technology. We came to the consensus that we just needed to build the course out in Canvas and not try to import any ANGEL content.*

### Logging in/out

- *Logging in would not fail but would take an extended period of time.*
- *Not able to log out of course in Canvas*

## Speed

- *Switching between sections of the course would be slow.*
- *Some slow loading times.*

## Uploading files

- *I would also like to just upload a file directly into a module instead of having to add it into the files, and then add it to a module. There may be a way to do this since I did not research in detail.*
- *Student file uploads had some file name issues if spaces or other non-alphanumeric characters were used. Files would appear to have a valid upload and file size, but would not be available for the instructor to download. There were also some issues with the responsiveness of the program.*

## Level of Satisfaction with the Canvas Tools

Faculty was impressed with the core functionality in Canvas. **Satisfaction with the functionality of these tools overall exceeds 80%.**

Level of Satisfaction with the Canvas Tools by Faculty		
<i>Tools over 70% satisfaction</i>	<i>Tools over 80% satisfaction</i>	<i>Tools over 90% satisfaction</i>
Communication Messaging	Class List/Roster	Assignments
N/A	Collaborations	Announcements
N/A	Conversations/Email Messages	Calendar
N/A	External Links	Canvas Documentation
N/A	Grades	Course Analytics
N/A	Files	Course Setup Checklist
N/A	Media Grading Feedback	Discussions
N/A	Modules	Embedding Media
N/A	Notifications	Groups
N/A	Profile	Media Storage
N/A	Quizzes	SpeedGrader
N/A	Rubrics	N/A
N/A	To-Do List	N/A
N/A	Class List/Roster	N/A
N/A	Collaborations	N/A
N/A	Conversations/Email Messages	N/A
N/A	External Links	N/A

**Table 2.2: Satisfaction with the Canvas Tools by Faculty**

## Selected Responses on Core Functionality

### Assignment and Announcement

- *Like the most: Assignment and Announcement tools were easily shown when students first access the course.*
- *Like the least: Lack of a built-in blog feature. Extra credit assignments difficult to manage in gradebook.*
- *My main problem with administration and assignment management was the lack of handling for repeating assignments. I have many types of assignments that happen 2 or 3 times a week. To have to manually enter each assignment is a pain. I realize that there isn't handling for this in ANGEL either, but surely some system must make allowance for this.*

### Calendar

- *I also like the way the calendar is integrated with assessments and the ability to notify.*

### Communication

#### *Communication via email*

- *Like the most: Being able to reply via email or inside Canvas without it making a real difference either way (Yay!) Grading is so much better, including quick and easy comments. To-do reminders for students and teachers both.*
- *Like the least: Email: > Restrict student communication; student should not be able to email all course individuals > Students should also not be able to choose when they receive my message; I had a student mention he only received my emails on the weekend and couldn't figure out why; he had set his email notifications to weekly and was missing important information during the week > Cannot interact with course when email compose box is open (need to double-check steps to access information when sending procedural emails) > Not able to add hyperlinks or formatting to emails > If logged into course and already selected that course, should not need to select the course from the dropdown menu > Need CC and BCC buttons > Need to be able to search for a message in my inbox > Great able to reply to emails from any account and reply is seen as coming from Canvas*

- *Students had trouble connecting the Canvas to their PSU emails so that when I contacted them it went to both Canvas mail and their PSU email.*

## **Conferences**

- *It was very easy to use and helped me to keep organized. I liked all the various functions like conference calls.*
- *Conference tool needs some work. Apart from the issues with working on a mobile device. I can't cut and paste information into the conference presentation. I can't move text boxes when I type in them. There is no erase feature. Blackboard Collaborate does a good job of this.*

## **Embedding**

- *I like the features that were disabled for the pilot—the ability to easily link to external sources and embed content.*
- *I love that it is web focused. The flexibility that it affords is pretty remarkable.*

## **Crocodoc (Used in SpeedGrader)**

- *Crocodoc is a little thin. It would be nice to have prebuilt marks for essays. Dragging and dropping units for comma use or run-on sentences is much easier than retyping the same comments over and over.*
- *The fact that Crocodoc lacks profiled comments makes it a weaker choice. If Canvas could include Turnitin within its system, they would have a credible mobile experience.*

## **Grading**

### *Grade book*

- *The grading system worked very smoothly. The speed grader made grading uploaded Word documents or PDF very easy.*
- *Liked the grading feature where it gave me a list of what needed to be graded, and liked the grading tools.*
- *I LOVE the grading features and the way it keeps me connected to my students.*
- *Chem 101 is a lecture-laboratory course combined. I would like it very much if we could separate grades for the two components of the course and then at the end,*

*combine them since the course will be graded as one. Right now, I have all the grades listed as one big system.*

- *I would like to grade by question, especially essay versus by student.*
- *Gradebook does not allow subcategories; drag and drop upload would be nice.*
- *Grading was an issue...it should be more flexible. Also, I like to be able to use the gradebook to notify and post information for the students that is private but that are not included in their grade. This was not easy to do so that they could see what I was importing in ungraded columns. For example, clicker number, or midterm grades that I calculated myself since Canvas did not consider weights of different categories. If it can do this, I was not able to find an easy way to do it.*

#### *SpeedGrader*

- *Like the most: drag and drop rearrangement speedgrader.*
- *Speedgrader is awesome. It's easy to build materials in the modules. I like that those changes reflect on the course schedule and calendar.*
- *Make an easier link to the speed grader. It was hard to get back to course content, or to get to the speed grader generally from the home page.*

#### **Groups/Teams**

- *Like the most: The integration of student groups for group projects was very well done.*
- *Canvas is much more flexible than ANGEL. I liked the way you manage teams.*
- *Like the most: All the team management tools.*

#### **Integration of third parties/platforms**

- *Like the most: Integration with other platforms.*
- *Like the most: Integration of Google Docs and synchronous conferencing.*

#### **Modules/Submodules**

- *No submodules. There needs to be a hierarchy to the information, such as the folder structuring in ANGEL. It is so close, but stops at just a module level.*

## Quiz

- *I liked the ability to craft a dynamic and linked syllabus page. The right hand menu that links to the quizzes and assignments made this a very easy process.*
- *The right hand menu that links to the quizzes and assignments made this a very easy process. The quizzes were great to use. I would use more quizzes in the future if we can use Canvas. It made a quiz a dynamic and engaging pedagogical exercise. The quiz overview allowed us to look at the class statistics immediately after the quiz. I found many of these lessons "stuck" as a result. It may seem less important, but I also liked the look and feel of the site.*
- *I had some problems with creating quizzes (the images wouldn't show up). I found work-arounds.*

## To-do reminders

- *Like the most: To-do reminders for students and teachers both. Pages opening in new tabs by default (I wish the editor's CTRL-K option was set to "New" by default, but I'm glad at last CTRL-K is supported). Able to resize text areas easily!*

## Seating Chart

- *Like the most: The Seating Chart in the Attendance module allowed me to quickly learn my students' names. I realize it is a pilot but importing student photos from the SIS will be an important feature for in person instructors. Some of my students voluntarily added photos but I did not require them to do so. The Attendance module was nice.*

## Syllabus

- *The syllabus never looked better—the details it allowed you to give the students.*
- *I liked the ability to craft a dynamic and linked syllabus page.*
- *Difficulty to create a table for syllabus.*

## Section 3: Summary of Student Survey Results

### Summary of Results

Feedback from students throughout the pilot has been very positive; **71% of students have indicated that Canvas would be a suitable replacement for ANGEL.** While most found Canvas easy to use, there were a few issues that students noted.

Some students noted that the navigation was confusing at times, especially with the addition of Groups in the course. This could have more to do with how instructors set up the course space that Canvas in general. Upload and load times were slow, compared to ANGEL.

### Statistical Data

**The student response rate for the mid-semester survey was 13.7%.** The overall student experience in Canvas was rated as being generally positive. In looking at the previous LMS pilots, none have rated so highly among students. While all core features were viewed positively, the **Mobile App** is one of the highest rated features. **Over 70% believed Canvas would be a suitable replacement for ANGEL. Below are selected responses from students.**

Statistical Data (Students)	
Total number of respondents	233
Total number of surveys sent	1739
Response rate	13.7%
Maximum scale	5

Table 3.1: Statistical Data (Students)

## Student Feedback on Suitability of Canvas as a Replacement for ANGEL

In the end-term survey, 85% of staff agreed or strongly agreed that Canvas will be a sufficient replacement for ANGEL.



Figure 3.1: Canvas as the Replacement for ANGEL by Students

## Selected Responses from Students on Suitability of Canvas as a Replacement for ANGEL

- *I liked it much more than ANGEL. Just make a way to organize all of the course files and it would be perfect.*
- *Canvas was a great tool for keeping up with everything that was going on in my ERM 430 class. I would recommend that Canvas be used in replacement of ANGEL.*
- *Canvas > ANGEL. The Files section alone on CANVAS is basically 90% of what ANGEL offers in terms of how a course is set up. If I were to add one thing, I would add in the grades section information about the class averages. On ANGEL under Course, one can see how their grades measure up to the class average for every category. Canvas should have something like that to if they want to fully replace ANGEL.*
- *A better email/conversation setup would be helpful. Sometimes it was difficult to find replies/sent messages on the inbox screen.*

## Student Feedback on Ease of Use

This section addresses participant perceptions of intuitiveness, adaptability, acclimation, and transition to the pilot platform. Questions in this section were asked as a way of gauging participants' perceptions of whether or not the system and its specific functionalities were easy or difficult to use, learn, and access.

**82% of students surveyed agreed or strongly agreed that Canvas was easy to use and 76% agreed or strongly agreed that Canvas was easy to navigate.** In addition, **78% of students surveyed agreed or strongly agreed that Canvas was relatively easy to learn and 77% agreed or strongly agreed that Canvas was reliable and stable when accessing their course.**

## Selected Responses from Students on Ease of Use

### Access

- *Unable to directly access reading materials via PSU library about midway through the course because of an issue with browser/cache.*

### Browser

- *Responsive design, works well with modern browsers, can have multiple tabs/sessions active at once.*
- *It didn't work well in Internet Explorer*

### Ease of Use

- *It was just easy to use; it also provided an entire calendar setup, which showed what would be done for the entire month all at once. That was really helpful.*
- *It seemed simple and straightforward*

### Navigation

- *It's sometimes hard to see the breakdown of items in a module because they blend in together. Also, it's annoying to have to scroll through all of the modules just to get to the file I want.*
- *My biggest complaint is that there are all these other Groups within the course. It just becomes difficult to understand where I am in relation to the website. Am I navigating the course, the overall website, a group?? But maybe I'm just biased by ANGEL.*

### File uploads

- *It takes a very long time to load pages and download documents.*

- *It loads very slowly. This is by far the biggest problem. (but could be related to Penn State not updating their browsers)*

### **Interface**

- *It is a great user interface, I don't have any extra comments besides that*
- *The home page has recent activity, but no side bar for Assignments, Grades, etc. Not the "Home" page, I mean this page "https://psu.instructure.com/", which is different from the page where you click "Home". I assume this is true because I only have one course, and so it gets a little confusing that it's arranged by Course. So like, a "Home" page for each course.*

### **Logging in/out**

- *It would freeze up a lot when I would login. Also it would not convert to my iPhone when I needed it.*
- *Clicking logout button does nothing but refresh screen, does not logout.*

### **Organization of Content**

- *I don't like how the information is listed by week. If I am looking for a specific homework assignment or project, I want to be able to find things based on the category, not which week we did it. This doesn't help when looking back to help for studying purposes.*

### **Overall**

- *I really liked using Canvas. I think it is much better than ANGEL, more user friendly, and much more organized.*

### **Speed**

- *Canvas is incredibly slow. While the format is more appealing than ANGEL, the wait for Canvas to start up and to switch between two pages is just not acceptable.*
- *Make it faster, would be my #1 suggestion.*

### **Storage**

- *We ran into an issue with storage capacity in the modules during the school year. This would be the only suggestion I would make. Some classes offer many*

*materials online and presentations, documents, worksheets so this could potentially be an issue for classes of that nature or of larger size.*

## **Videos**

- *The only real problem I had with Canvas was that videos would repeat themselves and shut off randomly. I do not know if it was the internet connection or Canvas itself, but sometimes I wasted more time trying to get the video to work without stopping rather than watching the video lecture itself.*

## **Level of Satisfaction with the Canvas Tools**

Students were impressed with the core functionality in Canvas. Of the tools surveyed, the twelve tools used most frequently are included here. **Satisfaction with the functionality of these tools exceeds 70%, with the Gradebook and faculty Inline Grading on Submissions exceeding 80%.**

Level of Satisfaction with the Canvas Tools by Students	
Tools over 70% satisfaction	Tools over 80% satisfaction
Announcements	Grades
Assignments	Inline Grading on Submissions
Calendar	N/A
Conversations/Email Messages	N/A
Discussions	N/A
Files	N/A
Modules	N/A
Notifications	N/A
Quizzes	N/A
Syllabus	N/A
To-Do List	N/A

Table 3.2: Level of Satisfaction with the Canvas Tools by Students

## Selected Responses on Core Functionality

### Assignments

- *The assignments, announcements, quizzes and such are good. Don't try and make it into another social media thing.*
- *I found it difficult to find what I needed on Canvas. It took too many clicks to get to assignments and documents. Each item on Canvas looked the same (assignments, announcements, etc.) so it was difficult to differentiate what was what.*

### Announcements

- *I like that it has an app and I really like the alerts whenever an announcement has been made or when something is due.*
- *It lets you know when assignments are coming up.*

### Calendar

- *The calendar was a great resource.*

## **Chat**

- *I would suggest upgrading the chat tool and make it available on smart phones. Similar to WhatsApp, GroupMe, Tango, etc.*
- *During conferences, there is a chat room box off to the side. It would be nice to see when other people are typing.*

## **Communication (email)**

- *I liked that I got an email message when an assignment was graded. (However, I did not like that I also got an email whenever a discussion post was added, or every slightest thing that occurred on Canvas, plus double emails on some occasions.)*
- *The email system is not reliable. I had a lot of group work and communication was very important. My group did not always get the information what we needed in a timely manner and some times not at all*
- *I liked the email format of ANGEL more than the one used on Canvas. Emailing was the only initial problem I had with using the Canvas site.*

## **Discussion Board/Thread**

- *Threaded discussions are handled great. In ANGEL you had to navigate through a set of button clicks and screens to reply to and read every topic, however with Canvas it's all on display and you can see everything in the chronological order it was posted in.*
- *I think the discussion boards need to be better organized. I felt like I had to scroll through way too much just to follow a thread. Threads were not easily followed. There was not a visually clear path of who was responding to who/what.*

## **Grades/Gradebook**

- *The thing I liked most about Canvas was how easy it was to navigate and find assignments and predict my grade using the "What-if" grades.*
- *I disliked how it doesn't show your overall grade of the course on the main page.*

## **Integration of third party**

- *I liked the integration our class used Tumblr for a lot of our assignments and uploading to Canvas and seeing others posts was super easy and convenient.*

### **Mobile App**

- *I really enjoyed Canvas because it allowed me to submit my work from my iPad*
- *App was great; wish all my classes were on an app like this. ANGEL is annoying to access on a mobile phone. I wish I could make slides full screen.*
- *I did not know that there was an app. I used the mobile site through Google Chrome on my iPhone.*

### **Quizzes**

- *The website is stable while taking quiz.*
- *Taking quizzes was easier. I never had a technical problem.*
- *The way the quizzes and assignments are displayed and organized was pretty good. The class lectures themselves should also be on there instead of a separate website.*

### **To Do List**

- *I like the feature "To Do List" and "Recent Feedback" that indicates what you have to turn in and by what time. The grey check mark turns green when something is submitted and lets me know that I am done with that assignment.*

## Section 4: Summary of Staff Survey Results

### Summary of Results

Feedback from staff, comprised mostly of instructional designers, has been very positive; **85% of staff has indicated that Canvas would be a suitable replacement for ANGEL.** While most found Canvas easy to use, there were a few issues that staff noted.

While, the import tool did a very good job of migrating content from ANGEL to Canvas, there was a minor issue with assessment feedback not being included in the migration. Penn State is working with Instructure to resolve this as well as on documentation to make this process easier. We will also provide migration services through Instructure, if instructors wish to utilize the service for course migration.

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The navigation was confusing at times, especially with the addition of Groups in the course. Upload and load times were very slow, compared to ANGEL.

### Statistical Data

**The staff response rate for the end-semester survey was 37.3%.** The overall staff experience in Canvas, much like the faculty experience, has been excellent. In looking at the previous LMS pilots, none have rated so highly among staff. While all core features were viewed positively, **Communication Messaging** is one of the highest rated features. **85% believed Canvas would be a suitable replacement for ANGEL.** Below are responses from staff.

Statistical Data (Staff)	
Total number of respondents	19
Total number of surveys sent	51
Response rate	37.3%
Maximum scale	5

Table 4.1: Statistical Data (Staff)

### Staff Feedback on Suitability of Canvas as a Replacement for ANGEL

**85% of staff agreed or strongly agreed that Canvas will be a sufficient replacement for ANGEL.**

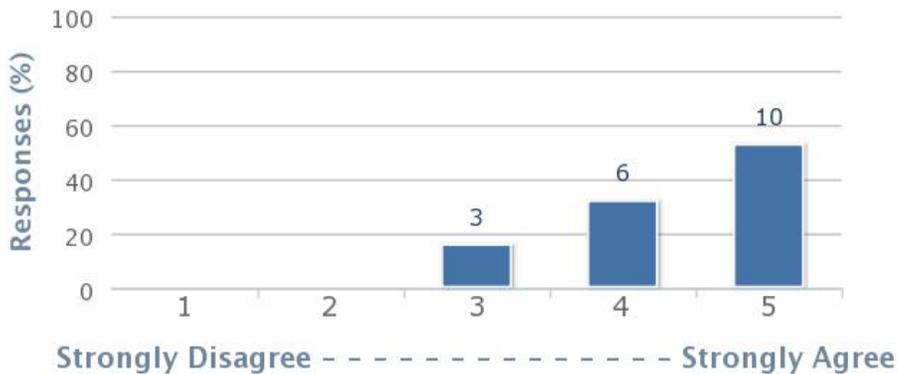


Figure 4.1: Canvas as the Replacement for ANGEL by Staff

### Selected Responses from Staff on Suitability of Canvas as a Replacement for ANGEL

- *Please move to Canvas!!!*
- *Overall very positive. I had to make some mental readjustments, but it is flexible enough to work.*
- *From talking with others, it seems people are generally pleased with it*
- *It is a much more modern environment compared to ANGEL. I liked how the grading tool worked, and how we could organize our content.*

Because the overwhelming majority of pilot participants had prior experience using ANGEL, comparisons with it were unavoidable.

## Staff Feedback on Ease of Use

This section addresses participant perceptions of intuitiveness, adaptability, acclimation, and transition to the pilot platform. Questions in this section were asked as a way of gauging participants' perceptions of whether or not the system and its specific functionalities were easy or difficult to use.

**95% of staff surveyed agreed or strongly agreed that Canvas was easy to use and 100% agreed or strongly agreed that Canvas was easy to navigate.**

## Selected Responses from Staff on Ease of Use

A critical objective for the pilot was to identify the pedagogical affordances of Canvas. For the pilot, pedagogy was defined as the affordances the LMS lends to teaching and learning. In order to understand the pedagogical affordances of each LMS, instructors/instructional designers were asked how well the tools available in the pilot platform suited their pedagogical needs.

A limitation in the analysis of the pedagogical affordances of each LMS was time. Participants only had access to the LMS for a single semester. Since they were also learning the LMS during this time, most of their energy was directed toward the course design and administration practices needed to keep the course moving forward.

### Content creation

- *Content creation is very lacking, only basic HTML can be used to create content. Exams and assignments are limited in those same ways. Exams and assignments also do not have a reasonable way to perform extensions for individual students. The email tool only uses plain text and does not have a WYSIWYG editor, so email communications is very basic.*
- *I think it also has wonderful capabilities to create and house online content that will allow for students to collaborate. I just did not have a chance to get to that this semester.*

- *I also like the ease of uploading and organizing the content into structured modules. This is so much easier than the interface for ANGEL to do a similar task.*
- *Like the most: Module displays with indents for organization of content. Able to show student his/her progress.*

### **Interface**

- *The interface is not responsive, which causes problems even on lower resolution laptop displays, let alone a mobile phone. The organization of the module interface is a bit lacking. Slapping a previous and next button on the bottom of content pieces to move from one item to the next does little for if you want to go back and find something specific but now you have to go through every page to get there or back completely out to the module TOC. Parts of the interface feel really old and inconsistent with the rest of the system (user files, ePortfolios, etc.)*

### **Migration/Importing/Exporting**

- *Didn't have any issues importing assessments from ANGEL. Building content within Canvas was easy to learn and navigate.*
- *Importing from ANGEL created some issues with content on the mobile app. Specifically, some pages were non-responsive.*
- *I did not have confidence in how the quizzes were imported. I didn't try very hard to determine the accuracy, but I saw some things were off—associated images, some fill-in-the-blank questions. It didn't bother me, because it was a good opportunity to build the course from the ground up and experience Canvas for all its own strengths.*

### **Module organization**

- *The module organization is not very innovative or easily adapted for non-linear course design. They also need the ability to create private graded group discussion forums.*

## **Staff Feedback on Core Functionality**

A critical success factor when adopting a new LMS is the ability to move content from a legacy system, in our case ANGEL, into a new LMS (Canvas). Ideally, the migration would occur in batch format where large amounts of data are exported from ANGEL,

imported into the new LMS, and populated without requiring much configuration from the instructor after the fact.

Migrating course content usually requires converting course data into some common format that can be output from the old database and input into the new database. Since the new database may be organized differently, it may be necessary to write a program that can process the migrating files. The purpose of including course migration as part of the pilot process was to test each LMS by making sure that course content could be migrated in a way that:

- Allowed participants to explore the distinct features of the new LMS.
- Old settings did not require changing.
- Ensuring that current applications continued to work in the new environment.

67% of staff surveyed was satisfied with course migration (importing/exporting content) from ANGEL to Canvas and 77% were satisfied with section-to-section migration (Canvas course to Canvas course).

## Level of Satisfaction with the Canvas Tools

Staff was impressed with the core functionality in Canvas. Satisfaction with the functionality of these tools overall exceeds 70%.

Level of Satisfaction with the Canvas Tools by Staff		
<i>Tools over 70% satisfaction</i>	<i>Tools over 80% satisfaction</i>	<i>Tools over 90% satisfaction</i>
Groups	Calendar	Adaptive Release Tools
Media Grading Feedback	Class List/Roster	Announcements
Media Recorder	Collaborations	Assignments
To-Do List	Conversations/Email Messages	Canvas Documentation
N/A	Course Analytics	Communication Messaging
N/A	Course Setup Checklist	Discussions
N/A	External Links	Embedding Media
N/A	Grades	Files
N/A	Modules	Media Storage
N/A	Profile	Notifications
N/A	Quizzes	N/A
N/A	Rubrics	N/A
N/A	SpeedGrader	N/A
N/A	Syllabus	N/A

Table 4.2: Level of Satisfaction with the Canvas Tools by Staff

## Selected Responses on Core Functionality

### Assignments

- *Allow for group assignments/quizzes that are only viewable by certain groups/students.*
- *There also needs to be a way to create an ungraded assignment so that it doesn't show up in the gradebook.*

### Chat

- *Chat is very basic, has no notifiers that anything new has happened, and can only be initiated with people who also happen to be in the chat area. This would be much better to have across the course (similar to Facebook) so that if someone has questions, they can see who is online and talk with them at any given moment. This would also add to the social experience of a course. They*

*would look much more like there are other actual people taking the course and less like the students are alone.*

### **Conferences**

- *Conferences are not supported on mobile. Based on Flash.*
- *Conferences: Students were able to create rooms themselves, which caused confusion as duplicates of rooms were being made. Also, not available through the Mobile App.*

### **Discussion**

- *Discussions limited in functionality. ANGEL has many different types of discussion forums.*

### **Email**

- *I don't trust the email function. I used PSU email instead, so it's not critical. It's partly because I find the Instructure daily reminders annoying so I ignore them.*
- *Email messages need a WYSIWYG.*
- *Add HTML editor to email. Allow adaptive release for specific items, not just the entire module. Improved social presence—see who's online and be able to chat with them*

### **Grades**

- *Inline grading—this can dramatically change the timeliness and meaningfulness of feedback for students. This will have a huge impact on learning and the efficient administrative workflow of instructors. This speaks to the heart of Penn State's ability to compete in an online learning market that is quickly becoming saturated by other schools with efficient and robust feedback capabilities.*
- *Gradebook does not show total points for a course. We need this option as it allows us to make sure the gradebook matches the course grading scale.*

### **Group/teams**

- *The biggest problem is the lack of group settings in Canvas.*
- *Groups and their related assignments, files, discussions, etc. that we set (at least from a master course) should copy over from section to section.*

### **SpeedGrader**

- *I like the potential for consistency across the institution. I loved the SpeedGrader feature and recorded student data. I look forward to using the Outcomes tool, and hope that we have more plug-ins activated to allow for integration of third-party tools.*

### **Media recorder/storage**

- *The media recorder is a good idea, but there are so many unknowns about it that it causes some concern. Where do the files go? How do we access those files? How would we delete those files? The player for internally created videos also has some accessibility challenges. The media storage for at least video is completely non-existent. We can't get to those files, we can't download them, delete them, replace them, anything. If a student needed other students' or instructor's recordings transcribed, this would be a monumental manual task. Modules navigation almost seems to be an afterthought to the module concept. If I wanted to jump back 2 pages, I can't, I have to go back to the previous page and then to the one I actually wanted to go to, or out to the module TOC and then find where I was and find what page was 2 pages before. No content or assignments are indexed for search capability.*

### **Mobile app**

- *I would like for the mobile app to allow users to do everything that they can in the web interface. Right now this is not the case and it is even different from device to device what you are able to do. I would instead like to see the site go responsive so that we wouldn't need to download a dedicated app and go through its setup unless I absolutely wanted push notifications (which I could set up anyway through email notifications).*

### **Notification**

- *The notifications and awareness that the dashboard gives is really nice. The speedgrader app is very useful to be able to grade items directly through the system.*

## **Quizzes**

- *Quizzes need a way to provide reasonable extensions and to be able to implement more complex code (HTML/scripts).*
- *Quizzes open in the browser and are not responsive. Again, the naming of E-mail is Messages within the app instead of Conversations or Inbox. Instructors are unable to edit announcements through the Mobile App. Instructors are also unable to delete any announcements.*

## **Other**

- *Would be nice if it had a date manager like ANGEL*

## Section 5: LMS Requirements Document Review

### LMS Requirements

The LMS Requirements Document outlines a list of high-level categories important to users of the LMS at Penn State. It is the result of a collaboration between ITS, World Campus, and faculty and design staff at Penn State.

It is not intended to be a comprehensive listing of all the features and functions required in the next LMS, rather a guide to be used to assess the viability of an LMS to meet some of our use cases. The twelve (12) criteria are listed below, with an explanation of both benefits and gaps found during the 2015 pilot of Canvas.

#### **1. Provide a robust environment for content authoring.**

Canvas has native tools that allow for the creation of necessary teaching and learning items, which include pages for course content, modules, assignments to which students can upload work products, discussion forums, quizzes, and rubrics.

The short white list of HTML tags and only having access to one JavaScript file limits course authoring in a fully online environment. This makes many interactive elements impossible to deliver online. It is probably sufficient for most resident instruction courses.

Canvas allows for third-party tool integrations. Each tool would require legal, privacy/risk, and security, technical, and purchasing evaluations by Penn State.

#### **2. Support Penn State's teaching and learning needs.**

While this is subjective, faculty in the pilot overwhelmingly agree that Canvas would be a suitable replacement for ANGEL, and it meets Penn State's teaching and learning needs.

#### **3. Support social presence, interaction, collaboration, and group work.**

Canvas offers profiles that include a bio and picture to help with social presence. It includes a toolset for collaborating on assignments, completing peer reviews of submissions, uploading files, creating wiki pages, starting threaded discussions, and "gathering" for real-time chats and web conferencing.

Canvas does not have visuals to reflect who is online in a course. There is no activity stream within or across courses.

Canvas Groups can be utilized to promote collaboration and group work. However, they are not scalable for multiple sections, as it requires manually entering the settings every semester. An enhancement request has been submitted to Canvas. API integrations are also being planned that can address it.

**4. *Provide a wide variety of grading, assessment, and grade management tools.***

Canvas provides a gradebook, which includes the following capabilities: Group grading, Student interaction reports, What-If grades, Extra credit, SpeedGrader, and Change assignment group weights.

**5. *Possess an intuitive interface with a contemporary look and feel.***

Many of the faculty, students and staff in the pilot agreed that canvas is an intuitive, modern LMS.

**6. *Be mobile optimized, device compatible, and work on all major browsers.***

See Mobile section of this report (page 36).

**7. *Be ADA compliant and meet accessibility needs.***

See Accessibility section of this report (page 34).

**8. *Allow for labor scalability and efficiency in administrative setup.***

This is one of the major shortcomings of Canvas out of the box. There are API integrations that can address some of these issues.

Canvas has the capability of copying from one course to another. It also includes the ability to select specific content to import. Not every item is included in the course copy. However, API integrations are being planned to incorporate these missing items, such as Groups (which are the equivalent to ANGEL Teams) and associated settings such as Group Assignments and Discussions.

Canvas does not have the capability to copy from one section into many others, which is a scalability concern for courses with multiple sections. An API integration is being planned that can address this.

See Technical/Infrastructure section for information regarding efficiency in administrative setup (page 38).

**9. *Support learning and administrative analytics and outcomes.***

Canvas has a robust feature set for the use and administration of outcomes. Analytics in Canvas contain only basic reporting features, including page views and quizzes (assessments such as writing assignments are not included). Third-party analytics tool integration such as Civitas is possible. We are planning to evaluate these integrations in the future.

**10. *Be “future proof” and able to evolve with educational and technological developments.***

The agile development methodology employed by Instructure enables it to implement changes and new technology faster than systems that have to write code to be backward compatible. In essence, everyone using Canvas is on the same version.

**11. *Support IMS Global standards.***

Canvas is a leader in Learning Tools Interoperability (LTI – v 1.0 and v 1.2), as well as Common Cartridge (CC - v1.0 v1.1, and v1.2 compliant).

**12. *Be available as close to 24/7/365 as possible in order to meet the needs of Penn State’s increasing global distance audience.***

Instructure operates on a three-week update cycle. Changes to the system are released on the test environment one week prior to being released to production. These changes typically happen without interruption to service. Any planned outages have been communicated well in advance to Penn State.

Although Canvas boasts a 99.99% uptime, there is a lack of clarity for this stated availability. There is no threshold for categorizing degradations of features or performance issues such as outages in credit calculations or in the availability calculation. The stated numbers are for the overall availability of the service, not for

individual institutions. Each institution will have a different “real feel” experience based on a combination of the availability of their Canvas shard and external LTI integrations providers, their authentication provider’s availability, and other ecosystem components that deliver the content to faculty and students. Our experience, during the pilot period, has been positive.

### **Summary**

Overall, Canvas meets the needs of these requirements. Like any system, there is room for improvement in some areas (especially in labor, scalability and administrative setup), but for the most part, Canvas has performed well for faculty and staff in regard to these requirements.

## Section 6: Accessibility Review

### Review Summary of Results from the Accessibility Review

Overall, Canvas is a very accessible platform. Canvas recently received Accessibility in Mind (WebAIM) certification (<http://webaim.org/services/certification/canvas>), which means it conforms with international standard Web Content Accessibility Guidelines 2.0 Level AA Conformance. Instructure is also pursuing the Gold Standard certification from the National Federation of the Blind.

Perhaps most important, Instructure has been very responsive in working with Penn State as we identify new accessibility issues. In spring 2015, staff from World Campus and ITS met with the accessibility and development teams at Instructure to report on accessibility issues discovered by teams at World Campus and TLT. Some issues have been fixed, with the remaining prioritized and scheduled as listed in Table XX.

Also in response to our urgent appeals, Canvas now provides significant support for MathML, a specialized markup language for the display and navigation of mathematical equations that is accessible to screen readers. As recently as spring 2015, Canvas did not support MathML. Support for MathML is not yet complete; as they continue to develop and deploy MathML throughout we will continue to test Canvas, provide feedback and make feature requests.

MathML is also a component of HTML5, the current markup standard, and the language on which Canvas is built. HTML5 has many features that support accessibility, and provides significant “future-proofing” as new affordances for users with disabilities are developed.

The system makes heavy use of Accessible Rich Internet Applications (ARIA), which we highly commend. The use of landmarks is a major benefit to the structure of the system, which helps assistive technology users navigate within pages.

The accessibility teams at World Campus and TLT are working with the ATHEN Canvas interest group, a multi-university and multi-disciplinary group focused on the accessibility of Canvas. We are also working with Unizin and other institutions that are either using or

interested in using Canvas to maintain a collective voice on the accessibility of the platform.

Case Number	Status	Subject
413874	Open	Unlabeled or non-descriptive form fields.
413873	Open	Collaborative tools are not accessible. Find alternative tools that are accessible.
413872	Open	Issues with quiz question types: Multiple select and multiple-choice answers are repeated 4 times.
413871	Open	File lists do not properly read image alt text.
413870	Open	Built-in editor has multiple issues. Not keyboard accessible; buttons in toolbar unlabeled; can't add column and row headers; does not accept MathML markup.
413869	Open	Chat window provides no audible notifications of new windows; does not mark messages as read/unread.
413868	Open	Keyboard traps: mail combo boxes and search box for messages.
413867	Open	The lang="***" attribute of HTML elements is not accepted by the editor.
413866	Open	Multiple issues with navigation and keyboard accessibility in e-Portfolio Help.
414012	Closed	Screen readers unable to access Tree View File List
414011	Closed	Multiple issues with the video player: video controls unlabeled; no control for closed captioning.
731266	Closed	Tables missing captions, column headers, row headers.
731265	Closed	Authors unable to create/edit descriptive page titles. System-generated titles are not descriptive.
731264	Closed	Multiple keyboard accessibility and usability issues: non-intuitive tabbing order; tabbing versus arrow-key navigation confusing; video player not keyboard accessible.
731263	Closed	Decorative images not properly marked up properly to be ignored by screen readers.
810045	Closed	Some controls identified with poorly described labels.
972223	Open	Some MathML expressions have errors in code.

Table 6.1: Accessibility issues submitted to the Canvas development team. Status indicates whether the issue remains open, or has been resolved and closed.

## Section 7: Canvas Mobile App Review

### Mobile Review

The Canvas app is one of the best LMS mobile apps we have used to date. It is easy to use and has many robust student and instructor focused features that work on both iOS and Android devices.

Students can view files, to-do lists that can sync with mobile calendar apps, announcements, syllabi with system-generated due dates, modules, and notifications. They can also submit assignments through either Dropbox or Google Drive, and take quizzes.

Instructors can add announcements, create discussions, manage course files, and submit grades through a separate SpeedGrader app (not available on iPhone). “Settings” is an instructor feature we would like to see added to the mobile app. Currently, only Android allows instructors to change course or assignment settings.

Student features not supported are Conferences, Collaborations, and Outcomes. Conferences require Flash, which does not work on iOS or Android. Collaborations and Outcomes can be opened in a browser, which takes you to the full LMS (but does not support responsive design where the information displayed reflows to improve usability on mobile device displays and low resolution monitors). Chat and Attendance are not responsive.

## Section 8: Technical/Infrastructure Review

### Technical Review

#### Summary of Results from Technical/Infrastructure Functionality

Project executive sponsors and University senior leadership have been presented the benefits and opportunities of Canvas, as well as a summary of technical risks and functional gaps. Additionally, the Office of the Vice Provost for Information Technology has reviewed the detailed technical risks and functional gaps.

University policy changes regarding data retention, security review, and recoverability may need to be revised to align with system capabilities. It is recommended that Penn State take steps to mitigate risks and gaps, as appropriate, through contractual, technical, or policy steps.

Canvas offers certain technical advantages.

- Instructure is transparent and very willing to discuss alternatives to overcome gaps for Penn State's unique use cases.
- Canvas does many of the basic functions of ANGEL. Some new features will be introduced and others will not have a parallel Canvas equivalent.
- Instructure is a market leader using LTI integrations based on IMS standards and provides access to many vendor extensions.
- Each LTI tool provider has different retention and terms of service that require contract review.
- As a hosted cloud-based solution, product innovation occurs much faster through more frequent release cycles.
- Changes to the user interface are introduced gradually over time.
- New releases are simultaneously deployed to all hosted customers every three weeks.
- Delegated administration will aid with delegating control to support complex college and department requirements.
- Canvas is agile. It does not have legacy requirements for version compatibility or support requirements from prior versions, since all customers must keep their data online and are updated at once for each release.
- Canvas is hosted on Amazon and data is replicated across multiple availability zones.

- A limited version of the application is available to the community as open-source with Instructure controlling release of core code.
- JavaScript is available to brand the application and add external links.
- Undelete functionality is available and may help recover lost information. It has been **partially** implemented in different areas of the application, and is not a production class service that Instructure is willing to support.
- The Canvas platform is common to other Unizin members and will promote collaboration.
- Instructure is transparent with their alerts for performance issues and outages.
- Canvas does have a mobile application, which was evaluated as part of the pedagogical review.

The following 22 items are limitations with Canvas that Penn State must mitigate, accept, or resolve. Some of these are significant and will require some level of mitigation.

**1. At this time, Penn State does not have the ability to recover courses from backups or archives into production from accidental deletion or for grade dispute research.**

*This may require policy changes, process changes, and expectation level setting.*

**2. Canvas is not currently NFB Gold certified.**

*Canvas is WebAIM certified, and is working toward updating their NFB certification.*

**3. Archive and restore of courses is currently not supported.**

*This may require mitigation by keeping data online longer, a dedicated restore cluster, policy changes, process changes, and expectation level setting. This assumes that the database infrastructure can scale to support the increased data retention requirement.*

**4. We are aware of at least two issues during the spring 2015 semester that caused temporary gaps in accessing exam answers for grading and log data for an extended period at other Canvas institutions.**

*Instructure was able to recover the data from log files using alternate tables. The root causes provided were process issues, and issues with a database optimization tool. There is no unilateral mitigation strategy. This requires level-setting expectations.*

**5. Canvas's infrastructure in the cloud remains constrained by potential performance bottlenecks, and Penn State's scalable delivery model may not be easily shared across multiple databases.**

*Canvas can be migrated to larger database servers, with SSD based volumes and committed IOPS. The single database shard may need to be re-architected to enable Penn State to reach scale over time. If there were no bottlenecks, then there would never be performance alerts or shard outages, which do occur in the Instructure cloud.*

**6. Instructure has issued alerts for outages and slowness multiple times each month during spring semester that may or may not have affected Penn State.**

*Penn State may be able to access monitoring for the shard, which may help with proactive communications. This may require mitigation through expectation level setting. Additionally, Instructure has committed to refine notification processes to ensure timely notification of issues that will directly affect Penn State.*

**7. Instructure has been addressing gradebook performance in large classes.**

*Instructure has improved gradebook performance over the spring semester, and anticipates having additional performance enhancements in place for fall semester. From a mitigation and level-setting perspective, course editors may alternately export their gradebook, and maintain it offline, should significant issues occur.*

**8. System and feature usage analytics are not as mature as Penn State would prefer, which is preventing scalability comparisons with other institutions at this time.**

*While this will be too late for full scalability comparisons, Instructure's largest higher education customers are currently in pilot and Penn State may be able to gain some minimal insight from those pilot institutions. However, until other large institutions (i.e. Michigan) and/or Penn State move into full adoption, scale and data retention requirements will remain a risk.*

**9. Penn State cannot directly introduce core programming modifications or control the rate of change in Canvas.**

*Instructure will review core contributions on a case-by-case basis. Penn State cannot fix bugs directly, change baseline functionality, or add new integration points unilaterally at this time. In the future, Penn State can lessen the potential for impact from frequent*

*releases by working closely with Instructure to be proactive and test Penn State integrations and extensions ahead of each three-week release cycle.*

**10. Account rights override rights for a course. This allows help desk staff and administrators taking a class to have faculty level rights with access to other students' submissions and exam answers if that course is in their realm of administration.**

*Penn State can mitigate this with separate ADM accounts and by implementing an audit process (which may add administrative overhead).*

**11. Change and delete rights cannot be separated. To permit faculty to change a course title also grants them the right to remove a course.**

*This may be mitigated through additional Penn State development efforts using LTI integrations with APIs to provide the tools necessary to make nondestructive changes while continuing to restrict access to delete rights.*

**12. Penn State is currently unable to introduce freeze periods over finals week or during drop/add periods.**

*Customers can recommend but not enforce freeze periods. New production releases are every three weeks.*

**13. Integrations using APIs are subject to rate limiting, which could affect efficiency and usability.**

*Instructure flags high-impact API integrations, and reaches out to customers to discuss more efficient methods and alternatives. API integrations may be manually throttled if a customer is unable to find a more efficient solution.*

**14. Many API interfaces are still in beta testing, which limits their functionality.**

*This remains a risk that cannot be mitigated, especially with the frequent update cycles. Instructure recommends that Penn State uses its Customer Service Management (CSM) to prioritize which APIs should be moved to a versioned status. The CSM would then advocate getting these on the formal roadmap.*

**15. Application and system administrative tools (e.g., restricting access to third-party learning tools to specific colleges, departments and courses) have not been**

**designed for organizations as complex as Penn State, and will require additional technical resources to support these functions.**

*In the short term, Penn State will need to fill this gap with custom programming. Longer term, Penn State will want to get these issues on the Canvas roadmap and/or work with its Unizin partners.*

**16. JavaScript can neither be used to restrict features nor change core functionality, and does not change parallel mobile functionality.**

*It will be incumbent on Penn State to verify the modifications remain functional with each release of Canvas. Instructure is introducing a new theme editor in the fall that will assist with colorization of the environment for the Penn State brand. However, other changes will remain brittle, unless Penn State and other partner institutions can get additional platform extension points on the roadmap to overcome this challenge.*

**17. At this time, Canvas does not support responsive design. It currently does not reflow the information displayed to improve usability on mobile devices and low-resolution monitors.**

*Instructure announced that they are developing a responsive design solution at the 2015 Instructure users conference. This will be deployed in a phased approach over time.*

**18. Penn State currently has no independent visibility into system availability and performance.**

*Penn State can request system availability and performance information from Instructure. Instructure is also researching how to provide Penn State with the ability to access server level performance data from the Penn State shard, directly. Page level performance visibility is on a future roadmap.*

**19. There is limited access via the interface and APIs for response to security and academic integrity requests.**

*Penn State may need to purchase the optional Canvas Data service, in conjunction with API calls, to best fulfill these types of requirements. If the data is not exposed using either of these methods, then Penn State will need to engage its CSM for alternatives.*

**20. The components of the storage calculations and quota usage are not documented.**

*Penn State will need to budget for optional long-term archival storage, in addition to user files (500MB/user), and potentially the database and other elastic block storage (EBS) or S3 file storage. In the future, Instructure may alternatively move some of this to less expensive Glacier long-term storage.*

**21. Ability and responsiveness to recover from outages are unknown.**

*Canvas utilizes at least two Amazon AWS Hosting availability regions. In their primary production region, data is spread across multiple datacenters. When a master (primary) database is lost, the recovery point objective (data loss) is 5 minutes if the slave database is up-to-date and not corrupted (consistent). However, if the slave database is in an inconsistent state (e.g. more than 24 hours behind or corrupt), then recovery occurs from the last nightly snapshot, which could result in a data loss of up to 24 hours. The recovery time objective (outage duration) is one hour for a consistent slave, and six hours for an inconsistent slave. Per Instructure, the failover process is described further below.*

*Between regions, US-EAST-1 (VA) to US-WEST-2 (OR) is what is called “inter-region” failover. A failover within a region, or better put, within AVAILABILITY ZONES (which are sort of analogous to a Data Center) is automatic and transparent because it is handled by the load balancers, which span all of the availability zones and are constantly checking the health of each zone. In this case, the failover is automatic and transparent because it is handled by the load balancers, which span all of the availability zones and are constantly checking the health of each zone. Furthermore, Instructure staggers the infrastructure (e.g. database servers, connection pools) so that they are not included in only one availability zone, which prevents single points of failure.*

**22. Canvas is currently not Learning Information Services (LIS) compliant—IMS Global Learning Consortium.**

*Per Instructure, LIS compliance is on the Canvas roadmap for early 2016. Instructure is an official Affiliate partner with IMS Global and contributes to many of the standards.*

**Risk mitigation may be managed by:**

- Contractual modifications to mitigate gaps
  - Contract exit clause
  - Whitelisting of API calls

- Uptime calculations that exclude periods where the user experience is negatively impacted (degraded tools, performance, and access).
- Improved clarity for quota and storage calculations
- Disaster recovery point and time objectives
- Policy changes to align with systems level agreements
- Retention of data
- Restore and recovery
- Types of security and grading forensics that requires access to system as of a historical point in time
- Set expectations for alternative manual recovery options and offline gradebook
- Segregate administrators and help desk using authorization-only accounts
- Collaboration with the vendor
  - Define processes to introduce or prioritize baseline changes such as moving to a most restrictive permissions model
  - Collaborate to improve API maturity and versioning
  - Develop more advanced integration points and methods
- Improve communications and processes
  - Streamlined process with leadership to overcome technical challenges and improve project transparency and support
  - Develop a process and workflow for prioritization, review, communication, and coordination of major issues and to facilitate requests for new features and integrations
- Be prepared to extend the rollout schedule to allow the system to stabilize at scale and to accommodate gap resolutions and integrations
- Establish shadow systems for emergency purposes
  - Maintain ANGEL as a recovery point
  - Assignments and exams
  - Course communications
- Support and fund staff opportunities to become more engaged in the Unizin initiatives, and be able to consume and participate in the ecosystem.
- Benchmark technical staff supporting the ecosystem with other R-1 CIC institutions such as Indiana and Michigan.

- Purchase the optional hosted data extract service to develop better analytics and to provide improved visibility into the data.
- Streamline processes to build supporting ecosystem components, or host the data externally using AWS for initiatives like real-time analytics, and other ecosystem components.

## Section 9: Summary and Recommendation

### Review

Overall, Canvas performed well during the pilot. Instructors, students, and staff agreed that Canvas would be a suitable replacement for ANGEL, and its usability and feature set was well received. Canvas fares well in regard to the LMS requirements document outlined in this document. The accessibility concerns discovered during our review were either resolved or are in the process of being resolved by Instructure. Overall, the primary concern for the pilot team is the technical piece.

It is recommended that Penn State adopt Canvas as a replacement for ANGEL with a continued commitment to active collaboration with Instructure and Unizin to ensure the technology supports teaching and learning.