Fall 2015 Yale Canvas Pilot: Final Report of the Working Group

February 3, 2015

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I. Executive Summary

A. Pilot Goals and Overview

Since 2014, Instructure's learning management system (LMS) Canvas has successfully supported over 50 Yale courses in Summer Programs and language study; hybrid and distance offerings in the Schools of Forestry, Management and Nursing; and a small number of traditional campus-based courses. As growing numbers of Yale faculty and students use Canvas for coursework, the task of supporting both Sakai (the basis of our legacy LMS, Classes*v2) and Canvas for Yale courses becomes more difficult and complex.

The long-term viability of Sakai is increasingly uncertain, as the open-source community supporting it diminishes: key contributor schools including Stanford, Michigan and Indiana have recently moved to Canvas. Given the risks of relying on a platform which may not be broadly supported over the long term, and the challenges of supporting multiple LMS platforms for Yale's distance, hybrid and on-campus courses, the Center for Teaching and Learning (CTL) initiated a pilot in fall 2015 to evaluate whether Canvas might be a strong candidate to replace Sakai for Yale's campus-based course support needs.

The fall 2015 pilot included 71 courses from across University divisions, with 100 instructors and over 2100 students participating. Support and assessment of the pilot were overseen by a Working Group composed of staff from the CTL, University Library, and the Schools of Divinity, Forestry & Environmental Science, Management, Medicine and Nursing.

The primary goals of the pilot were assessment of Canvas's usability and functionality, its operational robustness as a cloud-based service, and its supportability for on-campus courses. Assessment methods included a midterm survey of instructors and an end-of-term survey of instructors, teaching assistants, students, and support staff. Analysis of support logs, technical reliability and availability, and functional gaps between Canvas and Classes*v2 was also undertaken as part of the pilot evaluation.

B. Evaluation Summary

The Canvas Pilot Working Group has great confidence that Canvas can well meet the diverse needs of Yale instructors and students, and our evaluation is that Canvas is a very strong alternative to Sakai for support of on-campus coursework. An accessibility audit revealed it to be extremely strong in supporting all members of our community, and we believe that Canvas will have long-term viability in the LMS arena, given the active and growing community of peer institutions using the platform and the overall strength of its parent company, Instructure. In contrast, we have significant doubt that Sakai will continue to be the LMS of choice, as the open-source community on which it relies decreases in size and commitment.

The results presented in this report indicate a clear and convincing preference for Canvas among pilot instructors, students, and support staff. Satisfaction levels for Canvas at Yale are consistent with those seen by peers who have conducted similar pilots of Canvas for on-campus course support. Although there are some significant functional gaps between Classes*v2 and Canvas, most notably involving integration with data and services from Yale Student Information Systems, we are confident that critical gaps can be closed through a combination of local development work, extension of the platform through LTI apps, and collaboration with peers and Instructure to bring ongoing improvements to the core Canvas platform.

C. Recommendations

1. Adopt Canvas as Yale's centrally supported LMS for on-campus courses
2. Maintain our current hosting approach using Instructure's "cloud" services
3. Retire the two legacy instances of Canvas currently supported for distance and hybrid coursework, and migrate those programs to the same platform used for on-campus coursework
4. Engage in limited local development to close critical functional gaps between Canvas and Classes*v2
5. Become active in the Canvas R1 Peer Group to lobby collectively for improvements to the core platform
6. Develop a streamlined process for data governance around Canvas apps
7. Develop and communicate an LMS transition plan that targets all new course sites using Canvas by fall 2017
8. Augment the LMS support staff to manage a campus-wide transition to Canvas
9. Engage in further analysis of challenges reported by specific pilot constituencies to ensure a smooth transition
10. Consider discontinuing Instructure-provided tier 1 support for students
11. Launch a separate initiative for support of Classes*v2 academic "project sites" that are not used for course activities.

II. Pilot Goals and Overview

Yale has been using the open-source Sakai platform as the basis of its central learning management system since fall 2005, yet the most recent satisfaction survey performed by ITS in 2015 indicates that a growing number of campus constituents find the platform to be "clunky" and "outdated." While faculty were generally satisfied with Sakai's features (70% satisfaction), they were considerably less satisfied with its ease of use (55%) and efficiency (54%). Student satisfaction levels were comparable (undergraduates: 73% satisfaction with features, 58% ease of use, 57% efficiency; graduate students 69% features, 56% ease of use, 57% efficiency). Overall satisfaction for Classes*v2 decreased from 78% in 2013 to 70% in 2015, according to ITS surveys.

While Classes*v2 was designed to meet the needs of on-campus instruction—primarily file sharing and communication—it was found to be a weak solution for Yale's burgeoning distance education initiatives. As a result, Yale decided in 2013 to license Instructure Canvas for use in distance and hybrid course environments. In 2014 and 2015, Canvas was used by approximately 50 courses for distance offerings in Summer Programs and language study; hybrid courses offered by the Schools of Forestry, Management and Nursing; and a small number of traditional campus-based courses. Informal feedback on Canvas from faculty and students was very positive, and in fact a number of professors who used Canvas for their summer or hybrid courses subsequently requested Canvas sites for on-campus teaching and learning.

The future viability of the Sakai platform itself is somewhat in doubt, as many of the core contributor schools making up the open-source community (most significantly: Michigan, Indiana, and Stanford) have decided to abandon the platform in favor of Canvas.

Given the risks of relying on a platform which may not be broadly supported over the long term, and the challenges of supporting multiple LMS platforms for Yale's distance, hybrid and on-campus courses, the Center for Teaching and Learning (CTL) initiated a pilot in fall 2015 to evaluate whether Canvas might be a satisfactory platform for on-campus teaching and learning. The primary goals of the pilot included:

- **Tool usability and functionality**: assessment of faculty and student satisfaction with Canvas in conjunction with on-campus coursework
- **Operational robustness**: verification that a cloud-hosted solution will meet campus technical expectations, and identification of any significant functional gaps between our current deployment of Sakai and the standard Canvas platform
- **Supportability**: gaining a clearer understanding of resource requirements for transitioning to Canvas and sustaining the platform as a campus service, including both financial and support-related concerns.

A detailed set of pilot goals is included in Appendix A.

The scope of the pilot was initially targeted at 40-50 on-campus courses for the fall 2015 term, representing the most diverse set of use cases obtainable. The scope was broadened considerably with the School of Management's decision to move its entire first-year curriculum and executive MBA program onto Canvas during the fall semester. The pilot included 71 courses:

	Yale College & GSAS	Divinity	Engineering	Forestry	Management	Nursing	Public Health	Total
Pilot courses	24	6	1	8	27	4	1	71

A full list of courses and instructors in the fall 2015 pilot is available in Appendix B.

Technical support was provided by 22 members of a cross-campus pilot Working Group, which included members of the Center for Teaching and Learning, University Library, and distributed support providers from the Schools of Divinity, Forestry & Environmental Studies, Management, Medicine and Nursing. Pilot participants also had access to support provided by Instructure, via live chat or telephone.

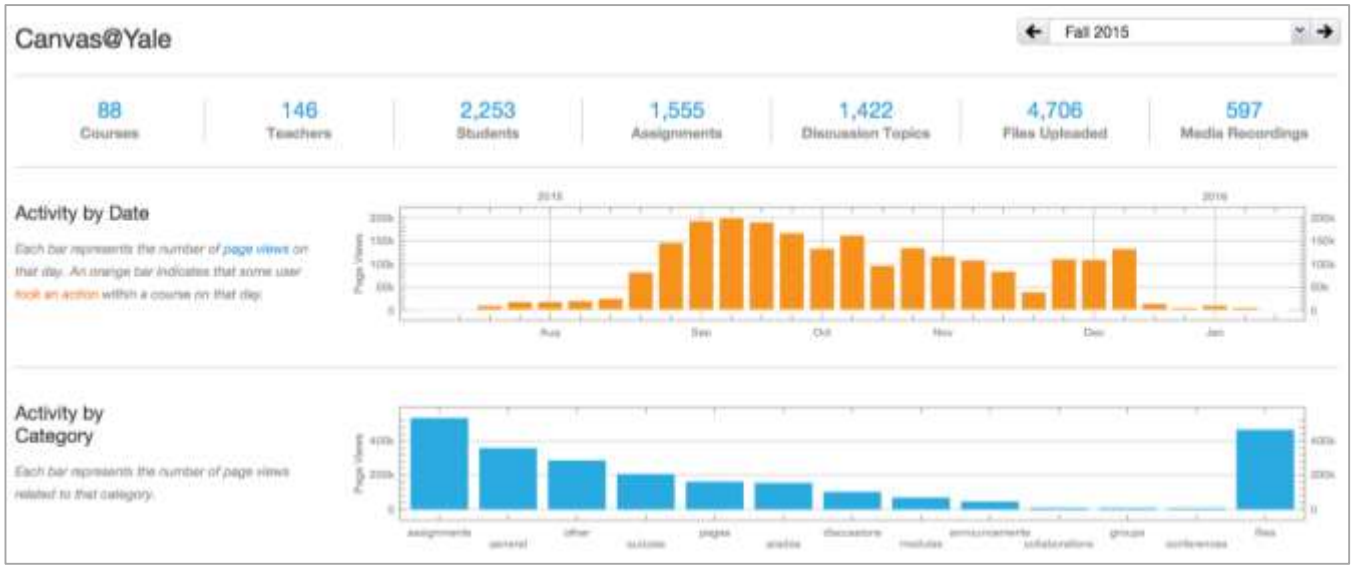
Assessment of the pilot was conducted by the Working Group through analysis of support requests, informal conversations with pilot participants, and surveys conducted at the midterm (pilot instructors) and at the conclusion of the semester (instructors, teaching fellows, students, administrators and support providers).

III. Platform Usage Data

A. General Usage Statistics for Fall Term 2015

The table below summarizes overall usage of Canvas (yale2.instructure.com) for the fall 2015 term. Note that 17 courses using the platform were not officially part of the fall pilot: the number of courses, "teachers" (instructors), and students here is somewhat larger than the corresponding numbers for pilot courses alone. These statistics were generated January 26, 2016.

	Yale College & GSAS	Divinity	Forestry	Management	Nursing	Public Health	Total
Courses	43	5	4	29	5	1	88
Teachers	48	3	3	79	6	2	146
Students	1326	142	115	594	84	28	2253
Assignments	1114	49	118	196	69	9	1555
Discussion Topics	825	112	62	346	65	12	1422
Files Uploaded	2183	146	474	1712	150	41	4706
Media Recordings	554	0	1	40	2	0	597



- *Courses*: the number of courses published in the account. This number does not count unpublished courses, deleted courses, or concluded courses
- *Teachers*: the number of unique teachers (instructors) who have had activity within Canvas in the last 30 days. If one user is a teacher in 5 courses, the statistic will count as 1 teacher
- *Students*: the number of unique students with activity in the last 30 days
- *Assignments*: the number of assignments submitted to active courses
- *Discussion Topics*: the number of discussion topics posted to active courses
- *Files Uploaded*: the number of files uploaded to the account (deleted files are not included in the count)
- *Media Recordings*: the number of media objects uploaded to active courses, such as video, audio, and music files.

B. Canvas Activity by Campus Unit

The table below shows **page views for each tool or feature** during fall 2015. "General" includes page views of the course home page, roster, course settings, and syllabus. "Other" refers to all the other page views that were not categorized.

Canvas tool	Yale College & GSAS	Divinity	Forestry	Management	Nursing	Public Health	Total
Assignments	167,075	8,743	6,767	322,398	22,455	4,664	532,102
Files	159,558	9,831	22,413	260,902	8,551	2,274	463,529
General	115,086	7,855	12,012	204,163	13,263	2,210	354,589
Other	71,913	11,711	10,805	181,850	4,715	1,110	282,104
Quizzes	95,736	3	42,593	61,940	1,531	54	201,857
Pages	81,080	2,278	21,616	44,633	4,086	4,163	157,856
Grades	71,482	3,824	4,160	62,452	7,102	1,472	150,492
Discussions	35,201	10,427	3,729	36,634	11,757	361	98,109
Modules	33,608	1,468	8,607	13,612	6,705	126	64,126
Announcements	15,972	1,710	634	19,344	2,341	264	40,265
Collaborations	2,016	203	0	650	28	14	2,911
Groups	294	110	1	1,757	217	1	2,380
Conferences	342	138	2	74	16	11	583

The next table shows the **average number of page views per participant** in each campus unit. Yellow cells indicate activity levels >1 standard deviation *above* the mean; blue cells indicate activity levels >1 standard deviation *below* the mean.

Canvas tool	Yale College & GSAS (N=1374)	Divinity (N=145)	Forestry (N=118)	Management (N=673)	Nursing (N=90)	Public Health (N=30)	Mean	Standard Deviation
Assignments	121.6	60.3	57.3	479.0	249.5	155.5	187.2	159.6
Files	116.1	67.8	189.9	387.6	95.0	75.8	155.4	121.9
General	83.8	54.2	101.8	303.4	147.4	73.7	127.4	91.8
Other	52.3	80.8	91.6	270.2	52.4	37.0	97.4	87.0
Quizzes	69.7	0.0	361.0	92.0	17.0	1.8	90.3	137.9
Pages	59.0	15.7	183.2	66.3	45.4	138.8	84.7	63.1
Grades	52.0	26.4	35.3	92.8	78.9	49.1	55.8	25.5
Discussions	25.6	71.9	31.6	54.4	130.6	12.0	54.4	43.0
Modules	24.5	10.1	72.9	20.2	74.5	4.2	34.4	31.3
Announcements	11.6	11.8	5.4	28.7	26.0	8.8	15.4	9.6
Collaborations	1.5	1.4	0.0	1.0	0.3	0.5	0.8	0.6
Groups	0.2	0.8	0.0	2.6	2.4	0.0	1.0	1.2
Conferences	0.2	1.0	0.0	0.1	0.2	0.4	0.3	0.4

This second table reveals that:

1. Yale College & GSAS courses made slightly higher than average use of Collaborations
2. Divinity courses show significantly higher than average use of Conferences, and significantly lower than average use of Grades
3. Forestry & Environmental Studies courses had heavier than average activity in Quizzes, Pages, and Modules, and significantly lower than average activity in Announcements and Collaborations
4. Management courses made especially heavy use of Assignments, Files, Grades, Announcements, and Groups, and showed significantly higher than average page views in the General and Other categories
5. Nursing courses showed much heavier than average use of Discussions, Modules, Announcements and Groups.

Index to Canvas tools mentioned in these tables

- *Assignments*: typically graded activities in which students make submissions through Canvas
- *Files*: Canvas's file-sharing tool
- *Quizzes*: graded or ungraded (self-test) online quizzes taken within Canvas
- *Pages*: custom web pages that instructors create to share information, including links to other Canvas tools
- *Grades*: Canvas's grade book function
- *Discussions*: online forums associated with a class
- *Modules*: collections of Canvas pages and activities which may be accessed in a set sequence
- *Announcements*: informational posts shared with the entire course site, which can be commented upon by participants
- *Collaborations*: Google Docs created especially for collaborative writing activities in a course site
- *Groups*: supplementary mini Canvas sites (containing their own files, pages, announcements and discussions) created for students' group activities
- *Conferences*: live web conferencing

IV. Feedback from Pilot Participants

A. Midterm Survey of Faculty

A 10-question survey was distributed between October 8-26, 2015 to pilot instructors. School of Management instructors were not included in the initial survey, because SOM had informally polled its instructors prior to distribution of the central survey. Additional details of the midterm instructor survey are available in a separate report.

School	Pilot instructors	Survey responses	Response rate
Yale College / GSAS	28	22	79%
Divinity	4	3	75%
Engineering & Applied Science	1	0	0%
Forestry & Environmental Studies	2	1	50%
Nursing	6	4	67%
Public Health	1	1	100%
Total	42	31	74%

Key findings of midterm instructor survey

- **Canvas ease of use**

Very easy or easy: 52% Neutral (neither easy nor difficult): 42% Difficult: 6%

- **Length of time before feeling comfortable with Canvas**

A week or less: 55% Several weeks: 39% Still not comfortable: 6%

- **Meets general expectations**

Positive: 68% Neutral: 21% Negative: 11%

- **Satisfaction level for specific course-related activities**

Satisfaction level	Tasks
Very high (90-100%)	Creating or uploading a syllabus (97%) Grading assignments (96%) Creating and managing modules (95%) Monitoring student activity (analytics) (95%) Creating and assigning quizzes (93%) Choosing a home page (93%) Using the grade book (92%) Creating content pages (91%)
High (80-89%)	Creating assignments (85%) Creating discussions (83%) Uploading and managing files (80%) Communicating via announcements or email (80%)
Medium (70-79%)	Creating a course calendar (75%) Managing student collaborations (73%)

- **What do you like MOST about Canvas?**

Description		Number of responses
Easy to use, clean, well organized		15
Modules		5
Assignments tool		4
Quizzing functionality Content creation and editing	Grade book functionality	3
Interconnection of tools Faster than Classes*v2 Speed Grader tool	Control over look and feel; flexibility File uploads: fast and reliable	2
Students' ability to message instructor Delayed posting of announcements Discussions tool Groups functionality	Attendance tool Assignment recordings Monitoring student activity	1

- **What do you like LEAST about Canvas?**

Description		Number of responses
Publishing and copyright requirements for files		9
Email location and functionality		5
No photo roster; can't download roster		4
Insufficient customizability of look and feel Assignments functionality	Grade book functionality Insufficient training and student confusion	3
Student view Notification settings Insufficient analytics	Modules: too much effort, insufficient flexibility Submission button terminology confusing Discussions tool	2
No Media Gallery (Kaltura) Not as sophisticated as Google Apps Announcements functionality Files: can't update, must replace	No synchronized "umbrella" sites for multi-section classes Speed Grader is tedious for large classes Doesn't support .asp code Slow page load	1

- **Which platform would you prefer to use for your teaching?**

Platform	Responses
Classes*v2	6% (2)
Canvas	81% (25)
Other platform(s)	13% (4)
Total	100% (31)

Among respondents who selected either Classes*v2 or Canvas (N=27), 92.6% chose Canvas at the midterm
"Other platform(s)" text responses: No preference yet (2), Blackboard (1)

B. Final Survey of Instructors, Students, Teaching Assistants, and Support Providers

An online survey was distributed to all pilot participants on December 11, 2015, and was available until January 13, 2016. Invitations were sent to 2127 students, 182 teaching assistants, 100 instructors, and 37 support providers and course administrators. A reminder email was sent on December 17 to those who had not yet participated in the survey. The survey questions are included in Appendix C.

School	Students	Teaching assistants	Instructors	Support providers / administrators	Total by school
Yale College / GSAS	431 (66%)	24 (60%)	22 (44%)	4 (16%)	481 (63%)
Divinity	59 (9%)	-	3 (6%)	2 (8%)	64 (8%)
Engineering	2 (<1%)	1 (3%)	1 (2%)	-	4 (<1%)
Forestry	27 (4%)	1 (3%)	2 (4%)	1 (4%)	31 (4%)
Management	82 (13%)	11 (28%)	13 (26%)	15 (60%)	121 (16%)
Nursing	33 (6%)	-	6 (12%)	2 (8%)	41 (5%)
Public Health	10 (2%)	3 (8%)	2 (4%)	-	15 (2%)
Other	3 (<1%)	-	1 (2%)	1 (4%)	5 (1%)
Total responses	**647** (85% of total)	**40** (5% of total)	**50** (7% of total)	**25** (3% of total)	**762**
Response rate	30%	22%	50%	68%	36%

Key findings of final survey

- **Ease of use**

Role	Very easy or easy	Neutral	Difficult or very difficult	Responses (N)
Students	67% (422)	24% (148)	9% (56)	626
TAs	58% (23)	30% (12)	13% (5)	40
Instructors	54% (27)	28% (14)	18% (9)	50
Support providers	75% (18)	21% (5)	4% (1)	24
Overall	66% (490)	24% (179)	10% (71)	740

0% of instructors who have used Classes*v2 for 1 year or less (N=12) describe Canvas as difficult or very difficult to use
24% of instructors who have used Classes*v2 for 2 or more years (N=38) describe Canvas as difficult or very difficult to use

- **Length of time before feeling comfortable with Canvas**

Role	A week or less	Several weeks	Several months	Still not comfortable	Responses (N)
Students	64% (403)	27% (167)	1% (8)	8% (48)	626
TAs	68% (27)	18% (7)	5% (2)	10% (4)	40
Instructors	46% (23)	40% (20)	0% (0)	14% (7)	50
Support providers	67% (16)	25% (6)	4% (1)	4% (1)	24
Overall	63% (469)	27% (200)	1% (11)	8% (60)	740

Among instructors who were still not comfortable with Canvas by the end of the semester (N=7), 29% had been using Classes*v2 for 2-3 years and 71% for 4 or more years. 3 of these instructors teach in Yale College/GSAS; 3 in Management; and 1 in Nursing.

- **(Instructors) "Which aspects of Canvas have been the most challenging to learn or to use?"**

Frequently cited tools and functions:

- Publication status: Canvas requires most types of content to be published before students can view it
- Gradebook
- Assignments
- Section-specific communications.

Less frequently mentioned tools and functions:

- Email tool (Inbox/Communications): difficult to find, lacks some functionality
- Deciding which tool to use, when there are multiple overlapping options
- Quiz tool
- Files: setting and maintaining a custom order; setting copyright status
- Notification settings: too many default notifications sent out; uncertainty whether students have been immediately notified of announcements.

- **(Students) "Which aspects of Canvas have been the most challenging to learn or to use?"**

Frequently cited tools and functions:

- Finding things in general: too many places to look for course activities and files
- Files: navigating file lists, downloading multiple files, inconsistent display of files; slow loading of Box Viewer
- Inconsistent use of tools by professors in different classes
- Assignments: challenges in submitting files, writing in Arabic, inability to delete submissions
- Grades: finding instructor comments, notification of grade changes, no weighted grades
- Multiple sites for a single course (Math 112 and 115, and group sites associated with course sites)
- Calendar: notifications, scheduling, iPhone use, no sync to external calendars, navigation of information.

Less frequently mentioned tools and functions:

- Notification settings; finding instructor's notifications in Announcements, Inbox, or Discussions
- Using 2 or 3 separate platforms for Yale courses (other Canvas instances, Classes*v2)
- Files and other materials not visible because instructor did not publish them
- Using Modules.

- **How well does Canvas meet your general expectations?**

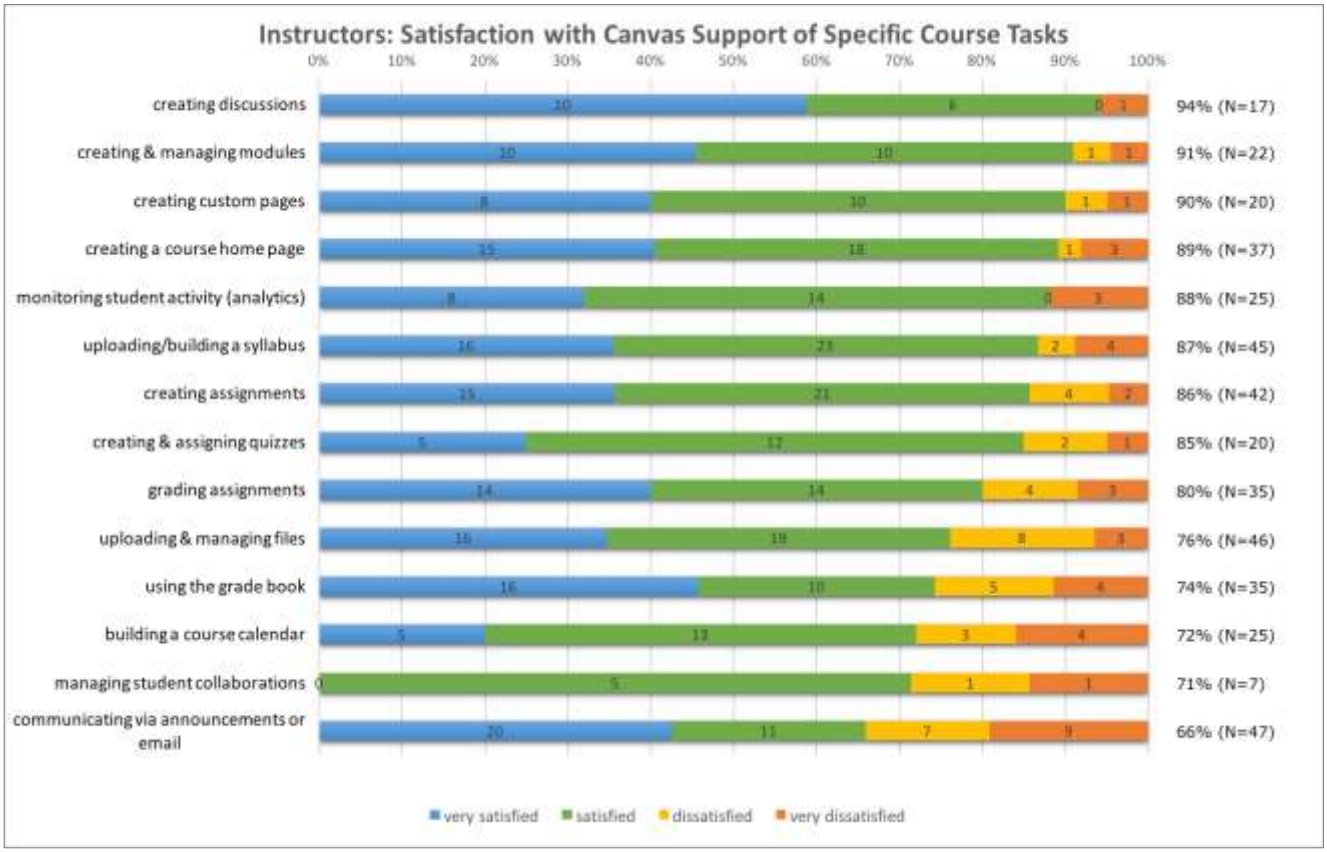
Role	Exceeds expectations	Meets expectations	Does not meet expectations	Total: meets or exceeds	Responses (N)
Students	19% (118)	69% (429)	13% (79)	87%	626
TAs	20% (8)	68% (27)	13% (5)	88%	40
Instructors	22% (11)	62% (31)	16% (8)	84%	50
Support providers	21% (5)	75% (18)	4% (1)	96%	24
Overall	19% (142)	68% (505)	13% (93)	87%	740

100% of instructors who have never used Classes*v2 (N=5) or have used it for only 1-2 semesters (N=7) said that Canvas meets or exceeds their expectations.

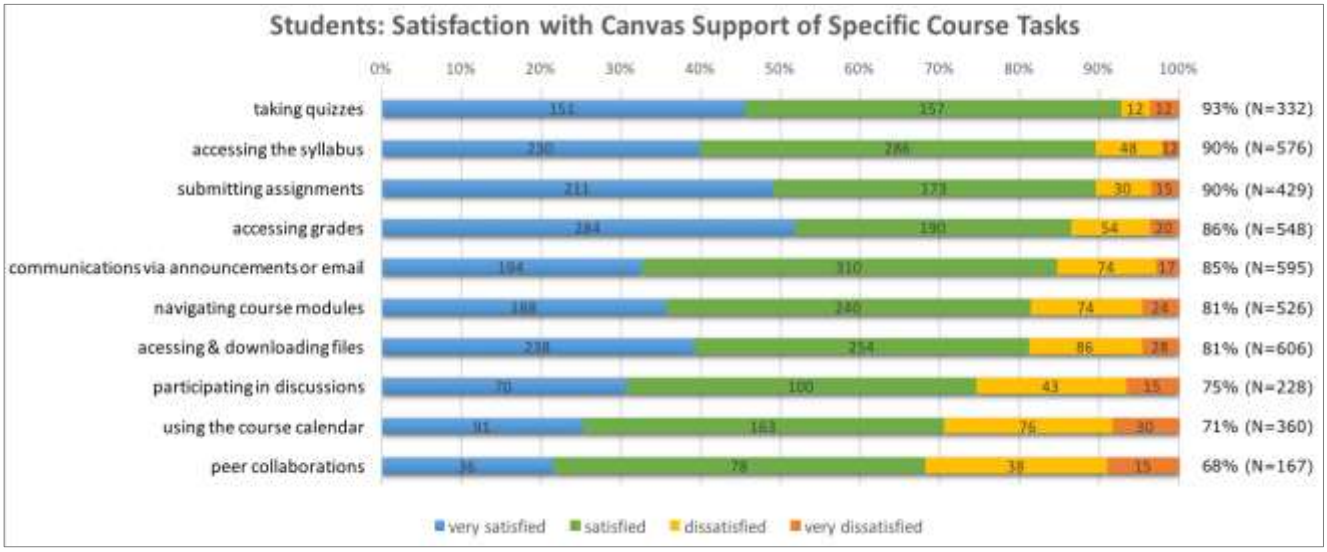
76% of instructors who have used Classes*v2 for 4 or more years (N=29) reported that Canvas meets or exceeds expectations.

Among instructors reporting that Canvas does not meet their expectations (N=8), 75% consider it difficult or very difficult to use, and are still not comfortable with it at the end of the semester. 87.5% of these instructors have used Classes*v2 for 4 or more years (N=7), and 12.5% (N=1) have used it for 2-3 years.

- **(Instructors) How satisfied are you with Canvas's ability to support these specific activities?**



- **(Students) How satisfied are you with Canvas's ability to support these specific activities?**



- **Which platform would you prefer to use for your on-campus courses?**

Role	Canvas	Classes*v2	Responses (N)
Students	65% (350)	35% (190)	540
TAs	69% (27)	31% (12)	39
Instructors	80% (35)	20% (9)	44
Support providers	78% (14)	22% (4)	18
Overall	66% (426)	34% (215)	641

(Note: This question was asked only of respondents who have previously used Classes*v2)

87.5% of instructors who have used Classes*v2 for 1-3 years (N=16) report a preference for Canvas.
75% of instructors who have used Classes*v2 for 4 or more years (N=28) report a preference for Canvas.

There was no statistically significant difference in student preference associated with the length of time they'd been using Classes*v2.

Student and instructor preference for Canvas in different schools

	Yale College & GSAS	Divinity	Engineering	Forestry	Management	Nursing	Public Health
Students	67% (265; N=398)	69% (35; N=51)	0% (2; N=2)	75% (18; N=24)	74% (17; N=23)	19% (6; N=32)	88% (7; N=8)
Instructors	85% (17; N=20)	100% (2; N=2)	100% (1; N=1)	100% (2; N=2)	58% (7; N=12)	100% (4; N=4)	50% (1; N=2)

Nursing students have a much lower preference for Canvas than students in any of the other schools (with the exception of Engineering, whose sample size of 2 students is too small to make accurate generalizations).

Management instructors have a significantly lower preference for Canvas than instructors in other schools (with the exception of Public Health, whose sample size of 2 instructors is similarly too small to make accurate generalizations).

C. New Feature Requests

A comparison of Classes*v2 and Canvas highlighting current gaps in Canvas functionality is available below in Part V: Technical and Vendor Evaluation, section H. In addition to these gaps, pilot participants requested new functionality that is not currently available in either platform.

Although these new feature requests are not considered critical to our assessment of Canvas's ability to replace Classes*v2 as it is today, they may help us predict the types of functionality that Yale faculty and students would like to see the LMS support in the future.

Tool or function	Desired functionality
Calendar	Share course calendar with people outside of Canvas (Google Calendar): currently you can share only your entire personal calendar, not for a single course. Feed should be dynamic, not a one-time export
Calendar: Scheduler	Office hours sign-up/scheduling for any student, not only those enrolled in specific courses (e.g., advisees)
Collaborations	Broader integration with Google Apps (Eli Apps) beyond Docs
Discussions	Increase indentation of threaded posts (via local CSS changes)
Discussions/Integration	Anonymous discussions like Piazza

Files	Should be an option to select and publish all files at once, as well as a way of globally setting copyright status
Files	Ability to print document from Box Viewer without having to download file
Grades	Ability to track which TA has graded each assignment
Grades/SIS Integration	Direct upload of grades from Canvas to Banner system
Integration	Math equation integration such as WIRIS for Quizzes and Announcements
Notifications	Remove students' ability to change notification settings, or at least set default for announcements to be sent immediately
People/SIS Integration	The ability to have students indicate they are no longer going to be in the course (probably a part of the wait list feature)
People/SIS Integration	A tool to manage wait lists
People	Seating chart tool
Quizzes	Ability to upload a Word document consisting of an exam/quiz with complex graphs and charts
Syllabus	Easier ability to print syllabus page
Video player	1.25 speed option rather than 1 or 1.5
Web Assign/Integration	Single sign-on and Canvas grade book integration

V. Technical and vendor evaluation

A. Platform Reliability and Availability

A platform's **reliability** reflects its ability to perform specified functions consistently over time without technical errors. During the pilot semester, Canvas performed very reliably and we had no reports of significant bugs or technical problems with the platform.

Availability is a measurement of the platform's accessibility and operational capacity over time, sometimes reported as a function of unplanned downtime per week or month. During the pilot semester, Yale experienced three periods when availability was significantly compromised:

- September 2, 2015, 10:15 a.m.-10:45 a.m.: multiple Yale users were unable to log on due to lack of timely response from Canvas servers
- September 3, 2015 11:25 a.m.-11:45 a.m., 10:20 p.m.-11:00 p.m.: several Yale users indicated significant slowness in platform responsiveness and page load errors
- November 30, 9:20 a.m.-2:00 p.m.: multiple users indicated significant degradation of service, and in some cases could not log on at all.

In each case, Instructure reported that the problem was related to issues with Amazon Web Services (AWS). (The third incident occurred on "Cyber Monday" and was part of widespread web slowdowns impacting many services and industries, including large companies like Target and PayPal.) Instructure reported at least one other degradation of service on September 20, 2015 which impacted other Canvas schools. We had no reports of problems from Yale users on this day.

The September 2-3 availability issues happened to coincide with the first two days of Yale's fall semester, which is typically a very high demand period for LMS use. While the timing was especially unfortunate, the incidents were resolved in a timely manner and there were no long-term negative repercussions on the pilot classes.

Instructure's use of AWS for Canvas hosting follows industry standards: many major service providers from Comcast to Netflix also rely on AWS, which is considered the dominant force in cloud hosting. Compared to competitor services, AWS offered five times the compute capacity of 14 other cloud providers combined (Garner 2013) and had the smallest amount of downtime in 2014. Amazon considers Instructure to be a very important client, featuring it in two AWS case studies on its web site: we have great confidence in their partnership and in Instructure's assurance that the root cause of the AWS issue has been identified and remediated.

B. Schedule of Upgrades and Enhancements

Instructure releases changes into its core code base every three weeks. Small improvements and fixes typically go directly into production. Larger changes in functionality are released first in beta mode, allowing schools to decide whether to release them to users.

Instructure does a good job of communicating upcoming changes a week in advance of their appearance in production, although we have found that unless a local support team member is assigned to review the change log, we may be unaware of changes that are either already in production or are optional yet not available to Yale users.

C. Responsiveness of Vendor

Canvas administrators have found Instructure representatives to be extremely responsive to our questions, requests, and support needs throughout the pilot. In many cases they have shared information that has resolved challenges faced during the pilot, and in other cases they have suggested temporary workarounds until a desired function is delivered as part of the standard Canvas development cycle. We have no reason to doubt that Instructure will continue to be a responsive and active partner if a decision is made to move beyond the pilot into broader implementation at Yale.

D. Tier 1 Support

Yale contracted with Instructure to offer tier 1 support for all instructors and students using the platform during the pilot. Access to Instructure support was available from the global Help on every Canvas page, with options for phone or live chat

help sessions. Part of the fall pilot includes assessment of the value of this service, since we are paying additional support fees on top of our standard licensing and administrative support fees.

Usage of Instructure's tier 1 support by faculty and students was fairly low throughout the pilot semester. Members of the Working Group or other local support providers and course administrators tended to use the service more frequently than students or instructors.

At the present time, Instructure's reports on tier 1 support usage are missing critical information that would be needed to understand both who is seeking help and which aspects of Canvas generate the highest number of support requests. In addition, Instructure cannot currently distinguish between support requests coming from members of the pilot (using yale2.instructure.com) versus Yale users of legacy Canvas instances (yale.instructure.com and yaleuniversity.instructure.com). We have requested additional information from Instructure to understand the most common questions and support challenges they receive from Yale users.

Across all three instances, Instructure logged a total of 161 support requests from July through December 2015.

The small number of pilot participants who indicated that they used Instructure support during fall 2015 reported high levels of satisfaction with the service provided:

Role	Satisfied or very satisfied	Responses (N)
Students	83% (21)	25
TAs	80% (4)	5
Instructors	75% (12)	16
Support providers	92% (11)	12
Overall	83% (48)	58

E. Integration with Yale Enterprise Systems

Two significant integrations with campus enterprise systems were established for the pilot:

1. User authentication/login via Yale CAS
2. Automated creation and population of course sites based on information in Banner.

The CAS authentication component was easily achieved using native configuration options in Canvas. Banner integration was a more substantial challenge which required a dedicated team of ITS specialists who worked on the project for approximately four months. Canvas documentation for SIS integration was not as robust as we may have wished, but Instructure integration staff were good partners during the process. Canvas passed a Security Design Review performed by ITS.

The biggest challenges with Banner integration were related to the limited functionality of Yale's Banner deployment: since we do not currently license a critical Banner module, near-real-time updating of course and enrollment information proved to be impossible. Instead we had no choice but to continue the same approach we have been taking with our Sakai deployment for Classes*v2, which does a full-batch update of Banner data once every six hours. If Yale were to upgrade its Banner deployment, or replace Banner with another SIS platform capable of sending only data changes (an event-driven approach) rather than full snapshots, Canvas would be capable of providing near-real-time data accuracy. This, in turn, would significantly improve the platform supportability: our support resources would no longer need to ask faculty and students to "try again in 6 hours, and let us know if you still have no access."

F. Integration with External Platforms and Services via LTI

Although one of Canvas's selling points is its extensibility through integration with external web-based services adhering to the Learning Tools Interoperability (LTI) standard, the Working Group made a conscious decision to limit the number of external services available through LTI during the pilot. There were two reasons for this:

1. The primary purpose of the pilot was to evaluate Canvas's core functionality, rather than the functionality of secondary tools and services that might be "plugged in" and used as alternatives to Canvas tools
2. Because LTI integrations typically share information about course participants with external service providers, requests for such integrations must be researched and the security of any shared Yale data (especially data surrounding student identity and enrollment) must be validated and approved by both technical and legal specialists on campus.

During the pilot, we successfully used several LTI apps available through Canvas:

- online course reserves through Yale's Library system, using the Ares app
- access to the external media repositories Mediacore and Echo360
- integration with e-resources provided by the textbook publisher Cengage.

Our experience with these LTI integrations was positive: configuration of the app connections is easy, and apps can be added at the course level, a sub-account level, or the root account level. The biggest challenge in supporting requests for external integrations is in data governance: for each request, we must investigate the type of data that would be shared between Canvas and the external platform, the security of data transfer and retention, and the external vendor's terms of use and privacy policy (particularly their support of FERPA guidelines). We worked with both the Office of General Counsel and the University Registrar before extending any student or course data to external services.

Demand for LTI integrations will certainly increase as more programs and instructors use Canvas. During the pilot semester, we received 5 new requests for Canvas apps to be added.

G. Accessibility Review

In partnership with ITS and the Technology Accessibility Working Group, we conducted a comprehensive review of Canvas in August 2015 to assess its current level of accessibility for individuals with disabilities. The audit was performed with reference to accessibility criteria outlined in the Web Content Accessibility Guidelines (WCAG) 2.0 Levels A and AA. The review was conducted from both the user's perspective, utilizing JAWS screen-reader software, and a programming perspective.

The review revealed 10 accessibility issues considered significant by the external audit team. These results were shared with Instructure in September 2015. Two of the issues were closed immediately: Canvas has a native configuration option, "Use High Contrast Styles," which was previously unknown to the audit team and which resolves contrast ratio issues. Four of the issues have subsequently been addressed with the fixes already available in the production service by 24 November 2015. Three issues are currently slated for remediation as part of Instructure's ongoing development of Canvas. One remaining issue was not considered significant enough by Instructure's own accessibility experts to open a ticket for remediation. We will continue to check in with Instructure to confirm that the three outstanding issues are resolved.

Instructure shows a very strong commitment to making Canvas accessible, and in 2010 was certified by the National Federation of the Blind as "equally accessible to blind and sighted users." Instructure also posts a regularly updated Voluntary Product Accessibility Template (VPAT) statement on its web site (https://www.canvaslms.com/accessibility) which identifies Canvas's ability to support specific Section 508 accessibility standards.

Note: an accessibility review of Classes*v2 is currently scheduled to be performed by the same external audit team. We anticipate learning that Sakai has a significantly higher number of accessibility issues than Canvas, since Sakai has never received external certification and a partial audit performed by Longsight in 2013 revealed over 50 outstanding issues. Work is currently underway in the Sakai community to bring the latest release up to WCAG 2.0 AA standards.

*H. Functional Gap Analysis, Classes*v2 vs. Canvas*

Classes*v2 offers a large number of features that are not available in the core Canvas platform. In some cases, these features were developed at Yale over the years in response to local needs, while in other cases they resulted from development initiatives launched at other Sakai contributor schools. Although all the intricacies of Sakai do not need to be fully represented in a new system, it is important that we identify those items that are absolutely necessary for the continued success of our course sites.

The table below lists critical functionality found in Sakai tools which is currently missing in our out-of-the-box implementation of Canvas. There are three avenues available to us for closing the gaps:

1. Local development to build tools and integrations providing specialized value to Yale constituents
2. Extension of Canvas core functionality through the integration of external tools, such as Piazza for discussions
3. Partnering with peer schools who have built custom tools that may be reused at Yale, and who participate in the R1 Canvas Peer Group which lobbies Instructure to act on priorities that are widely shared by Group members.

Each gap must be assessed to determine how significantly it might impact the Yale community, whether there are acceptable workarounds available, and whether Instructure or a peer school is planning to address the gap through development initiatives.

***NOTE**: The following list is based on the critical tools and functions needed for course sites only. Highlighted tools/functions are considered mission-critical gaps that must be resolved prior to initiating a broad Canvas deployment.*

Sakai tool/function	Canvas tool/function	Critical gaps (functionality missing in Canvas)
Announcements	Announcements	Cannot send announcements to specific sections or groups Cannot set announcement availability open/close dates Cannot create public announcements
Media Gallery (Kaltura)	(Upload to Canvas Files)	Media hosting and publication through an integration with an external service. We are currently researching alternative platforms for this service
Messages	Inbox/Conversations	Cannot cc or bcc recipients outside of the course list Cannot broadcast messages to all course participants from authorized external email address (listserv function)
Resources	Files	No WebDAV bulk upload functionality Cannot release files to specific groups/sections Cannot set file availability open/close dates
Roster/Site Info	People	No photo roster Does not include fields for email, college, major, year No function to export the roster
Syllabus	Syllabus	Does not integrate with Online Course Information (OCI) Unable to send notification when changes are made to syllabus No preview/draft feature
Feedback	Quizzes (Survey)	Submissions are not truly anonymous
Global NetID access	User accounts	Not automatically accessible to anyone with a valid NetID. NetID login to Canvas is possible only after a Canvas account has been created. Account creation is currently automated only for participants appearing in a current Banner course feed. Other users' accounts are created by request manually by a Canvas administrator

Members of the Working Group have discussed with ITS possible ways to address the highlighted issues. Should a decision be made to move ahead with a full-scale Canvas implementation, we are confident that these gaps could be closed prior to the start of fall classes in the 2016-17 academic year.

For more detail and additional course tool/functional gaps, please see Appendix D.

VI. Supportability

A. Support Log Summary

There were two main avenues for support available to pilot participants: to contact Instructure tier 1 support directly through the Canvas Help menu, or to contact the Canvas Working Group through the canvas-pilot@yale.edu email address. The following chart shows the number of requests received by Instructure's tier 1 support, the number of requests submitted to the Canvas Working Group team locally at Yale, and the total number of requests to both teams during the pilot.

Month	Number of requests to Tier 1 support (Instructure)	Number of requests to Canvas Working Group (Yale)	Total
July 2015	16	5	21
August 2015	23	40	63
September 2015	65	101	166
October 2015	17	15	32
November 2015	21	17	38
December 2015	19	15	34
Total	**161**	**193**	**354**

In August and September, when support numbers are highest, the local Yale support team received twice as many requests as the Instructure tier 1 support. This is not entirely surprising, since a large number of these requests concerned gaining access to Canvas sites by people not officially associated with the course in the Registrar's system (including TFs). Other months show a more even distribution of support requests to the two teams.

Unfortunately, due to limitations in the reporting currently provided by Instructure, it is not yet possible to know how many of the Instructure tier 1 requests came from students, from instructors, or from support providers.

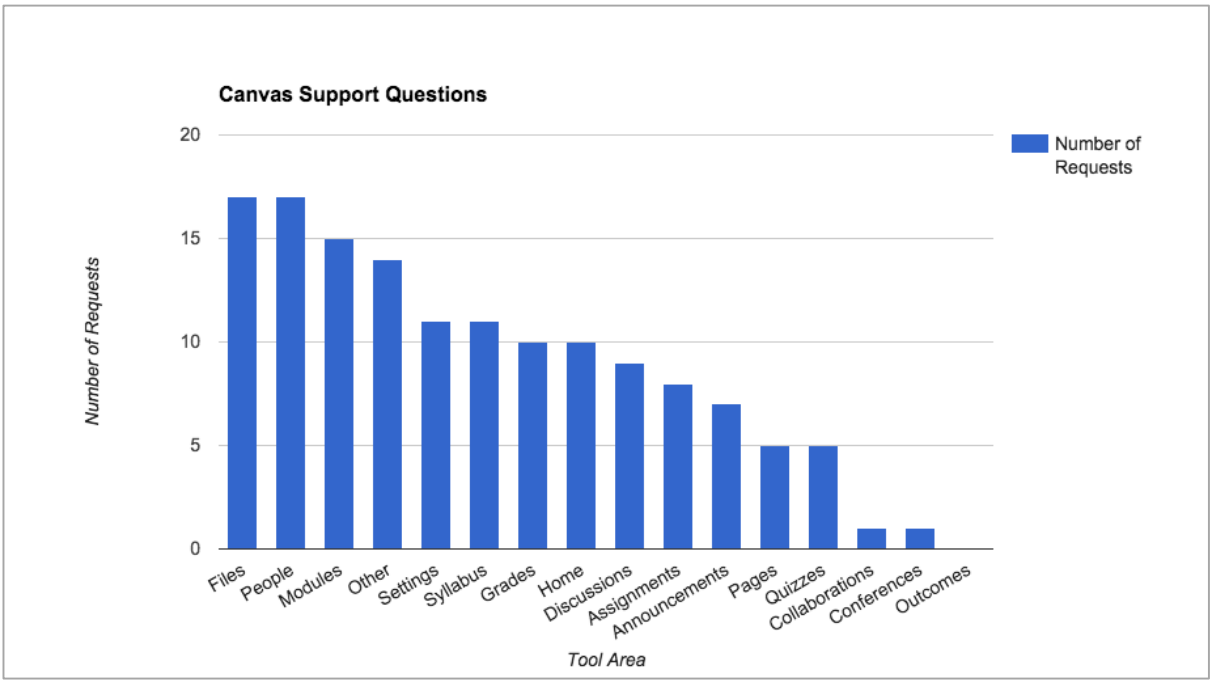
To help understand why Instructure tier 1 support was contacted, Instructure shares a chart that shows which issues, questions and bugs our users reported most during a given time period. For the month of September when the most issues were reported to Instructure directly, the following list shows the top 10 components reported, with the number of requests in parenthesis.

1. Enrollment (5)
2. Assignment Submitting (4)
3. Browser Issues (3)
4. Files (3)
5. Speed Grader (2)
6. Quizzes: Editing (2)
7. People/Users (2)
8. Login (2)
9. Conversations (2)
10. General Assignment (2).

The top 5 reported support questions asked of the Canvas Working Group covered the following areas:

1. Course Selection ("shopping") period differences across schools, and use of the Online Course Selection tool
2. User account creation outside of official enrollments
3. Migration and restructuring of content from Classes*v2
4. File storage and course content visibility
5. Linking to Classes*v2 functionality to mitigate gaps
    a. Photo Roster
    b. Syllabus integration with Online Course Information/Online Course Selection
    c. Feedback tool for anonymous midterm feedback.

The following chart indicates the tools faculty asked about the most when setting up a course for the first time.



B. Post-Pilot Supportability

While the support model used during the pilot was largely successful, a full-scale transition from Classes*v2 to Canvas would require a different support model than the Working Group was able to provide for the fall 2015 pilot.

The Pilot Working Group was comprised of 22 individuals, 12 of whom were from the CTL. Many of these staff members took on support of the Canvas pilot in addition to their regular duties, but this is not a support model that can be scaled or sustained during a campus-wide transition. In addition, our small dedicated LMS support staff in the CTL will find it extremely challenging to support both Classes*v2 and Canvas during a transition period when both platforms would be used for Yale courses.

Some of the support issues encountered during the pilot should be addressed by technical development initiatives that could take place in spring and summer 2016: issues 2 (user account creation) and 5 (links to Classes*v2 tools) from our top 5 reported support questions above can be addressed through the closure of functional gaps between Canvas and Classes*v2. Issues 1 (support for course selection processes), 3 (migration and restructuring of content from Classes*v2), 4 (content publishing), and working with new Canvas instructors on effective use of the new platform, will remain the largest support responsibilities for our team going forward.

The success of a post-pilot transition from Classes*v2 to Canvas would depend in large part on the support we are able to provide: as one instructor commented in the midterm survey, "much hand-holding of faculty will have to happen when the switch is made, or there will be hell to pay." For this reason, the Working Group sees the need to augment the LMS support team for the duration of the transition from and retirement of Classes*v2. This augmented support team would be better able to assist faculty in migrating their content from Classes*v2 and restructuring their content in Canvas. Assistance in this area will enable the existing LMS support team to focus on development of support documentation and training sessions to assist faculty and students during this transition.

C. Support Information from Final Survey

The final survey contained 3 questions related to participants' support needs and preferences. The first question asked respondents to indicate their satisfaction with the three primary modes of support offered during the pilot: support provided from Instructure, support provided by Yale, and Canvas online help materials. Satisfaction levels for Instructure support appear earlier in this report (see above, Part V, "Technical and Vendor Evaluation," section D, "Tier 1 Support").

- **Satisfaction with Yale-provided support**

Role	Satisfied or very satisfied	Responses (N)
Students	85% (66)	78
TAs	100% (12)	12
Instructors	85% (35)	41
Support providers	95% (20)	21
Overall	87% (130)	149

- **Satisfaction with Canvas online help materials**

Role	Satisfied or very satisfied	Responses (N)
Students	87% (55)	63
TAs	75% (6)	8
Instructors	66% (19)	29
Support providers	89% (17)	19
Overall	81% (95)	117

It is worth highlighting the comparatively low satisfaction rate for Canvas online help materials among instructors: this suggests a need to do some local development of online support resources that will be more useful to Yale instructors.

The second support-related question asked participants about the type of support they'd be inclined to use first if they had questions about Canvas:

Role	Yale support (in-person, email, phone)	Online support resources	Live chat	Group orientations and training	Ask professor or TA	Ask peers
Instructors	16	10	4	2	-	-
Students	68	81	35	-	26	10

The third question asked instructors to identify the types of Canvas training they would find useful:

Training type	Percent of respondents who would find this useful (N=40)
In-person training sessions and workshops	38% (15)
Self-paced online course on using Canvas	33% (13)
Walk-in sessions and scheduled Canvas office hours	33% (13)
Video tutorials on common course activities	25% (10)
Departmental training sessions	25% (10)
Roundtable sharing sessions for instructors	25% (10)
Live webinars on using Canvas	5% (2)

VII. General evaluation and recommendations

A. Summary of Key Findings

Part III: Platform Usage Statistics

- The breadth and depth of Canvas usage during the pilot was sufficient to test all critical functions in Canvas and to serve as a base for conclusions about its strengths and weaknesses for supporting on-campus courses at Yale
- Patterns in tool usage of different campus units in section B, "Canvas Activity by Campus Unit," suggest significant variation in how academic programs use the LMS. Further analysis would be required to determine if higher usage of specific tools, or particular types of course activity, correlate with schools' or individuals' satisfaction levels.

Part IV: Feedback from Pilot Participants

- Between the midterm and final surveys, instructors' rating of Canvas's ease of use remained relatively constant, with 52-54% responding that it was "very easy or easy" to use. Less than 10% of survey respondents said it was difficult or very difficult to use
- Almost all instructors reported feeling comfortable with Canvas within a few weeks (94% in midterm survey; 86% in final survey). This is consistent with reports from students (91%) and TAs (86%)
- Canvas met or exceeded the general expectations of the vast majority of pilot participants by the end of the term (students: 87%; TAs: 88%; instructors: 84%; support providers: 96%; overall: 87%). These results are significantly higher than overall satisfaction rates for Classes*v2 in 2013 (78%) and 2015 (70%)
- 80% of pilot instructors preferred Canvas to Classes*v2. Preference for Canvas was somewhat lower for TAs (69%) and students (65%), although even here Canvas was preferred to Classes*v2 by 2:1. The majority of student complaints about Canvas concerned how instructors were using the platform to organize activities and resources, rather than the platform's capabilities. Instructors in Management and students in Nursing were much more inclined to prefer Classes*v2 than other participants, which could warrant further analysis
- Instructors most frequently cited Canvas's top strengths as its ease of use and clean interface, and appreciated the new functionality of Modules to organize course content. File publication, email and the lack of a photo roster were identified as weaker points at the midterm. Canvas's Grades, Assignments and communications tools were the most challenging for instructors to learn or use
- Students' most common challenges were related to the way their instructors organized course communications, activities and files. Assignments, Grades, and Calendar were the most difficult to learn for students
- Instructors and students are quite satisfied overall with Canvas's ability to support the most common activities handled by an LMS. Although relatively few courses used Canvas to facilitate student collaborations, both students and instructors felt that Canvas's support for this type of activity was weaker than for other course activities.

Part V: Technical and Vendor Evaluation

- Canvas is highly reliable with few bugs reported by pilot participants. With the exception of 3 days when issues with Amazon Web Services led to significant slowness in server response, the platform availability was solid
- Regular updates to the core platform were deployed to production every 3 weeks without incident
- Instructure has been a very responsive partner throughout the pilot, and seems genuinely committed to ensuring that Yale's needs are met
- Tier 1 support provided by Instructure was very well received by the small number of Yale community members who used it. Yale should investigate whether tier 1 support for students is sufficiently used and useful to warrant continuation of this fee-based service
- Integration with campus systems and external platforms was mostly straightforward and smooth. Yale should continue investigating alternatives to our current full-batch mode of updating Canvas with Banner data, in hopes of providing as close to real-time update of Canvas course information as possible
- Canvas performed very well in an accessibility review, and Instructure has been responsive to Yale's request that the small number of outstanding accessibility issues be remediated in future development cycles
- A functional gap analysis between Classes*v2 and Canvas revealed a number of issues that the Working Group deemed critical to close before a full campus deployment of Canvas could take place. The CTL and ITS are prepared to remediate 4 of these issues by fall 2016 should Yale decide to move ahead with a full campus deployment. Further analysis and remediation of the remaining critical gaps should be part of an LMS transition plan.

Part VI: Supportability

- The largest number of support requests concerned enrollment and account creation at the start of the fall semester
- Differences between Canvas's and Classes*v2's mode of handling files, and displaying course participant information, prompted the most frequent support requests by pilot instructors. Instructors also frequently requested support on issues relating to grading, quizzing, and communicating with course participants
- Survey respondents were very satisfied with the support they received from Instructure (83% satisfaction overall) and from Yale support providers (87%). Canvas online support materials received significantly lower satisfaction ratings from TAs (75%) and instructors (66%) than from students (87%) and support providers (89%)
- Most instructors tend to seek support first from Yale providers, with a smaller number trying to help themselves with online support materials. Students are more inclined to search for online help first
- Instructors would most like to receive in-person training sessions (one-on-one help is preferred to departmental or group sessions), and would also find use in self-paced online courses, video tutorials, and instructor roundtable discussions on effective use of Canvas.

B. Review of Peer Institutions' Canvas Pilots

A significant number of our peers have undertaken similar pilots of Canvas:

Peer institution	Legacy LMS	Duration of transition to Canvas
Brown University	Blackboard Campus Edition /WebCT	2 years
University of California, Berkeley	Sakai	2 years
University of Chicago	Blackboard	(evaluation still in progress)
Dartmouth College	Blackboard	1.25 years
Harvard University	iSites (homegrown system)	2 years
Indiana University	Sakai	2 years
University of Michigan	Sakai	1 year
Northwestern University	Blackboard	1 year
University of Pennsylvania	Blackboard	1 year
Stanford University	Sakai	1 year

In each case (with the exception of Chicago, whose evaluation is still underway), the pilot study led to a decision to move from the legacy LMS to Canvas. We are not currently aware of any peer institution that has undertaken a rigorous Canvas pilot yet ultimately decided not to move forward with its implementation.

Review of peer institutions' pilot survey results shows close correspondence to the results included in the current Yale report. Although each school asked slightly different questions and not every school has made its evaluation results public, overall satisfaction ratings across institutions appear to be loosely comparable to what we've seen at Yale:

- instructor satisfaction with Canvas ranged from 58% (Harvard) to 90% (Indiana), averaging about 80% overall satisfaction among faculty
- student satisfaction with Canvas was typically a bit lower than that of instructors, with roughly 65-70% satisfaction (Harvard was an exception, with students reporting significantly higher satisfaction than faculty, at 79% vs. 58%)
- these satisfaction ratings translated into a majority of participants in each pilot preferring Canvas to the legacy LMS.

It is worth noting that Yale's fall 2015 pilot was significantly larger in scope than many of our peers' pilots. Yale's one-semester pilot involved 71 courses, whereas UC Berkeley piloted 10 courses; Harvard 53; Indiana 35. Northwestern piloted a total of 97 courses over a full academic year, and Michigan piloted over 130.

Many of these schools are members of a Canvas R1 Peer Group, which shares knowledge about their transition to Canvas as well as support strategies. The group lobbies Instructure collectively with shared priorities for feature enhancements and new functionality. Members of Yale's Pilot Working Group have already begun attending the Peer Group's monthly meetings.

The Working Group has begun researching our peers' transition plans for migration from the legacy LMS to Canvas. We are particularly interested in the duration and structure of our peers' transitions, additional staffing requirements identified for the transition, and learning how each school is closing critical gaps between Canvas and the legacy platform. This information will prove extremely valuable in our transition planning should Canvas be selected as Yale's new LMS.

C. Working Group's Final Evaluation and Recommendations

The Canvas Pilot Working Group has great confidence that Canvas can well meet the diverse needs of Yale instructors and students, and our evaluation is that Canvas is a very strong alternative to Sakai for support of on-campus coursework. An accessibility audit revealed it to be extremely strong in supporting all members of our community, and we believe that Canvas will have long-term viability in the LMS arena, given the active and growing community of peer institutions using the platform and the overall strength of its parent company, Instructure. In contrast, we have significant doubt that Sakai will continue to be the LMS of choice, as the open-source community on which it relies decreases in size and commitment.

The results presented in this report indicate a clear and convincing preference for Canvas among pilot instructors, students, and support staff. Satisfaction levels for Canvas at Yale are consistent with those seen by peers who have conducted similar pilots of Canvas for on-campus course support. Although there are some significant functional gaps between Classes*v2 and Canvas, most notably involving integration with data and services from Yale Student Information Systems, we are confident that critical gaps can be closed through a combination of local development work, extension of the platform through LTI apps, and collaboration with peers and Instructure to bring ongoing improvements to the core Canvas platform.

Recommendations

1. Based on our assessment of the fall pilot, the Working Group unanimously recommends that **Yale adopt Canvas as the centrally supported LMS for the University's on-campus courses**.
2. We recommend continuing our current licensing approach in which **Canvas is hosted and maintained "in the cloud" by Instructure**. We see no reason for Yale to take responsibility for hosting the LMS on campus or managing labor-intensive software updates once or twice a year, when Instructure's hosting is robust and updates occur every 3 weeks, with no downtime from the end users' perspective.
3. As part of a full-campus rollout, the University should aim to **retire the two legacy instances of Canvas currently supported for distance and hybrid coursework** (yale.instructure.com and yaleuniversity.instructure.com). A significant number of support requests during the pilot stemmed from confusion on the part of instructors and students regarding which instance of Canvas was being used for a particular course. Courses currently offered on those instances should eventually be moved to the centrally managed instance used during the fall pilot (yale2.instructure.com), which allows for both CAS and Canvas-based user authentication. Analysis of courses currently hosted on these other instances, and identification of any obstacles in moving them to the yale2 instance, should be part of a broader Canvas transition plan.
4. The Working Group believes that some of the critical gaps identified during the pilot can be addressed through a **manageable amount of local technical development.** We are confident that 7 of these gaps can be closed before the start of fall classes in 2016.
5. Other identified gaps may be resolved by changes to the core Canvas platform, and the Working Group suggests that **Yale should become active in the Canvas R1 Peer Group** to help lobby Instructure for functional improvements.
6. Remaining gaps may be addressed by taking advantage of Canvas's LTI extensibility, and our initial exploration of Canvas "apps" indicates that there will be significant demand to integrate Canvas with external services for specialized teaching and learning activities. However, the process of obtaining security clearance from the Office of General Counsel and the Registrar's Office is currently very time-consuming. We recommend development of a **streamlined process for data governance around Canvas apps** that will improve timely decision-making and responsiveness to faculty requests for LTI extensions.
7. An **LMS transition plan** should be developed for migration of schools and individual courses to Canvas as quickly as possible, taking into account a practical timeline for critical gaps to be closed. We recommend a **1-year transition period (summer 2016-summer 2017) when both Classes*v2 and Canvas would be supported** for coursework, after which all new course sites would be created on Canvas. Classes*v2 would need to remain accessible for at least one year beyond the transition for new courses (see recommendation 11 below), and an archiving strategy for Classes*v2 legacy content will need to be developed.

   This is an ambitious schedule, which assumes our ability to close critical gaps between Classes*v2 and Canvas quickly. Courses and programs with special needs should be identified as early as possible. The transition plan should be responsive to challenges voiced by pilot participants, and should include a concrete action plan for addressing the most commonly reported sources of confusion. We are confident that many of these challenges can be overcome through instructor training on effective ways of using Canvas for their courses.

8. We recommend an **augmentation of the LMS support staff** in the CTL during the transition period. Additional support providers will be necessary to ease the transition for Yale instructors, including the migration of existing course content from Classes*v2 to Canvas. As part of the transition, the CTL should also develop an effective training and support program for instructors, teaching assistants and students.
9. **Further analysis of the pilot experience of constituent groups expressing dissatisfaction with Canvas**– including Management instructors, Nursing students**,** and a subset of instructors who have used Classes*v2 for many years–should be undertaken to ensure that these groups' needs are addressed during the transition. Detailed study of these users' survey responses, followed by targeted conversations and focus groups, are advised as initial steps.
10. The Working Group is **undecided on the value of tier 1 support from Instructure, especially for students**. Students tend not to seek help with the mechanics of using the LMS (regardless of the specific LMS platform): fewer than 4% of student respondents to the final survey reported having contacted Instructure for support. When they do need support it is typically related to access issues that can be resolved only through Yale support channels. That said, the cost per student for Instructure support is relatively low at $3.50/student/year, and Instructure's support is available 24/7/365, which is not the case for Yale-provided support.
11. While the pilot focused on Canvas's ability to support course-related activities, retirement of Classes*v2 will have repercussions on other academic uses of the LMS that are not course-related. The Working Group feels that **migrating "project sites" off Classes*v2 should be handled as a parallel but separate initiative**: we cannot offer an opinion on whether Canvas is the best choice for supporting these non-course-related needs.

Members of the Canvas Pilot Working Group

Pilar Abuin, Center for Teaching & Learning

Kelly Barrick, University Library

Thomas Bruno, University Library

Sara Epperson, Center for Teaching & Learning

Suzanne Estelle-Holmer, Divinity School

Ekaterina Ginzburg, School of Nursing

John Harford, Center for Teaching & Learning

David Hirsch, Center for Teaching & Learning

Ilknur Kelceoglu, School of Management

Graziano Krätli, Divinity School

Trip Kirkpatrick, Center for Teaching & Learning

Gary Leydon, School of Medicine

David Malinowski, Center for Language Study

Edward O'Neill, Center for Teaching & Learning

Alina Nevins, Center for Teaching & Learning

Jordanna Packtor, School of Forestry & Environmental Studies

Pam Patterson, Center for Teaching & Learning

Steelsen Smith, University Library

Matt Reynolds, Center for Teaching & Learning

Matt Snyder, Center for Teaching & Learning

Melissa Thomas, Center for Teaching & Learning

Tonie Young, School of Management

Appendix A: Pilot Goals (May 2015)

A. Tool Usability and Functionality

Validate the usefulness of Canvas for on-campus teaching and learning

1. Evaluate the overall usability of Canvas, both on its own merits and in comparison to Sakai/Classes*v2
2. Ensure that the most common LMS-based course tasks are easy to perform by faculty and students
3. Ensure that the Canvas equivalents of the most frequently used tools in Classes*v2 are tested and meet expectations
4. Determine ease of reusability of materials across course sites and from one semester to the next
5. Ensure that there are no "deal-breaker" functional gaps between Canvas and Sakai which could not be remediated during a full-campus rollout
6. Identify tools and functionality that were not available or frequently used in Classes*v2, and measure the significance of these to faculty and students
7. Determine whether a core set of LTI-enabled external applications may be needed to replace or augment core Canvas tools to achieve desired levels of faculty/student satisfaction
8. Assess default Canvas configurations for course sites and user notification settings, and identify any changes that Yale should consider implementing before a larger rollout of the platform

B. Supportability

Identify the types of campus-based support that might be required for a broad Canvas rollout

1. Evaluate the effectiveness of Canvas-provided live and email support, and determine whether it is sufficiently used and valuable to justify the service charges
2. Determine whether Canvas-provided online documentation is sufficient for resolving most platform-specific questions
3. Identify how much local support faculty may need to migrate content from Sakai into Canvas
4. Identify how much local support faculty may need to build sites in Canvas
5. Measure the amount of independence faculty members gain over time when using Canvas
6. Determine what types of local outreach, training and Yale-specific documentation may need to be in place before a broad Canvas rollout could take place

C. Operational Robustness and Vendor Relations

Verify that the cloud-hosted Canvas offering meets campus technical expectations

1. Measure the platform stability, responsiveness and availability
2. Ensure that Canvas meets or exceeds Yale's accessibility and data security standards
3. Evaluate the effectiveness of Canvas's multi-tenant approach by establishing a school/department hierarchy of sub-accounts based on Banner information and assigning sub-account administrative privileges as appropriate for course administration testing purposes
4. Evaluate the ease and sustainability of extending core Canvas functionality through managed use of LTI apps at the account, subaccount and course level
5. Assess Instructure's responsiveness to Yale's needs and priorities.

Appendix B. Pilot Participants

Yale College and GSAS		
ARBC 130/ ARBC 502	Intermediate Arabic I	Sarab Al Ani
ARBC 162/ ARBC 513	Modern Arabic Political Thought	Sarab Al Ani
ASTR 170	Introduction to Cosmology	Louise Edwards
ASTR 220	Galaxies and Cosmology	Louise Edwards
CHEM 423/ CHEM 523	Synthetic Methods for Graduate Students	Timothy Newhouse
CHEM 430/ CHEM 530	Statistical Mechanics and Thermodynamics	Ziad Ganim
CHNS 130	Intermediate Chinese	Ninghui Liang, Chuanmei Sun, Peisong Xu
E&EB 235/ HLTH 250	Evolution and Medicine	Stephen Stearns
ECON 131	Econometrics and Data Analysis I	Doug McKee
FREN 121	Intermediate French	Candace Skorupa
GMAN 130	Intermediate German I	Theresa Schenker
GMAN 150	Advanced German I	Marion Gehlker
HSAR 252/ CLCV 175/ ARCG 252	Roman Architecture	Diana Kleiner
LING 112	Historical Linguistics	Claire Bowern
LING 219/ ANTH 380/ LING 619	Evolution of Language & Culture	Claire Bowern
MATH 107	Mathematics in the Real World	Brett Smith
MATH 112	Calculus of Functions of One Variable I	Dylan Allegretti, John Hall, Marketa Havlickova, Liyang Zhang
MATH 115	Calculus of Functions of One Variable II	John Hall, Kyle Luh, James Rolf, Brett Smith
MCDB 221L	Model Organisms Lab	Maria Moreno
MUSI 112	Listening to Music	Craig Wright

PHYS 112	Practical Electronics	Stephen Irons
PHYS 170	University Physics for the Life Sciences	Claudia De Grandi, Simon Mochrie
PHYS 205L	Modern Physical Measurement	Karsten Heeger, Stephen Irons, Steve Lamoreaux
PHYS 206L	Modern Physical Measurement II	Karsten Heeger, Stephen Irons, Steve Lamoreaux
Divinity		
REL 501	New Testament Interpretation	Michal Dinkler
REL 580	Exegesis of the Gospel of Matthew (Greek)	Michal Dinkler
REL 687	Prayer Book	Andrew McGowan
REL 718	Religion in the American West	Tisa Wenger
REL 720	Religious Freedom in U.S. History	Tisa Wenger
REL 969	Christianity and Ecology	Matthew Riley
Engineering & Applied Science		
MENG 459/ BENG 459/ ENAS 559	Neuromuscular Biomechanics	Madhusudhan Venkadesan
Forestry & Environmental Studies		
F&ES 510	Introduction to Statistics: Environmental Sciences	Jonathan Reuning-Scherer
F&ES 510E	Introduction to Statistics: Environmental Sciences	Jonathan Reuning-Scherer
F&ES 515	Physical Sciences for Environmental Management	Shimon Anisfeld
STAT 101, 102, 103, 105, 109	Introduction to Statistics	Jonathan Reuning-Scherer
Management		
ECON 363/ LAW 20515/ MGT 890	Global Financial Crisis	Timothy Geithner, Andrew Metrick
MGMT 700	Accounting Research Seminar	Rick Antle, Shyam Sunder

MGT 401	Managing Groups & Teams	Victoria Brescoll, Heidi Brooks, Michael Kraus, Amy Wrzesniewski
MGT 401E	Managing Groups & Teams (Executive MBA)	Lorenzo Caliendo, Ian Rogan, Kevin Williams, Jidong Zhoui
MGT 402	Basics of Accounting	Kalin Kalev, Thomas Steffen
MGT 402E	Basics of Accounting (Executive MBA)	Kalin Kalev, Ian Rogan
MGT 403	Probability Modeling & Statistics	Constanca Esteves, Jonathan Feinstein, Edward Kaplan, Arthur Swersey
MGT 403E	Probability Modeling & Statistics (Executive MBA)	Constanca Esteves, Ian Rogan, Arthur Swersey
MGT 404	Basics of Economics	Joyee Deb, James Levinsohn, Sharon Oster, Jidong Zhou
MGT 404E	Basics of Economics (Executive MBA)	Lorenzo Caliendo, Ian Rogan, Kevin Williams, Jidong Zhou
MGT 405	Modeling Managerial Decisions	Anjani Jain, Donald Lee, Nathan Novemsky
MGT 405E	Modeling Managerial Decisions (Executive MBA)	Donald Lee, Nathan Novemsky, Ian Rogan
MGT 408	Introduction to Negotiation	Daylian Cain, Barry Nalebuff
MGT 408E	Introduction to Negotiation (Executive MBA)	Daylian Cain, Ian Rogan
MGT 410	Competitor	Judith Chevalier, Joyee Deb
MGT 410E	Competitor (Executive MBA)	Judith Chevalier, Ian Rogan
MGT 411	Customer	Ahmed Khwaja, Vineet Kumar, K. Sudhir
MGT 411E	Customer (Executive MBA)	Ian Rogan, K. Sudhir
MGT 412	Investor	Roger Ibbotson, Tyler Muir, Marina Niessner
MGT 412E	Investor (Executive MBA)	Roger Ibbotson, Ian Rogan
MGT 414	Leadership Fundamentals	Amy Wrzesniewski
MGT 414E	Leadership Fundamentals (Executive MBA)	Ian Rogan, Amy Wrzesniewski
MGT 415	Advanced Leadership	David Bach

MGT 415E	Advanced Leadership (Executive MBA)	David Bach, Ian Rogan
MGT 423	Sourcing & Managing Funds	Geert Rouwenhorst, Jacob Thomas
MGT 699E	Sustainability Colloquium (Executive MBA)	Paul Anastas, Johanna Palacio, Ian Rogan
MGT 876	Operations Strategy	Anjani Jain
Nursing		
NURS 717	Transitions to Professional Practice	Marianne Davies, Judith Kunisch
NURS 757	Primary Care of Adults II	Geraldine Marrocco
NURS 782	At Risk Childbirth: Clinical	Cecilia Jevitt, Erin Morelli, Michelle Telfer
NURS 783	At Risk Childbirth: Theory	Cecilia Jevitt
Public Health		
EMD 518	Principles of Infectious Diseases	Melinda Pettigrew

Appendix C: Final Survey Questions

Section 1: Participant Demographics

1. *What was your primary role in the Canvas sites you used this semester?

- ❍ Student
- ❍ Teaching assistant
- ❍ Instructor
- ❍ Support provider / administrator

2. *What is your main school affiliation?

- ❍ Yale College/GSAS
- ❍ Divinity
- ❍ Engineering
- ❍ Forestry
- ❍ Law
- ❍ Management
- ❍ Medicine
- ❍ Nursing
- ❍ Public Health
- ❍ Other school _____

3. *Which of your courses used Canvas in the fall term?

4. *Have you used Classes*v2? If so, for how long?

- ❍ I have never used Classes*v2
- ❍ 1-2 semesters
- ❍ 2-3 years
- ❍ 4 or more years

Section 2: Evaluating your Canvas Experience

5. *How would you describe Canvas's overall ease of use?

- ❍ Very Difficult
- ❍ Difficult
- ❍ Neutral
- ❍ Easy
- ❍ Very Easy

6. *How long did it take before you felt comfortable with Canvas when first using it?

- ❍ A week or less
- ❍ Several weeks
- ❍ Several months
- ❍ I'm still not comfortable

7. Which aspects of Canvas have been the most challenging to learn or to use?

8a. *How satisfied are you with Canvas's ability to support these specific activities? (Instructors, TAs, Support Providers)

	very dissatisfied	dissatisfied	satisfied	very satisfied	n/a (did not use)
uploading/building a syllabus	❍	❍	❍	❍	❍
building a course calendar	❍	❍	❍	❍	❍
creating a course home page	❍	❍	❍	❍	❍
communicating via announcements or email	❍	❍	❍	❍	❍
uploading & managing files	❍	❍	❍	❍	❍
creating custom pages	❍	❍	❍	❍	❍
creating & managing modules	❍	❍	❍	❍	❍
creating assignments	❍	❍	❍	❍	❍
creating & assigning quizzes	❍	❍	❍	❍	❍
grading assignments	❍	❍	❍	❍	❍
creating discussions	❍	❍	❍	❍	❍
using the grade book	❍	❍	❍	❍	❍
managing student collaborations	❍	❍	❍	❍	❍
monitoring student activity (analytics)	❍	❍	❍	❍	❍

8b. *How satisfied are you with Canvas's ability to support these specific activities? (Students)

	very dissatisfied	dissatisfied	satisfied	very satisfied	n/a (did not use)
accessing the syllabus	❍	❍	❍	❍	❍
using the course calendar	❍	❍	❍	❍	❍
communications via announcements or email	❍	❍	❍	❍	❍
accessing & downloading files	❍	❍	❍	❍	❍
navigating course modules	❍	❍	❍	❍	❍
submitting assignments	❍	❍	❍	❍	❍
taking quizzes	❍	❍	❍	❍	❍
participating in discussions	❍	❍	❍	❍	❍
accessing grades	❍	❍	❍	❍	❍
peer collaborations	❍	❍	❍	❍	❍

9. Did you use any non-Canvas online tools to support your pilot course? If so, what were they and why did you choose to use them? (Instructors, TAs)

10. If Canvas is selected to replace Classes*v2, we'll ensure that it has a Photo Roster tool and that syllabi are integrated with the Registrar's Online Course Information system. Are there other critical functions you'd want to see introduced during a campus-wide rollout of Canvas? (Instructors, TAs, Support Providers)

11. *How well does Canvas meet your general expectations?

- ❍ Does not meet my general expectations
- ❍ Meets my general expectations
- ❍ Exceeds my general expectations

11a. Where in particular does Canvas fall short in meeting your expectations? (if previous answer was "Does not meet my general expectations")

12. Which platform would you prefer to use for your on-campus courses? (if respondent indicated use of Classes*v2 in Question 4)

- ❍ Classes*v2
- ❍ Canvas

Section 3: Support and training

13. Please tell us a bit about your experience with Canvas support resources.

	very dissatisfied	dissatisfied	satisfied	very satisfied	did not use	if you were not satisfied, please explain why
Live Canvas support (phone or chat)	❍	❍	❍	❍	❍	
Support from Yale staff	❍	❍	❍	❍	❍	
Online help materials	❍	❍	❍	❍	❍	

14. What type of support would you be most inclined to use if you had a question about using Canvas?

15. Which of the following types of Canvas training would you find useful?

- ❑ In-person training sessions and workshops
- ❑ Live online webinars on using Canvas
- ❑ Departmental training sessions
- ❑ Walk-in sessions and scheduled Canvas office hours
- ❑ Self-paced online course on using Canvas
- ❑ Video tutorials on common course activities
- ❑ Roundtable sharing sessions for instructors
- ❑ Other (please describe) _____

16. If you have any additional thoughts to share about Canvas, please use the text space below.

17. Please share your email address below if you are willing to have a follow-up conversation about Canvas.

Appendix D: Gap Analysis Details

The chart below indicates the tools and functionality that have been identified as important to Classes*v2 course sites but not currently available in Canvas. Preliminary priority levels have been included, although further analysis of usage levels in Classes*v2 will be required to establish an accurate ranking of functional gap priorities.

Items shaded orange are mission-critical gaps that must be addressed before a full-scale migration could begin.

Priority	Tool / Functionality in Classes*v2	Tool/Functionality in Canvas	Description of Gap in Canvas
1	Announcements	Announcements	Unable to send announcements to specific sections and/or groups
			Unable to set open/close dates for announcements
			Unable to create public announcements.
			Unable to attach more than one file to announcement
1	Course Reserves	Course Reserves	None – LTI Integration available for Ares tool in both systems
1	Feedback	Quizzes?	Survey submissions in Canvas are not truly anonymous – results can be mapped back to the user that submitted them. Anonymous quizzing is slated for release in Canvas in spring/summer 2016
1	Media Gallery	(Upload to Canvas Files)	Classes*v2 hosts media files externally in Kaltura. Yale is evaluating alternative media host services
1	Messages	Conversations/Inbox	Recipient List: No CC/BCC functionality; cannot send copy of message to users' external email addresses
			Unable to preview/save draft
			Does not have WYSIWYG editor
			Cannot broadcast messages to all course participants from authorized external email address (listserv function)
1	NetID Login	Accounts	NetID accounts must first be set up within Canvas before users can access the system. In Classes*v2, no local accounts are required for NetID access
1	Resources	Files	No WebDAV functionality for drag-and-drop downloading of files
			Unable to release files to specific sections/groups
			Unable to set open/close dates for files
			Unable to post links directly
			Difficulty to keep files in custom order (Canvas has only alphabetical sort)
1	Roster/Site Info	People	No Photo Roster
			Missing extra fields for Email, College, Major, and Year
			No downloadable version of roster
1	Syllabus	Syllabus	Syllabus tool is not linked to OCI
			Unable to send email notifications when changes are made
			Unable to preview/save draft

2	Umbrella Sites	(none)	Unable to reuse rosters in multiple course sites (for those courses that use both the umbrella site and the section sites)
2	Assignments	Assignments	Unable to add honor pledge to assignments
			Unable to have an assignment that is not tracked in the Gradebook.
			Unable to associate an assignment to an existing Gradebook entry
			Unable to preview/save draft (when creating or submitting assignments)
			Cannot submit text in languages from right to left (e.g., Arabic and Hebrew)
2	Drop Box	(none)	Workaround: using Assignments for private file sharing between instructors and students
2	Schedule	Calendar/Scheduler	~~Unable to set up recurring/repeating events~~: this functionality was added during the pilot for course calendars (not personal calendars)
			Unable to import calendar events from other calendar tools (Outlook, Meeting Maker, CSV, etc.)
2	Section Awareness	Sections	The following tools cannot be used with individual sections - Announcements - Files (file sharing) - Modules - Pages
2	Sign Up	Calendar/Scheduler	Unable to track attendance at events
			Unable to target email notifications to specific users/coordinators
			No wait list option
			No advanced reminder notifications
3	Chat	Conferences	Cannot create a conference that becomes visible at a later date.
3	Forums	Discussions	Unable to customize the display order of topics Limited functionality for modifying/moving/copying topics Unable to customize role permissions on individual topics Unable to send notifications to those who “watch” a topic
3	Gradebook	Grades	Cannot create a generic column within the gradebook. All columns must link to an assignment/test
3	Group Awareness	Groups	Group communications and interactions are contained in a “group site” which is outside of the main course space.
3	Home/Site Info	Course Home	No integration with Online Course Information
3	Post’Em	(none)	Cannot upload a .csv file containing grades or comments to be shared privately with individual students. (Indiana University has created a standalone tool for this purpose, but is not yet certain whether it will be shared with the Canvas community)
3	Tests & Quizzes	Quizzes	(Due to a planned fall 2016 release of a revised quizzing tool, gaps will be evaluated at a later date)