LMS RFP Findings

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Introduction

Request for proposals (RFP) #2196-20 were solicited February 2, 2020 to replace UNM's Learning Management System (LMS), a self-hosted, on-premises instance of Blackboard Learn (branded UNM Learn). This RFP is a response to both changing needs within the institution and an evolving marketplace that is moving away from self-hosted LMS systems like the one that UNM hosts today.

The current LMS was in heavy use pre-COVID-19, and UNM's reliance on a system for remote instruction has only grown since the onset of the pandemic. As a result of the pandemic and the shift to Remote Instruction, the LMS saw a 20% increase in the number of instructors using the system and a 59% increase in maximum concurrent users each day. Some of this surge in usage is likely to persist, with more faculty using skills and technologies for remote teaching to supplement classroom instruction going forward. Not only must an LMS meet UNM's current needs, but must be flexible, modern, with a very low barrier to entry to accommodate the changes that will appear in the education landscape once social distancing and other pandemic concerns have receded into the background.

Responding vendors were asked to:

- Propose a cloud-based Learning Management System.
- Have at least 5 years' experience delivering enterprise level, campus-wide solutions to large institutions categorized by the Carnegie Commission of Higher Education as Research 1: Doctoral Universities with Very High Research Activity.
- include all 5 campuses in a single instance, which matches the current state.
- Integrate with UNM's Banner system.
- Provide a system that can effectively support UNM teaching and learning activities with an interface that is intuitive, easy to use, and makes efficient use of faculty and student time.

Four vendors responded to the RFP. The core scoring team evaluated the responses and identified three finalist systems, which were then evaluated by members from UNM's faculty, student, and staff communities. The scoring team was small, but over 500 evaluators signed up to review the systems. Every evaluator was required to sign a confidentiality agreement in order to participate, and were given access to the systems under review, including fully developed sample courses (both

students and faculty) and sandboxes to test course development (faculty). Multiple demos, orientations, and office hours were scheduled so any questions evaluators had about the systems could be addressed. Those presentations were recorded and made available for anyone who missed them. Task-based and post-demo survey responses were solicited from the evaluators to gauge ease of use from both the student and faculty perspectives.

In accordance with the criteria established for the procurement, the committee recommends awarding the contract to Instructure Inc., whose product Canvas was consistently rated as the top candidate by both the scoring team and the larger evaluation community.

Below is a brief timeline of the work initiated in support of the RFP process:

- **November 2019:** As part of the early discovery process, major LMS vendors were invited to present their platforms to faculty, instructional designers, and LMS administrators.
    - Invited groups included: Faculty Senate IT Use Committee, Online Course Advisory Council, Faculty Senate Teaching Enhancement Committee, Academic Technologies Advisory Board, and members of from the Provost Taskforce on Redesigning the University.
    - Attendees were surveyed at the end of each presentation to help develop themes for the RFP evaluation.
- **February 2020:** RFP was issued by UNM Procurement
    - A collaborative team comprising representatives from the Faculty Senate IT Use Committee, the Center for Digital Learning, UNM Online, and UNM IT developed the RFP questions and evaluation criteria.
- **July 2020:** RFP scoring committee completed evaluations to determine semi-finalists. Three semi-finalist systems were identified: Blackboard, Brightspace, and Canvas.
- **September 2020:** Academic Technologies worked closely with semi-finalists to configure multiple sandbox environments appropriate for instructors and students. Invitations were issued to the campus community to participate in the evaluation process.
- **October-November 2020:** students, instructors, and staff were invited to explore the sandbox environments, provide structured feedback, and attend virtual sessions held by all semi-finalists.
    - Access to the sandbox environments and feedback surveys closed on November 6th.
- **November-December 2020:** scoring committee analyzed feedback from instructors, students, and staff.

More detail on the feedback methods and results can be found in the remainder of this report.

Project Rationale

UNM currently maintains a self-hosted, on-premises version of Blackboard Learn (branded UNM Learn). Blackboard has stated their future direction is a cloud-only environment that includes both Blackboard Original (our current interface) and Ultra (a more modern, redesigned interface). In fact, Blackboard has recently announced an end-of-life date (end of 2023) for the self-hosted Learn software that UNM uses. Therefore, UNM faces an inevitable migration to a cloud environment with either Blackboard or another LMS vendor, with associated increases in licensing and hosting fees.

In Fall 2018, a Provost Taskforce on Redesigning the University produced a set of recommendations to improve UNM including a recommendation to re-evaluate our Academic Learning Management System (LMS) needs. In particular, the committee recommended that the University seek a more intuitive system that simplifies faculty workflows and promotes student engagement and learning. Concurrently, the Academic Technology Advisory Board also recommended that Academic Technologies re-evaluate our LMS needs, and the Faculty Senate IT Use Committee has supported these efforts.

We can see that most development and innovation in the LMS space is headed strongly toward cloud-only solutions. These more modern solutions provide a means for limiting downtime, add flexibility for scaling, make the most effective use of university resources, and promote quicker and more consistent innovation in the LMS platform.

Project Objectives

Engage faculty, students, and campus leaders to evaluate options in the current LMS market, and identify the best LMS to meet UNM learning, teaching, and infrastructure needs.

The solution should be:

- Engaging for a diverse body of learners
- Intuitive and make efficient use of student and faculty time
- Accessible for a diverse body of learners and across a variety of devices

LMS Background

Thanks to forward looking leadership from Debby Knotts and others, UNM was an early innovator in the online teaching and learning space (First online class taught at UNM in 1997), and an early adopter of LMS solutions (first LMS at UNM in 1999). With the UNM Banner implementation project in 2005, UNM took the opportunity to also move to the enterprise version of its LMS and signed a perpetual license agreement for WebCT Vista. During implementation, Blackboard, Inc. acquired the WebCT company, and agreed to honor the perpetual license for the software that UNM had purchased. While UNM continued to pay maintenance fees for support, the perpetual license agreement with Blackboard saved UNM millions of dollars in licensing over the last 15 years.

A statewide initiative called IDEAL-NM signed an agreement with Blackboard in 2008 to provide a consolidated solution for K-12, Higher Education, and Workforce development. Under the proposal, Higher Education customers could use the Vista product while K-12 districts would use the Blackboard Academic Suite. In theory, students would be able to seamlessly move between the systems. Since UNM already had a perpetual license, UNM provided support and advice for the IDEAL-NM project but did not migrate to the system.

By 2011, it was clear that Blackboard's future direction was more aligned with its Blackboard Learn product than the WebCT code base, and UNM was faced with the decision to either issue an LMS RFP or migrate to the Blackboard Learn product under the existing perpetual license. With no funds available for a new system at the time, UNM chose the latter, completing the migration to Blackboard Learn 9.1 in 2012 (Branded as UNM Learn). As Blackboard continued to consolidate its code base and compete with vendors who offered cloud-native solutions such as Canvas by Instructure and Brightspace by D2L, it has been shifting to a cloud-hosted strategy as well. With the announcement that Blackboard is dropping

support for self-hosted systems in 2023, UNM has the choice of either moving to a cloud solution from one of the leading vendors, or an open source one.

Many institutions have already made this choice, and Blackboard reports that UNM is one of its few remaining self-hosted customers, with most schools having already moved to the hosted version or selected a different system. While most of Higher Ed in NM was formerly on a Blackboard system, that uniformity has splintered.

LMS Peer Review

Within the state of New Mexico, higher education schools have chosen a variety of systems: New Mexico State was an early adopter of Canvas, many other schools that have followed its lead, some institutions that stayed on Blackboard, and CNM is a recent adopter of Brightspace. New Mexico PED recently selected Canvas as the statewide system for K-12, but not all schools have fully transitioned over.

Sampling of NM Schools and LMS provider

Institution	**LMS**
Central New Mexico	Brightspace
University of New Mexico	Blackboard, Brightspace for MD program
New Mexico State University	Canvas
New Mexico Highlands University	Brightspace
New Mexico Tech	Canvas
Eastern New Mexico University	Blackboard
Doña Ana Community College	Canvas
Western New Mexico University	Canvas
Santa Fe Community College	Canvas
Northern New Mexico College	Blackboard
San Juan College	Canvas
Mesalands Community College	Moodle
Public Education Department	Canvas

Many of UNM's Peer institutions were also on the Vista LMS system prior to Blackboard's acquisition and subsequent end-of-life. A survey of those institutions in 2021 reveals that a majority of them are using the Canvas system.

UNM Peer institutions as defined by NM HED

Institution	**LMS**
Arizona State University	Canvas
Florida International University	Canvas
New Mexico State University-Main Campus	Canvas
Oklahoma State University-Main Campus	Canvas
Texas A & M University-College Station	Canvas
Texas Tech University	Blackboard
The University of Tennessee	Canvas

The University of Texas at Arlington	Canvas
The University of Texas at Austin	Canvas
The University of Texas at El Paso	Blackboard
University of Arizona	Brightspace
University of California-Riverside	Canvas
University of Colorado-Boulder	Canvas
University of Colorado Denver	Canvas
University of Houston	Blackboard
University of Iowa	Canvas
University of Kansas	Blackboard
University of Missouri-Columbia	Canvas
University of Nebraska-Lincoln	Canvas
University of Nevada-Las Vegas	Canvas
University of Oklahoma-Norman Campus	Canvas
University of Utah	Canvas

Future of the LMS

From small beginnings, the Learning Management System has become a central piece of technology in the teaching and learning mission of the university, and facilitates distribution of course content and materials, assignment submissions, assessment delivery, communication, and grading. Just as importantly, the Learning Management System serves as a hub for related tools and content providers that extend its functionality for video, proctoring, web conferencing, publisher content, etc. These integrations provide faculty and students with a secure and private environment to collaborate, engage in course content, and submit work.

Early competition between LMS providers was characterized by a race to add more features and configuration flexibility to systems. In many ways, the core functions of the LMS have settled over the years, and the expectations and evaluations of these systems now tends to focus much more on ease-of-use, and in some cases bundled services that LMS providers can add to provide additional value. Some examples of these additional products or services include student services and recruitment outsourcing, analytics, accessibility checkers, plagiarism detection systems, student portfolios, or web conferencing systems.

If the core LMS functions have become commodity offerings over the years, the core utility of the services they offer has only gained importance. This has been especially true during the pandemic, and selection of reliable LMS that can scale, is easy to support and use, and can be extended through integrations with other systems is central to UNM's academic mission.

Gathering Methods

The goals of this RFP are broad and the results impact much of the University's central mission. In response, the gathering methods needed to be just as ambitious and wide-reaching despite the challenges presented by the COVID-19 health crisis.

After taking recommendations from both the Provost's Committee on University Redesign report and the IT Advisory board, a team from Academic Technologies and the Center for Teaching and Learning also engaged the Faculty Senate IT Use Committee (FSITUC) for advice on the scoring committee's composition as well as the content of the RFP itself. The FSITUC reviewed the instructional questions in the RFP and a representative group from that committee—including representatives from HSC, branch campuses, UNM Law, and main campus—was invited to contribute to the case studies included in the RFP. The FSITUC also advised on the types of feedback instruments that would be useful as well as the process of providing vendors with sample UNM courses to use in demonstrating course migration.

The final RFP contained 304 questions and included 20 case studies (AKA use cases). Below are the primary sections of the RFP, totaling 135 possible points.

1. Vendor Background (10 Points)
2. Cost (15 Points)
3. Functional (30 Points)
    a. General
    b. Assessments
    c. Gradebook
    d. Badging/Credentialing
    e. Social Learning/Collaboration
    f. Communication
    g. Calendar
    h. Core/3rd-Party Compatibility with Desktop, Mobile Browsers, and Mobile App
    i. User Identity Management and Person Profile
    j. Institutional Content and Shared Templates
    k. Data/Course Export/Import
4. Administration (10 Points)
    a. General
    b. Course Management
    c. Enrollment Management
    d. Customization and Branding
    e. Roles and Permissions
    f. Tool/Feature Settings
5. Integrations (10 Points)
    a. 3rd-Party Applications
    b. Student Information System
6. Hosting/Performance (10 Points)
    a. Environments
    b. System Releases: Maintenance and Upgrades
    c. Performance
    d. Data/Storage
7. Implementation (5 Points)
8. Reporting/Analytics (5 Points)
9. Support (10 Points)
10. Training (5 Points)

11. Compliance (20 Points)
12. People/Planet (5 Points)

The RFP was opened on February 5, 2020 and responses were due from vendors on April 13, 2020. The RFP scoring committee itself was kept small at the advice of UNM procurement to ensure that scoring of the initial responses could take place in a timely fashion. The committee included:

- Jennifer Laws (Faculty, UNM School of Law, Faculty Senate IT Use Committee)
- Julia Mummert (College of Nursing)
- Jon Bocock (Academic Technologies)
- Lisa Yuka (Academic Technologies)
- Stephanie Spong (Center for Teaching and Learning)

The team completed scoring for four vendors at the end of July, and their feedback determined the three finalist vendors that would be invited to UNM for demos and meetings with the University community.

With the finalists established, the next step was to allow students, instructors, and support staff to interact with demo versions of these solutions in order to provide thorough feedback. Academic Technologies worked closely with UNM Procurement to develop a method by which interested participants could sign up to be a part of the feedback process and consent to the necessary non-disclosure agreement. Invitations to this process were announced through the UNM News Minute, Learn announcement, Office of the Provost Academic Dispatch (All University list), All Faculty list, All Staff list, Learn Instructor list, HSC Communications list, Faculty Senate list, Advisors list, Research PI list, Staff Council Weekly Message, ASUNM, GPSA, Academic Technologies Advisory Board, Faculty Senate IT Use Committee, Academic Operations Officers, Deans, Department Chairs, Departmental Administrators, IT Officers, and contacts in individual main, Health Sciences Center, and branch departments.

Interested participants were then added to a Microsoft Teams space that became the central portal for the schedule of feedback opportunities and events, informal conversation among participants, and questions that arose while participants worked with the vendor solutions. A total of 523 Lobos signed up to be part of the process, including 118 students, 298 instructors, and 107 staff. From this group, 91 participants were affiliated with the Health Sciences Center. Academic Technologies began enrolling participants in the MS Teams space on September 25, 2020 and the space remained open until November 6, 2020.

Through the MS Teams space, participants had access to:

- Instructions for accessing the sample and sandbox courses in each system
- Weekly Office Hours with each vendor
- Student-focused demonstrations on solution functionality
- Instructor-focused demonstrations on solution functionality and course migration
- Academic Technologies and Center for Teaching and Learning staff to answer real-time questions about the vendor solutions and implementation plans
- Questionnaire to pose questions directly to the vendors. Results were posted as vendors responded.

- Recordings of office hours and demo presentations
- Access to feedback surveys

Additional meetings with the vendors were set specifically for technical teams, instructional designers, and University leaders working across the technology ecosystem at UNM.

Feedback and Analysis

The scoring committee, supported by Academic Technologies and Center for Teaching and Learning, used feedback instruments targeted to each constituent group that provided both qualitative and quantitative data for analysis. The following three instruments were adapted to provide feedback from instructors, students, or support staff.

- **Task-based Surveys** provided a list of common tasks and asked the participant to rate how easy or intuitive it was to complete the task.
- After vendor presentations, **Demo Surveys** were distributed to users to determine how positively or negatively they felt about the vendor's solution and its ability to support teaching and learning at UNM.
- **Cognitive Interviews**, or user studies, recorded a participant as they completed a list of common tasks in an LMS, and two notetakers documented the participants' comments and affective responses to the solutions.

The surveys used a three-point scale to help participants identify their comfort level and ease of use with each vendor solution. The survey instruments can be found in Appendix 1. For all surveys, the evaluation team tested the hypothesis that the distribution of scores for the LMSs were not the same. We used a nonparametric Kruskal-Wallace test to compare distributions of all three LMS candidates. For those elements found to have differences between the LMSs, the differences were calculated using Tukey pairwise comparisons (alpha=0.10).

Student Feedback and Analysis

For each of the three vendors, students were provided a Task-based Survey with ten tasks. The student survey was made available in the MS Teams space on September 30, 2020 and closed on November 6, 2020 at 5:00 PM. There were 34 responses: 9 completed the survey using Blackboard, 11 using Brightspace, and 14 using Canvas. Regardless of the LMS they chose, students were asked to complete the tasks and rate them based on the following three criteria:

- This action was easy and intuitive to complete (2)
- It took some effort to figure out how to do this (1)
- It was difficult or I could not find where to do this, even after reading documentation (0)

The criteria were chosen to help the evaluation committee understand how intuitive the user interface was for students to navigate, find and submit various assessments, use communication tools, use the mobile app, check grades, etc. We'd like an interface that students can navigate easily without looking up any documentation, as that would be an unwanted hurdle to online learning and student success in the new learning management system.

Figure 1 illustrates the distribution of responses for each LMS vendor. While Blackboard and Brightspace both received a majority of 2s in individual evaluations, they also received greater numbers of 0s and 1s than Canvas. Canvas received the greatest number of 2s and the least number of 1s and 0s.

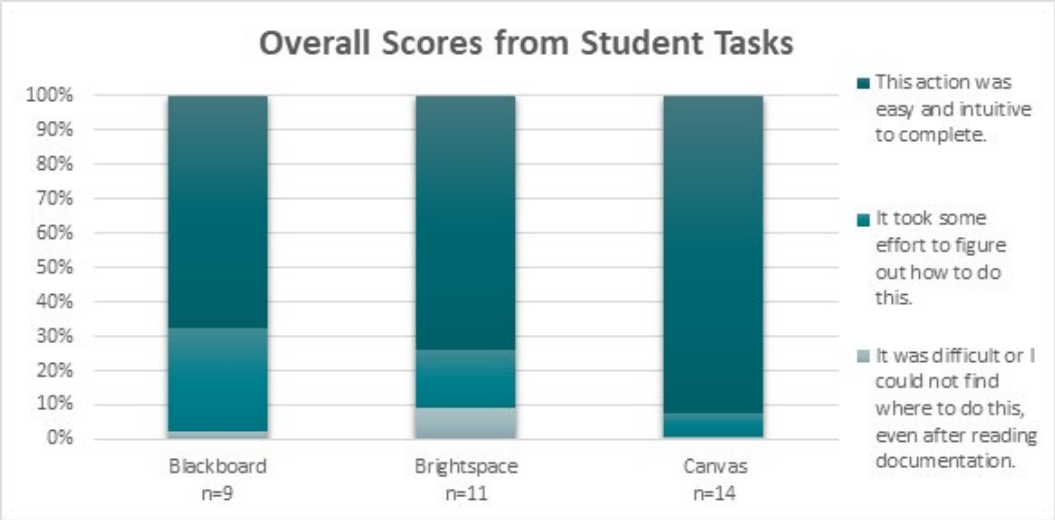

Figure 1

When the mean scores were analyzed for significance (Figure 2), Blackboard and Brightspace scores did not show a significant difference. The Canvas mean scores, however, were significantly greater than either Blackboard or Brightspace. A table of the mean scores can be found in Appendix 2.

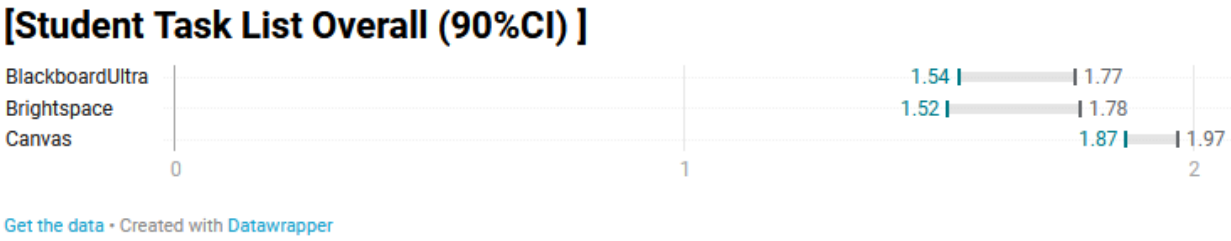

Figure 2

Overall, students were more likely to rate the tasks they completed in Canvas as "This action was easy and intuitive to complete" than they were in either Blackboard or Brightspace. Below are the general comments students shared about their experience.

Vendor	Positive	Neutral	Negative
Blackboard (Ultra Experience)	• Anything we move to will be an improvement (2) • This LMS is not bad, This is an improvement over the current Learn but nothing special.		• It feels clunky.

Brightspace	• My first LMS to check and I LOVE it, More featureful than Canvas		• I do not feel this is a sufficient upgrade over UNM Learn, not intuitive and would take time to figure out, • Layout was not spaced well (3), requires more clicks than necessary (2), un-interesting and un-customizable
Canvas	• Really like this system (4), Better than Blackboard (2), Everything was incredibly intuitive and beautifully designed, I liked this LMS the best out of the three (2). I think it is easy to use and has a great layout. Well-organized and modern • I have used Canvas at a previous college and had a good experience (2)	• Compared to Brightspace, it was much easier to use and didn't feel as constrained, I felt like I enjoyed Brightspace more but I'll revisit that and see.	• I have a very small computer and so the online page was VERY squished and seemed cluttered.

Instructor Feedback and Analysis

Instructors could provide feedback in three ways: Task-Based surveys, Cognitive Interviews, and Demo Surveys. Across all three feedback instruments we received 124 responses.

Task-based Surveys

Instructors were asked to complete a Task-based Survey for four different vendor solutions: Blackboard Original, Blackboard Ultra, Brightspace, and Canvas. Although we are working with three vendors, the evaluation team determined that Blackboard Original and Blackboard Ultra have different enough workflows for instructors to necessitate two different Task-based surveys. The tasks and criteria for the survey were determined in collaboration with representatives from the Faculty Senate IT Use Committee and UNM Health Sciences. The surveys were made available in the MS Teams space on September 30, 2020 and closed on November 6, 2020 at 5:00 PM. There was a total of 75 responses: 10 Blackboard Original responses, 17 Blackboard Ultra responses, 23 Brightspace responses, and 25 Canvas responses. Regardless of the vendor, instructors were asked to complete the same 27 tasks and rate them based on the following three criteria:

- This action was easy and intuitive to complete (2)

- I could complete the action once I saw the documentation or watched a tutorial (1)
- This action was not intuitive, or the documentation was difficult to find or use, or both (0)

The criteria were chosen to help the evaluation committee understand not only how intuitive a workflow is on its own, but how well-developed or seamless the vendors' support resources are. As UNM moves to a cloud-hosted solution, changes will be rolled out continuously. This is similar to how we experience common tools like Amazon, O365 Online, or tools in Google Suite. These updates either need to be so intuitive that an average user doesn't need to access any support documentation, or the support documentation needs to be robust, up-to-date, and seamlessly integrated in the user experience.

Figure 3 provides a breakdown of the scores for each instructor Task-based Survey. Blackboard Original and Blackboard Ultra received a majority of 0s and 1s. Brightspace and Canvas both received a majority of 1s and 2s, but (like the student Task-based survey) Canvas received the greatest number of 2s and the least number of 1s and 0s.

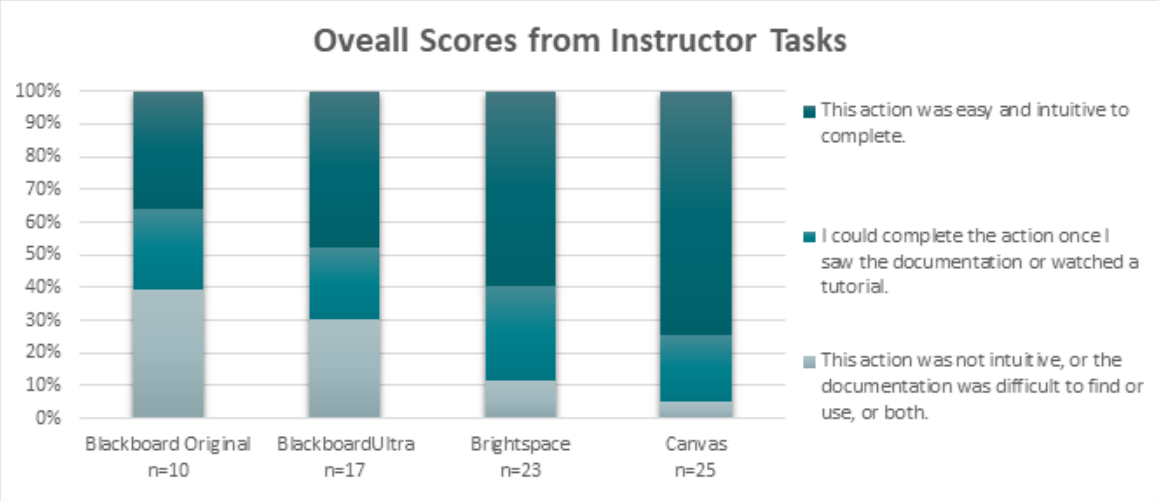

Figure 3

When the mean scores were analyzed for significance (Figure 4), Blackboard Original and Blackboard Ultra did not show a significant difference. While Brightspace mean scores were significantly greater than either Blackboard solution, Canvas mean scores were significantly greater than all three of the other solutions. A table of the mean scores can be found in Appendix 3. Figure 4, below, illustrates the distribution of mean scores.

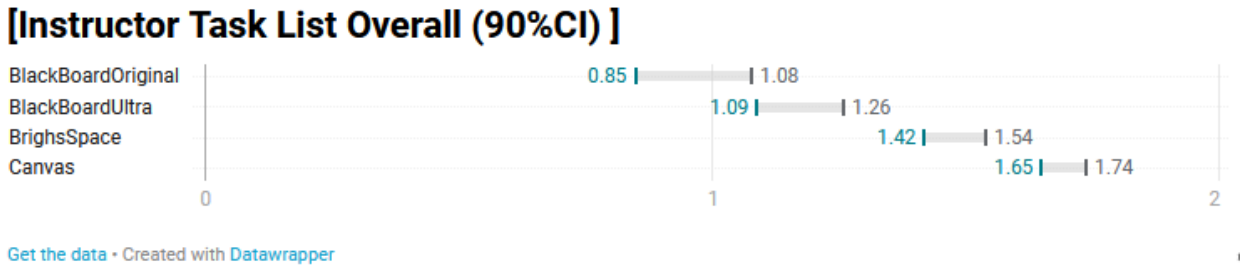

Figure 4

Cognitive Interviews

Interested instructors could sign up to complete the 27 tasks outlined in the Task-based Survey as part of a Cognitive Interview, or user study. During these cognitive interviews, each participating instructor was randomly assigned to one of the three vendors and asked to share their thoughts as they moved through the list of tasks. Interviews were scheduled for 90 minutes; an interviewer guided the participant through the tasks, a notetaker documented instructor responses and facility with the task, and a second notetaker repeated this documentation with the interview recording.

Cognitive interviews provided specific information on why an action might be difficult, or how instructors were navigating through the vendor systems. They help to provide greater context to what instructors may have experienced but not reported during the Task-based surveys. They also reveal common sticking points that instructors may not recognize to self-report. The complete interview protocol for the Cognitive Interviews can be found in Appendix 4.

We scheduled 13 Cognitive Interviews with instructors, and 12 produced information for the following analysis. One participant did opt out of continuing with the cognitive interview once it began. Four participants completed their interview using Blackboard (either Ultra or Original), five participants completed using Brightspace, and three completed using Canvas. Participants in the cognitive interviews included instructors across contract status (including graduate students), experienced and inexperienced LMS users, and represented seven UNM colleges and schools (College of Nursing, School of Education, Anderson School of Management, Arts and Sciences, School of Engineering, College of University Libraries and Learning Sciences, and Valencia Branch Campus).

A number of common themes arose across these interviews and the following table breaks down the themes as well as their frequency. Frequency is shown below to give readers a sense of the density of commentary on the theme and should not be interpreted as a tabulation of votes.

Vendor	Likes	Dislikes
Blackboard (4 Users)	Common themes: • tool, task, or workflow is perceived as easy or intuitive (5) • tool or task is perceived as cool/fun/novel (3) Unique themes: • "I know how to do this" (33) • "I think it just might take some time really going through everything" (3 mentions, 1 user)	Common themes: • Something does work the way the user expected (27) • something is missing or functions in a substandard way (4) Less common themes: • negative references to instructions or tutorials (4) • "frustrating" (4) Unique themes: • something doesn't work like the current version of Blackboard (2)

Brightspace (5 Users)	Common themes: • tool, task or workflow is perceived as easy or intuitive (18) • tool or task is perceived as cool/fun/novel (11) Unique themes: • Pleasant or welcoming look and feel (2)	Common themes: • Something doesn't work the way the user expected (15) • something is missing or functions in a substandard way (6) Less common themes: • user is unclear what they are doing or how their actions are affecting a change in the course (8) • negative references to instructions or tutorials (11) • "frustrating" (1)
Canvas (3 Users)	Common themes: • tool, task, or workflow is perceived as easy or intuitive (18) • tool or task is perceived as cool/fun/novel (17) Unique themes: • "Given a little more time and the available directions, I could figure this out" (3 participants) • positive mentions and/or use of directions and tutorials (6) • safety nets, or a feature that works automatically to save time, energy, or cognitive load (4)	Common themes: • something doesn't work the way the user expected it to (16) • Something is missing or functions in a substandard way (3) Less common themes: • user is unclear what they are doing or how their actions are affecting a change in the course (9)

The "common" likes and dislikes detailed above can be interpreted as expected responses to a new system. There will be features and tools that seem interesting or garner excitement, or the newness of those features and tools might make users miss the familiarity of a system they already know well. It's not surprising that some of the positive comments for Blackboard focus on familiarity while some of the negative comments for both Brightspace and Canvas focus on a lack of familiarity (and, by extension, some negative comments about Blackboard were based on it not looking like the version participants currently use).

For our analysis, the "less common" and "unique" themes provided the greatest insight for users' experiences. For Blackboard, at least one user had confidence that they could learn this new solution "after really going through everything." It's possible that the users' current familiarity with Blackboard helps them imagine reaching the same level of facility with the newer version. For Brightspace, users mentioned a welcoming look and feel—something that we hope to create in any online learning space. For Brightspace and Blackboard, users also had negative experiences with help resources and were quoted as feeling "frustrated" by the system.

Notably, Canvas was the only solution where users were not quoted as feeling “frustrated,” and the only solution with positive references to help resources. These observations lend context to the preference shown within the Task-based surveys for Canvas. Despite Canvas being a new system to users, they are still more likely to find it “easy and intuitive.”

Demo Surveys

Each vendor was invited to provide a demo of their proposed solutions to instructors. Demos included information on product functionality, migration, and a walkthrough of a UNM course that the vendor had migrated and built out in their solution. The RFP project team met with each vendor ahead of time to help them prepare for these presentations and to ensure that the demonstrations were aligned with UNM goals.

At the close of the demo, instructors were provided with a survey that included four Likert scale questions and two open-ended questions. Instructors were also able to leave clarifying comments after all the Likert scale questions.

There were a total of 36 responses for these surveys: 11 Blackboard, 13 Brightspace, and 12 Canvas. Figure 5 illustrates the breakdown of responses to the Likert scale questions.

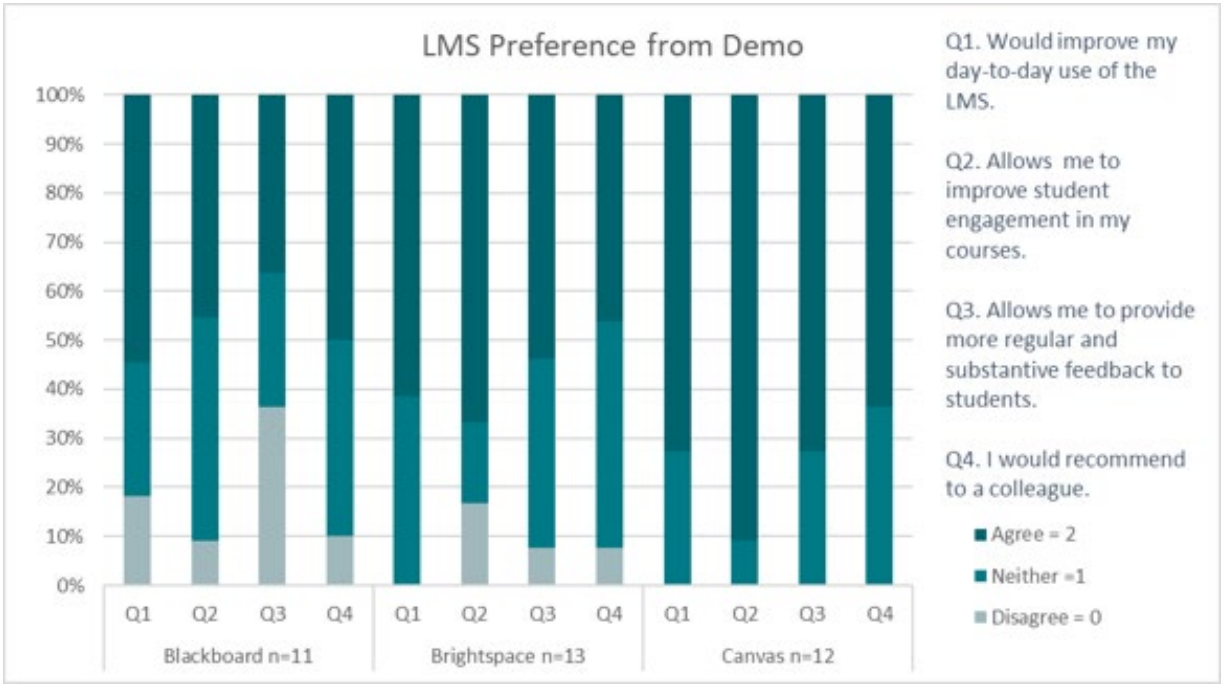

Figure 5

Below (Figure 6) is the distribution of mean scores from the Likert scale questions. While there were no significant differences in means, similar to previous feedback mechanisms, Canvas received a greater number of 2s and 1s across all four questions.

Figure 6

Comments from the demo surveys also aligned with the preferences demonstrated in the Likert questions.

Vendor	Positive Comments	Negative Comments
Blackboard (including Ultra)	• More capabilities than current (2) • More student-oriented • Varied opportunities for communication would help student achievement.	• Not enough improvement over Original (3), Concerned UNM will choose Blackboard because it is the current LMS • Not user friendly for either student or faculty, UI is not user friendly (2), Too text oriented and needs more visuals • Presentation was rushed with too much detail and not very impressive • Struck by the number of items planned but not functional yet
Brightspace	• More user friendly (4) • Easy to use & setup • More functional than Blackboard • Setup was easier than in Canvas	• Not very flexible (2), Not very user friendly/too complicated (3) • Don't see much improvement over Blackboard • Seemed they were trying to catch up to other LMSs
Canvas	• Best of the three candidates (3) • Easy to use and learn structure for faculty and students (2), • More functional than Blackboard (3) • Sophisticated, powerful, and modern • Easier for students to find what they need, Student-oriented design	• Had a hard time figuring out how things worked, Tutorials were popping up at every step which was a little irritating but good to see that help was right there if I needed it. • I have some concerns about putting everything into the format they have but it

	• Ideal system for UNM because NM public schools are moving to this platform and will be familiar (2)	seems to be a common theme with all the LMSs, • If this LMS is linked with Blackboard collaborate and Kaltura so that lectures can be viewed synchronously or at a later time then it will be a good solution

Below are additional comments that respond more specifically to the tools instructors observed in each vendor demonstration.

Vendor	Positive Comments	Negative Comments
Blackboard (Including Ultra)		• Easiest tools to prevent student cheating on assessments (prevent backtracking of answered questions) is now gone • Blackboard can't seem to figure out how to delay sending an email with a delayed announcement, Feedback to students did not seem to be clear or direct • BB Annotate is a concern and difficult in the current system
Brightspace	• Monitoring tool looked attractive (2) • I like the video discussion board option • Much easier to contact students, Providing feedback was a lot easier than Blackboard • I like the grade book overview and ability to see the whole grade book and edit it	• Needs ability to conduct synchronous lectures with recording capability for asynchronous • How do we use existing videos we have created? • Personally, don't like badges but could see the benefit in particular circumstances
Canvas	• They can use their mobile devices (4) • Course migration looked easy (2) • I liked the tools demonstrated for feedback (2) • Looked easy to adjust due dates when moving class material • Video tool would be useful	

Support Teams Feedback and Analysis

Instructional designers from both the Center for Teaching and Learning and the College of Nursing were invited to provide feedback through separate Task-based surveys geared toward their respective work.

The Task-based Survey for instructional designers comprised 127 separate tasks with the options to provide comments after each question. Designers were asked to rate the ease of the task based on the same criteria used for the instructors' Task-based Survey. Figure 7 illustrates the total distribution of scores for the tasks.

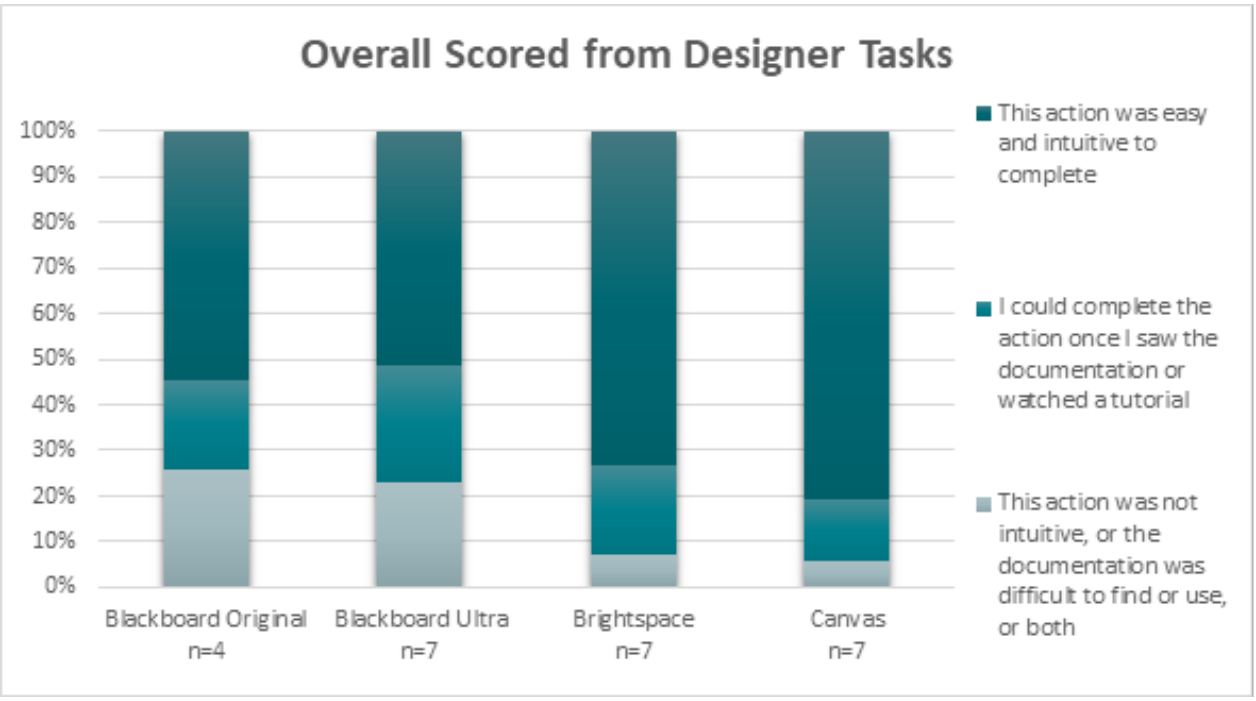

Figure 7

Similar to both the student and instructor responses, both Blackboard solutions received the greatest number of 0s and 1s, Brightspace received a greater number of 2s, and Canvas received the greatest number of 2s and the least number of 0s and 1s.

When the mean scores were analyzed for significance (Figure 8), Blackboard Original and Blackboard Ultra did not show a significant difference. While Brightspace mean scores were significantly greater than either Blackboard solution, Canvas mean scores were significantly greater than all three of the other solutions. A table of the mean scores can be found in Appendix 5. Figure 8, below, illustrates the distribution of mean scores.

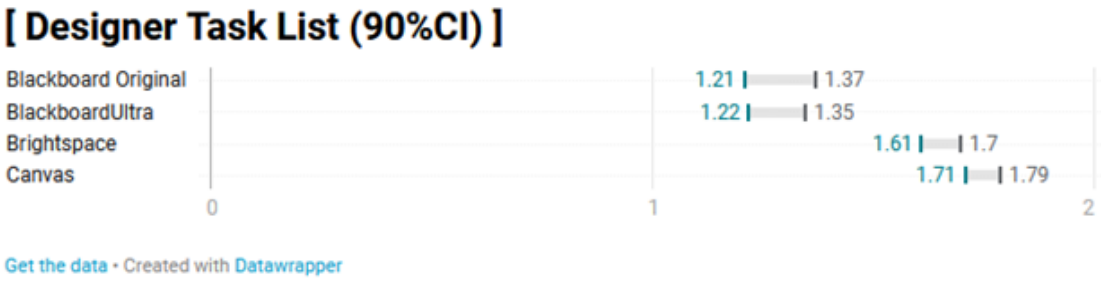

Figure 8

Accessibility Review

The initial RFP included several questions aimed specifically at accessibility:

1. Describe how your system complies with (1) the U.S. Federal Rehabilitation Act, Section 508 and (2) with Web Content Accessibility Guidelines (WCAG) 2.1.
2. Describe how products and support materials are tested for their accessibility to people with disabilities.
3. Describe tools that are available to help faculty create accessible course content. Include (1) a description of the type of content checked (e.g., uploaded files, content created via the text editor in the LMS, etc.) and (2) what the tool does. (3) Specify whether the tool is part of the core offering, available for an extra fee, or an external solution available via a vendor partner.
4. Describe how your system supports accommodations (e.g. extended time, additional attempts, accessible formats) on quizzes and assessments for students with disabilities.

Each vendor was also asked to submit a recent and independently reviewed Voluntary Product Accessibility Template (VPAT) and respond to a use case where the instructor was attempting to improve their course's accessibility. In order to be invited to the semi-final stage of the evaluation process, all three vendors provided sufficient responses to these questions.

Requirements and Technical Analysis

Members of Academic Technologies met weekly with all three vendors from September through mid-November to ask follow-up questions and work through exploratory scenarios. Any choice UNM makes will be part of a larger technology eco-system at UNM, and it was determined that all three met a baseline threshold of feasibility. Because so many of our current practices have been largely determined by the tool we use (self-hosted Blackboard Original), it was also determined that all three solutions would require modifications to current practices.

Conclusion

After thorough analysis of all feedback and vendor information, the scoring committee has selected the Canvas LMS solution offered by Instructure, Inc. This selection is pending approval by the Board of Regents, and UNM Executive Leadership who are still working through contract finalization and recurring funding allocation. Canvas was a clear winner in the overall RFP process which included scoring of RFP submissions, student, faculty, and staff evaluations, technical and instructional design reviews, and ADA accessibility checks.

Critical deciding factors included:

- Canvas consistently (and in many cases significantly) appeared as the preferred choice by students, instructors, and technical and instructional design support teams based on ease of use and intuitive design.
- Canvas is the consistent choice among most of UNM's Peer institutions.
- The Accessibility Resource Center determined that Canvas will be accessible "out of the box."
- Technical teams determined that the solution meets current needs for the LMS in terms of larger technology ecosystem at UNM.

Appendices

(1) Survey Instruments

Instructor Tasks for Task-based Survey and Cognitive Interviews

Options for all Task-based Survey:

a. This action was easy and intuitive to complete
b. I could complete the action once I saw the documentation or watched a tutorial
c. This action was not intuitive, or the documentation was difficult to find or use, or both.
d. N/A

Tasks:

1. Customize the course landing page with a course description and your photo or other image.
2. Upload a document. Replace the uploaded document with a new version.
3. Create a content page with an image
4. Add an alt-tag to the image.
5. Create a discussion board
6. Post and respond on the discussion board
7. Create an assignment
8. Create a test/quiz
9. Add three questions
10. Set questions presented to students in a randomized order
11. Set the quiz so that one student can turn it in a day late.
12. Create a rubric and connect it to a discussion or assignment
13. As a demo student:
    a. Post in the discussion board
    b. Complete the assignment/quiz you created as a demo student
14. Return to instructor view, navigate to the gradebook and locate the total grade column
15. Assign extra credit points to a demo student
16. Change the quiz/assignment score for a demo student
17. Save/export gradebook from system
18. Grade/provide feedback on an assignment
19. Grade/provide feedback on discussion board activity
20. Send message to the class
21. Start and record a video conference presentation

22. View a dashboard of class information, or analytics.
23. View an individual students' activity.
24. View a summary of the class's activity.
25. Import course from Bb Learn. (If you need a sample course, use CDL template course from website.)
26. Log into vendor mobile app
27. Grade Assignments on App

Student Task-based Survey

Options for all tasks:

a. This action was easy and intuitive to complete.
b. It took some effort to figure out how to do this.
c. It was difficult or I could not find where to do this, even after reading documentation.
d. N/A

Tasks:

1. Login and explore the navigation bar. Find a course you are enrolled in as a Student.
2. Enter your course, find your course's content, view a syllabus, open a few files/pages.
3. Access the course calendar.
4. Submit an assignment.
5. Take a quiz.
6. Post to a discussion board.
7. Send a course message to one of the course's Instructors.
8. View your grades.
9. View results for a graded quiz.
10. Access your course on their mobile app.
11. Overall, on a scale from 1 - 10, how would you rate this learning management system, in terms of how easy it was to navigate, find the course items you need, use the various course tools, and in its overall design and layout?

Instructional Designer Task-Based Survey

1.1 Import course from Learn
1.2 Course copy or elements of a course (e.g., content, gradebook, assessments, discussion board)
1.3 Options to select elements to be copied (e.g., adaptive release, permissions, discussion board posts)
2.1 Set a release date
2.2 Create module or section pages
2.3 Create content within the LMS content editor
2.4 Edit content within the LMS content editor
2.5 Delete content within the LMS content editor
2.6 Create document files
2.7 Edit document files
2.8 Delete document files
2.9 Create links to content outside of the LMS
2.10 Delete links to content outside of the LMS
2.11 Edit links to content outside of the LMS
2.12 Create images

2.13 Delete images
2.14 Edit images
2.15 Create LMS syllabus (not an imported document)
2.16 Delete LMS syllabus (not an imported document)
2.17 Edit LMS syllabus (not an imported document)
3.1 Create discussions
3.2 Duplicate discussion
3.3 Explore discussion options and features
3.4 Copy discussion to another course
3.5 Subscribe to a discussion
3.6 Create a peer review discussion
3.7 Add a video to a discussion (instructor and student)
3.8 Add files to a discussion, such as images and documents (instructor and student)
3.9 Create blogs
3.10 Create and manage wikis
3.11 Create assignments in other communication tools (If available, use other communication/social media tool)
4.1 Create groups
4.2 Manage groups
4.3 Edit groups
4.4 Explore group options (e.g. sets, sign-up, switching groups, randomizing, privileges)
4.5 Create a group discussion
4.6 Create a group assignment
4.7 Create and send a group announcement
4.8 Explore group options and features
4.9 Explore communication tools within groups (e.g., written, audio and video formats for both synchronous and asynchronous scenarios)
5.1 Create test
5.2 Edit test
5.3 Explore test options and features
5.4 Explore question types
5.5 Create assignments
5.6 Edit assignments
5.7 Make the assignment a peer reviewed assignment
5.8 Explore assignment options and features
5.9 Create homework
5.10 Edit homework
5.11 Explore homework options and features
5.12 Create other assessments if available
5.13 Explore other assessment options and features
5.14 Create adaptive release for the assessment listed above using the grade criteria
5.15 Explore adaptive release options and features
5.16 Create survey
5.17 Edit survey
5.18 Explore survey options and features
5.19 Review submitted answers for the survey and overall consolidated data for analysis
6.1 Create rubric
6.2 Edit rubric

6.3 Align rubric with and assignment
6.4 Explore rubric options and features
6.5 Import rubric from another course
7.1 Explore viewing options (e.g., arrangement, filters, grading status, columns, sorting)
7.2 Import and export gradebook
7.3 Explore late policies
7.4 Explore student visibility
7.5 Grade override
7.6 Entering grades
7.7 Grade details by assessment or student
7.8 Extra credit
7.9 Weighted grades
7.10 Explore advanced grading options (e.g., curved, drop lowest grade, late penalties)
7.11 Explore grade feedback options (e.g., video, markup)
7.12 Create an assessment not turned in through the LMS
8.1 Create a message that can be sent from the course
8.2 Explore options for adding video, files, etc.
8.3 Explore options for recipients
8.4 Create an automated message from the gradebook (e.g., not submitted an assignment, low score, high score)
8.5 Set messages to be sent through SMS and Email
9.1 Create an announcement
9.2 Explore options for adding video, files, etc.
9.3 Explore announcement options and features
10.1 Create chat
10.2 Explore chat options and features
11.1 Enable attendance tool
11.2 Explore attendance options and features
12.1 Add events to calendar
12.2 Edit assignment dates in the calendar
12.3 Integrate with Outlook
12.4 Explore calendar options and features
12.5 Experiment with what tools create calendar entries for students
13.1 Schedule the session
13.2 Hold the conference
13.3 Record the conference
13.4 Take attendance of participants
13.5 Explore video conferencing options and features
14.1 Create video
14.2 Edit video
14.3 Place into module page
14.4 Place into announcement
14.5 Place into assessment feedback
14.6 Place into discussion
14.7 Transfer or share videos to other individuals
14.8 Evaluate the stability and speed of upload
14.9 Explore audio controls (e.g. waveform graphic, can you tweak mistakes, background noise reduction)

14.10 Explore video options and features
15.1 Import a SCORM package
15.2 Explore SCORM options and features
15.3 Import a HTML 5 folder
16.1 Create some of the items listed in other sections within the mobile app
16.2 Explore mobile app options and features
17.1 Look for flags of document files that aren't accessible
17.2 View resources for accessibility improvement
17.3 View alternative formats for uploaded and LMS created content (e.g., audio, HTML, tagged PDF, transcript, video subtitles)
17.4 Explore any other accessibility features
18.1 Assess aesthetics
18.2 How customizable is the tool
19.1 Assess the LMS's documentation (ease of use and thoroughness)
20.1 View individual student activity by date
20.2 View overall class activity by date
20.3 View individual student completion of videos
20.4 View overall class completion rate of videos
20.5 View course grades visually with some type of graph
20.6 View overall individual student analytics (e.g., page views, video completion, attendance/participation, grades, submissions on time)
20.7View exam question analytics (individual question students got correct or incorrect)

(2) Student Feedback Responses

	Blackboard		Brightspace		Canvas		p-value (wilcoxon)	Differences
T1	1.75	0.463	1.82	0.405	1.93	0.267	0.512	
T2	1.67	0.500	1.64	0.505	1.93	0.267	0.1762	
T3	1.67	0.500	1.27	0.905	2.00	0.000	**0.0203**	Canvas > Brightspace
T4	1.56	0.527	1.64	0.809	1.86	0.363	0.3029	
T5	1.56	0.527	1.80	0.422	2.00	0.000	**0.0289**	Canvas > BBUlt
T6	1.44	0.726	1.90	0.316	1.86	0.363	0.1195	
T7	1.50	0.756	1.13	0.835	1.86	0.363	**0.0544**	Canvas > Brightspace
T8	1.89	0.333	1.64	0.674	2.00	0.000	0.1127	Canvas > Brightspace
T9	1.78	0.441	2.00	0.000	2.00	0.000	**0.0638**	Canvas > BBUlt
T10	1.67	0.516	1.57	0.787	1.70	0.675	0.8893	
	1.65		1.64		1.91		alpha=10 %	
	n=9		n=11		n=14			
Rating	7.11	1.69	6.91	2.34	9.07	1.21		

(3) Instructor Feedback Responses

	Bb Original		Bb Ultra		Bright-space		Canvas			
	mean	se	mean	se	mean	se	mean	se	p-values (Wilcoxon)	Differences
T1	0.80	0.789	0.75	0.856	1.42	0.717	1.56	0.651	**0.0038**	Canvas, Brightspace > BB(all)
T2	1.20	0.789	1.38	0.885	1.67	0.637	1.71	0.624	0.1374	
T3	0.89	0.928	1.00	0.961	1.45	0.759	1.80	0.408	**0.0078**	Canvas > BB(all)
T4	0.67	0.816	1.08	0.900	1.11	0.832	1.43	0.676	0.2142	
T5	1.00	0.816	1.44	0.892	1.48	0.512	1.92	0.282	**0.0017**	Canvas > BBOrig, Brightspace
T6	1.22	0.833	1.63	0.806	1.70	0.635	2.00	0.000	**0.0044**	Canvas > BBOrig
T7	1.20	0.919	1.47	0.834	1.74	0.541	1.92	0.277	**0.0268**	Canvas > BBOrig
T8	1.00	0.943	1.13	0.885	1.33	0.856	1.75	0.532	**0.0388**	Canvas > BB(all)
T9	1.10	0.876	1.43	0.852	1.55	0.759	1.75	0.550	0.1570	
T10	0.90	0.994	0.73	0.799	1.42	0.692	1.50	0.513	**0.0185**	Canvas, Brightspace > BBUlt
T11	0.83	0.983	1.00	0.816	1.26	0.653	1.45	0.605	0.2448	
T12	1.11	0.928	1.40	0.828	1.86	0.351	1.85	0.489	**0.0107**	Canvas, Brightspace > BBOrig
T13	1.11	0.928	1.31	0.873	1.60	0.681	2.00	0.000	**0.0065**	Canvas > BB(all)
T14	1.50	0.850	1.25	0.931	1.73	0.631	1.96	0.209	**0.0193**	Canvas > BBUlt
T15	0.78	0.833	1.00	0.961	1.10	0.831	1.60	0.598	**0.0518**	Canvas > BBOrig
T16	1.50	0.850	1.40	0.828	1.68	0.568	1.90	0.301	0.1530	
T17	1.00	0.816	1.27	0.799	0.95	0.865	1.65	0.573	**0.0237**	Canvas > Brightspace
T18	1.00	0.816	1.20	0.941	1.57	0.598	1.81	0.402	**0.0196**	Canvas > BBOrig
T19	1.20	0.919	1.27	0.799	1.47	0.697	1.75	0.550	0.1500	
T20	0.89	0.928	1.33	0.816	1.71	0.561	1.78	0.518	**0.0115**	Canvas, Brightspace > BBOrig
T21	0.67	0.816	0.93	0.730	1.00	0.707	1.38	0.669	0.1020	

T22	0.38	0.744	1.31	0.793	1.41	0.666	1.58	0.776	**0.0057**	Canvas, Brightspace > BBOrig
T23	0.56	0.882	0.79	0.699	1.52	0.602	1.44	0.705	**0.0024**	Brightspace, Canvas > BB(all)
T24	0.56	0.882	1.07	0.884	1.60	0.503	1.42	0.769	**0.0171**	Brightspace, Canvas > BBOrig
T25	0.71	0.951	0.57	0.976	1.29	0.825	1.26	0.733	0.1666	
T26	0.75	0.957	0.83	0.983	1.33	0.707	1.70	0.483	0.1266	
T27	0.75	0.957	1.00	1.000	1.50	0.756	1.73	0.467	0.1518	
	0.94		**1.15**		**1.46**		**1.69**		alpha=10%	
	n=10		n=17		n=23		n=25			

(4) Cognitive Interview Protocol

Introduction

We are performing cognitive interviews as one strategy (among many) to evaluate different LMS (Learning Management System) candidates for UNM. Cognitive interviews allow us to gather specific information on why an action might be difficult, or how instructors are moving through the vendor systems. We may be able to reveal common sticking points that instructors may not recognize to self-report. We also hope to provide context to the surveys from instructors performing the same actions in the self-paced task surveys.

In addition to cognitive interviews, there will be self-paced task list surveys and surveys sent out after each LMS demonstration meeting. Together these pieces will provide a comprehensive picture of how each LMS operates and whether or not it fulfills the needs of our instructors, students, and other users.

Preparing to Conduct an Interview

- Respondents will be selected both on a volunteer basis and through targeted requests based on randomized selection.
- Subjects will be targeted for inclusion with an invitation letter. Every 10th person to be added to the Teams site will receive a copy of the invitation. This does not mean they will be included in sample. It is merely a recruitment tool.
- A more general recruitment notice will be posted publicly on the Teams site. If a subject has volunteered to join a cognitive interview, make sure they receive a copy of the invitation. This ensures they have the same information as selected subjects.

Copy of the Invitation Letter

> "*The Center for Teaching and Learning would like to invite you to participate in a Cognitive Interview to help gather more information about our LMS choices.*
>
> *During your interview you will be randomly assigned to one of three LMSs and asked to complete the task list that has been provided to everyone currently testing the system. You will be asked to share*

your thoughts as you move through the tasks in the LMS and provide general comments at the end. Interviews will be approximately 90 minutes in length.

If you choose to participate, we ask that you not work through any task lists prior to your appointment. Do however spend a few minutes familiarizing yourself with all three LMS candidates' sandboxes. You will be able to complete the task lists for all other LMS candidates after your interview.

Please contact the Center for Teaching and Learning at (insert correct email) if you would like to participate. If selected, you will be able to choose a day and time that work for your Zoom interview. Interviews will be recorded, and we ask that you have a working camera or request one be provided."

The Interview

Instructions for the Interview

- The interviewer and note-taker should arrive in the Zoom session about 15 minutes before the scheduled time. This allows time to review roles and confirm which LMS has been assigned for that interview.
- Ensure both interviewer and note-taker have a blank copy of the Note-Taking Sheet.
- Whoever is host should ensure that the session is being recorded. Before the session make sure to select the proper settings. In Settings under Recording, check 'Add a timestamp to the recording', 'Record video during screen sharing', and 'Place video next to the shared screen in the recording'.
- Record the time at which the interviewee arrives, and the interview starts.

Tips for Conducting the Cognitive Interview

- It is the job of the interviewer to guide the interviewee to provide thorough feedback on their train of thought. Encourage the interviewer to provide specific details. Provide neutral verbal feedback like 'okay' and 'I see.'
- It is the job of the note-taker to write down what the interviewee is saying or doing as they interact with the LMS. Because we will be recording the session, focus on major themes and live observations above literal dictation.
- If the interviewee has not completed the task list in the allotted time, ask them to wrap up the task they are on then move to the closing questions. We do not want to take up more than the allotted time.
- Both interviewers should use the following criteria to score each task:
    - 2: This action was easy and intuitive to complete.
    - 1: They could complete the action once they saw the documentation or watched a tutorial.
    - 0: This action was not intuitive, or the documentation was difficult to find or use, or both.
    - -1: Chose not to do the task or did not actually complete the task properly.
    - N/A: skipped because of time constraints
    - Blank: unable to observe interaction with this task.

Introduction (5 Min)

"Thank you for participating in our usability research. Your participation will help guide the process in selecting a new Learning Management System for UNM. The information from these interviews will be combined with other data to inform the final decision.

The purpose of this interview is not to measure your expertise. Rather, it is to give us insight about how you navigate through an LMS and determine areas you find most useful and most challenging. You are welcome to look at documentation and tutorials throughout the interview.

During the interview, I'm going to ask you to complete the task list that was given to all instructors. Take as much time as you need with each task and feel free to skip or go back as you see fit. As you perform each task, please describe what you are doing and why. If we run out of time, we will have you wrap-up your current task, so we have time for our closing questions. We are taking notes and I may be quiet while writing your responses to questions. I am recording our Zoom session which will be secured and only shared with the research team and RFP scoring committee.

(Optional) If this is not what you thought you were signing up for today, would you like to proceed, or would you like to pursue other feedback options available to you in the Teams site?

Before we get started, I would like to confirm that you have the link to the sandboxes. Otherwise, I can post that for you in the chat."

Warm-Up Exercise (5-10 Min)

"Before we begin the actual interview, I'd like to ask you a 'warm-up' question to introduce you to the think aloud process. In thinking aloud, please know there are no wrong answers. I am only interested in knowing what is going through your mind. Any information you provide during this warm-up will not be used in our analysis; this session is merely to help us both become familiar and comfortable with the 'think aloud' process. It may feel awkward at first or like you are talking to yourself. This is a normal part of the process."

"Try to visualize a place where you've lived. As you think about that place, think about how many windows there are in that place, or in one part of that place if it is very large. As you move through the place and count the windows, tell me what you are seeing and thinking about." (Willis 1994)

- Provide positive feedback for what the interviewee did well.
- Provide guidance to the interviewee if their response is less descriptive, providing them with your own example to the prompt.

Initial Questions (5 Min)

1. "How familiar are you with the current Blackboard Learn LMS?"
2. "What have you done in the LMS Sandboxes since being given access?"
3. "Approximately how long have you spent with each LMS?"

Navigation and Tasks (45 Min)

1. "Now we have uploaded a task list for you in the chat. Please download this and work through the task list at your own pace."
    a. *– Refer to Appropriate Task List in the appendix.*

2. *When only 20 minutes is left, if the participant has not finished the task list, ask them to stop when the active task is complete.*

   "We do not want to take more than our scheduled time. Please finish this task and then we will ask you for your final thoughts. Thank you."

Closing Questions (10 Min)

1. "What other thoughts did you have about the LMS that you have not already shared?"
2. "What did you like most using this LMS?"
3. "What was most challenging about using this LMS?"
4. "Overall, how would you describe your experience with this LMS?"

Closing (10 Min)

"Thank you for taking the time to participate in this process and allowing us to observe you using this LMS. Please feel free to share any other comments that you have not shared up to this point."

- Pause for comments.

"You input will be very helpful in this decision-making process."

- Pause for comments.

"We want you to have the same opportunity as everyone to review all the LMS candidates. Now that you have completed this interview, feel free to complete the self-paced task list surveys for the other LMS candidates."

Immediately After Interview

- Record the end time of the interview on the note-taking form.
- Record any final comments or notes from the interview.
    - What went well?
    - What didn't?
    - How did the interviewers attitude seem after working through the tasks?
    - Any distractions?

Table. Prompts During Exploration

If the interviewee:	**You may respond:**
Asks what s/he is supposed to do…	"I am interested in what you are thinking as you look over the interface. Do whatever you need to help you think aloud about this." "Tell me what you are thinking."
Appears to be having difficulty thinking aloud…	"What thoughts are going through your mind right now?" "What thoughts come to mind while you look at the interface?" "How are you feeling about this?"
Is thinking aloud with no difficulty…	"That's great. Thinking out loud like this is what I need." "Good. Your comments are helping me understand what you are thinking."
Asks you questions about the task or LMS…	"I'm very interested in your questions; however due to the nature of the interview, I cannot answer them for you at this time. Please continue to express any questions you have and I will make a note of them."
Expresses concern at having not prepared…	"To clarify, we are not evaluating your ability to complete the tasks. We are evaluating the usability of the LMS."
Becomes angry or hostile toward the interviewer…	"Participation is voluntary. You are welcome to end the interview at any time."

Cognitive Interview Note-taking Sheet

Interviewee:	LMS: Blackboard
Date: _____ Interviewer:_____ _____ Note-taker:_____	Start Time:_____ Stop Time:_____ Interview Recorded: Yes No

*place an X if attempted

X	Tasks/Questions	Score	Notes
	Q1. How familiar are you with the current Blackboard Learn LMS?		
	Q2. What have you done in the LMS Sandboxes since being given access?		
	Q3. Approximately how long have you spent with each LMS?		
-	Content Creation	-	-
	1. Customize the course landing page with a course description and your photo or other image.		
	2. Upload a document. Replace the uploaded document with a new version.		
	3. Create a content page with an image.		

	4. Add an alt-tag to the image.		
	5. Create a discussion board.		
	6. Post and respond on the discussion board.		
	7. Create an assignment.		
	8. Create a test/quiz with three questions		
	9. Edit the test/quiz so that the questions are presented to students in a randomized order.		
	10. Set the quiz so that one student can turn it in a day late.		
	11. Create a rubric and connect it to a discussion or assignment.		

-	Student View	-	-
	12. As a demo student: Post in the discussion board.		
	13. As a demo student: Complete the assignment or quiz/test you previously created.		
-	Grading and Feedback	-	-
	14. Navigate to the gradebook and locate the total grade column.		
	15. Assign extra credit points to the demo student.		
	16. Change the quiz/assignment score for the demo student.		
	17. Save/export a copy of the gradebook from the system.		
	18. Grade and provide feedback on an assignment.		
	19. Grade and provide feedback on discussion board activity.		

-	Communication and Analytics	-	-
	20. Send a message to the class.		
	21. Start and record a video conference presentation.		
	22. Locate a dashboard of class information, or analytics.		
	23. On the dashboard, view an individual student's activity.		
	24. On the dashboard, view a summary of the class's activity.		
-	Course Import and Mobile	-	-
	25. Import a course from our current version of Blackboard Learn.		
	26. Log in to the vendor mobile app.		
	27. Grade an assignment in the app.		

	Closing Questions		
	Q4. What other thoughts did you have about the LMS that you have not already shared?		
	Q5.What did you like most using this LMS?		
	Q6.What was most challenging about using this LMS?		
	Q7.Overall, how would you describe your experience with this LMS?		

Final Comments:

(5) Support Feedback Responses

Task1.1	T1	0.75	0.957	1.29	0.951	1.43	0.787	1.86	0.378	0.2011	
Task1.2	T2	1.00	0.816	1.20	1.095	1.67	0.516	1.83	0.408	0.2941	
Task1.3	T3	1.25	0.957	0.67	1.155	1.57	0.787	1.75	0.500	0.4348	
Task2.1	T4	1.75	0.500	1.17	0.983	1.71	0.756	1.71	0.756	0.4656	
Task2.2	T5	1.50	1.000	1.71	0.488	1.71	0.488	1.86	0.378	0.9086	
Task2.3	T6	1.75	0.500	1.57	0.787	1.71	0.488	1.86	0.378	0.8964	
Task2.4	T7	2.00	0.000	1.29	0.951	2.00	0.000	2.00	0.000	**0.0387**	Canvas, Brightspace>

											BBUltra
Task2.5	T8	2.00	0.000	1.86	0.378	2.00	0.000	2.00	0.000	0.4625	
Task2.6	T9	2.00	0.000	1.86	0.378	2.00	0.000	2.00	0.000	0.4883	
Task2.7	T10	2.00	0.000	1.57	0.787	2.00	0.000	2.00	0.000	0.1887	
Task2.8	T11	2.00	0.000	1.86	0.378	2.00	0.000	2.00	0.000	0.5153	
Task2.9	T12	1.75	0.500	1.86	0.378	2.00	0.000	1.71	0.756	0.6758	
Task2.10	T13	2.00	0.000	1.86	0.378	2.00	0.000	2.00	0.000	0.4625	
Task2.11	T14	2.00	0.000	1.86	0.378	2.00	0.000	2.00	0.000	0.4625	
Task2.12	T15	1.67	0.577	1.40	0.894	1.80	0.447	1.83	0.408	0.7594	
Task2.13	T16	1.75	0.500	1.83	0.408	2.00	0.000	2.00	0.000	0.4034	
Task2.14	T17	1.67	0.577	1.50	0.577	2.00	0.000	2.00	0.000	0.1573	
Task2.15	T18	1.50	0.577	1.33	0.577	1.25	0.500	1.57	0.787	0.6933	
Task2.16	T19	1.75	0.500	1.00	.	1.75	0.500	2.00	0.000	0.1544	
Task2.17	T20	1.75	0.500	1.00	.	1.75	0.500	2.00	0.000	0.1544	
Task3.1	T21	1.25	0.957	1.57	0.787	1.86	0.378	1.71	0.488	0.5911	
Task3.2	T22	1.75	0.500	0.75	0.957	1.29	0.951	1.86	0.378	0.1564	
Task3.3	T23	1.25	0.957	1.50	0.837	1.71	0.488	1.71	0.488	0.7906	
Task3.4	T24	1.50	0.707	1.00	0.816	1.00	0.894	1.71	0.488	0.2996	
Task3.5	T25	1.67	0.577	0.67	0.816	1.71	0.488	1.50	0.548	**0.0813**	Brigthspace > BBUltra
Task3.6	T26	1.50	0.707	0.50	0.707	0.67	1.155	1.60	0.548	0.2915	
Task3.7	T27	1.00	1.155	1.00	1.000	1.86	0.378	2.00	0.000	**0.0613**	Canvas > BBUltra

Task3.8	T28	1.75	0.500	1.43	0.787	2.00	0.000	2.00	0.000	**0.0910**	
Task3.9	T29	1.25	0.957	0.67	0.577	0.00	.	1.00	1.414	0.5933	
Task3.10	T30	1.33	1.155	0.33	0.577	.	.	1.00	1.000	0.4271	
Task3.11	T31	1.25	0.957	0.50	0.707	1.33	0.577	2.00	0.000	0.2828	
Task4.1	T32	1.00	1.155	1.00	1.000	1.57	0.535	1.57	0.787	0.5362	
Task4.2	T33	1.25	0.957	1.14	1.069	1.57	0.535	2.00	0.000	0.2570	
Task4.3	T34	1.25	0.957	1.14	1.069	1.86	0.378	1.71	0.756	0.3656	
Task4.4	T35	1.00	1.000	1.14	1.069	1.71	0.488	1.86	0.378	0.2864	
Task4.5	T36	1.00	1.155	1.00	1.000	1.71	0.488	2.00	0.000	0.1133	
Task4.6	T37	1.00	1.155	1.14	1.069	1.71	0.488	1.86	0.378	0.3537	
Task4.7	T38	0.67	1.155	0.40	0.894	1.75	0.500	1.67	0.816	**0.0883**	
Task4.8	T39	1.00	1.155	0.83	0.983	1.86	0.378	1.86	0.378	**0.0739**	
Task4.9	T40	0.75	0.957	0.40	0.894	1.50	0.548	2.00	0.000	**0.0374**	Canvas > BB(All)
Task5.1	T41	2.00	0.000	1.50	0.548	1.71	0.488	1.86	0.378	0.3017	
Task5.2	T42	2.00	0.000	1.57	0.787	1.86	0.378	2.00	0.000	0.3453	
Task5.3	T43	2.00	0.000	1.71	0.488	1.86	0.378	1.86	0.378	0.6705	
Task5.4	T44	1.50	0.577	1.57	0.787	1.86	0.378	2.00	0.000	0.2469	
Task5.5	T45	2.00	0.000	1.57	0.535	2.00	0.000	2.00	0.000	**0.0382**	Canvas, Brightspace > BBUltra
Task5.6	T46	2.00	0.000	1.86	0.378	2.00	0.000	2.00	0.000	0.4625	
Task5.7	T47	0.75	0.957	1.50	0.577	0.20	0.447	1.71	0.488	**0.0147**	Canvas,

											BBUltra > Brightspace
Task5.8	T48	2.00	0.000	1.71	0.488	1.86	0.378	2.00	0.000	0.3588	
Task5.9	T49	2.00	0.000	1.67	0.577	2.00	0.000	2.00	.	0.6444	
Task5.10	T50	2.00	0.000	1.67	0.577	2.00	0.000	2.00	.	0.6440	
Task5.11	T51	2.00	0.000	1.67	0.577	2.00	0.000	2.00	.	0.6440	
Task5.12	T52	0.50	0.707	1.50	0.707	2.00	0.000	2.00	0.000	**0.0680**	Canvas, Brightspace > BBUltra
Task5.13	T53	1.00	1.414	1.75	0.500	2.00	0.000	2.00	0.000	0.2428	
Task5.14	T54	1.25	0.957	1.29	0.756	1.57	0.535	1.29	0.951	0.9132	
Task5.15	T55	1.25	0.957	1.43	0.787	1.83	0.408	1.29	0.951	0.6083	
Task5.16	T56	1.75	0.500	0.83	0.753	1.50	0.548	1.40	0.548	0.1773	
Task5.17	T57	1.75	0.500	1.40	0.548	1.83	0.408	2.00	0.000	0.1794	
Task5.18	T58	1.50	1.000	1.20	0.447	1.67	0.516	2.00	0.000	0.1132	
Task5.19	T59	1.00	1.000	0.80	0.837	1.40	0.894	2.00	0.000	0.3245	
Task6.1	T60	1.75	0.500	1.57	0.787	1.86	0.378	1.43	0.976	0.8525	
Task6.2	T61	2.00	0.000	2.00	0.000	2.00	0.000	1.71	0.756	0.4625	
Task6.3	T62	1.75	0.500	2.00	0.000	2.00	0.000	1.67	0.816	0.3836	
Task6.4	T63	2.00	0.000	1.86	0.378	2.00	0.000	1.50	0.837	0.2685	
Task6.5	T64	1.00	1.000	1.50	0.837	1.17	0.753	1.67	0.816	0.4488	
Task7.1	T65	1.25	0.957	0.86	0.900	1.86	0.378	1.71	0.488	**0.0864**	Brightspace >

											BBUltra
Task7.2	T66	1.00	1.000	1.50	0.837	1.80	0.447	2.00	0.000	0.1694	
Task7.3	T67	0.50	0.707	1.00	1.000	1.00	1.155	1.67	0.516	0.3506	
Task7.4	T68	0.00	0.000	1.29	0.951	1.50	0.837	1.71	0.488	0.1377	
Task7.5	T69	1.75	0.500	1.57	0.535	1.86	0.378	2.00	0.000	0.2539	
Task7.6	T70	1.75	0.500	1.57	0.787	2.00	0.000	2.00	0.000	0.2395	
Task7.7	T71	0.75	0.957	1.14	0.900	2.00	0.000	1.83	0.408	**0.0258**	Brightspace > BBUltra; Canvas, Brightspace > BBOrig
Task7.8	T72	1.00	1.000	0.33	0.516	1.50	0.577	1.17	0.983	0.1537	
Task7.9	T73	1.25	0.957	0.86	0.900	1.14	0.900	1.29	0.488	0.7811	
Task7.10	T74	0.25	0.500	0.71	0.756	1.00	1.000	1.29	0.488	0.1587	
Task7.11	T75	0.75	0.957	1.00	1.000	1.86	0.378	1.43	0.787	0.1433	
Task7.12	T76	1.33	1.155	1.60	0.548	1.75	0.500	1.50	0.548	0.9058	
Task8.1	T77	2.00	0.000	0.57	0.787	1.86	0.378	1.57	0.787	**0.0083**	BBOrig , Brightspace , Canvas > BBUltra
Task8.2	T78	1.25	0.957	0.80	0.837	2.00	0.000	2.00	0.000	**0.0051**	Canvas, Brightspace

											> BB(All)
Task8.3	T79	1.25	0.957	1.00	1.000	1.40	0.894	1.80	0.447	0.5261	
Task8.4	T80	0.33	0.577	1.20	0.837	1.33	0.816	1.71	0.756	0.1103	
Task8.5	T81	0.67	1.155	1.00	0.707	1.57	0.787	1.50	0.548	0.3041	
Task9.1	T82	2.00	0.000	1.71	0.488	2.00	0.000	2.00	0.000	0.1468	
Task9.2	T83	1.25	0.957	1.43	0.787	2.00	0.000	2.00	0.000	**0.0536**	
Task9.3	T84	1.75	0.500	1.71	0.488	2.00	0.000	2.00	0.000	0.2412	
Task10.1	T85	.	.	0.00	.	1.29	0.756	1.86	0.378	**0.0701**	Canvas > BBUltra
Task10.2	T86	.	.	0.00	.	1.43	0.787	1.86	0.378	0.1063	
Task11.1	T87	2.00	0.000	1.50	0.548	1.67	0.816	1.60	0.894	0.6150	
Task11.2	T88	2.00	0.000	1.67	0.516	1.50	1.000	1.80	0.447	0.8277	
Task12.1	T89	1.00	1.000	1.57	0.787	1.86	0.378	1.86	0.378	0.2562	
Task12.2	T90	1.00	1.000	1.29	0.756	1.83	0.408	2.00	0.000	**0.0519**	Canvas > BB(All)
Task12.3	T91	0.00	.	0.25	0.500	0.75	0.957	1.33	0.816	0.1830	
Task12.4	T92	1.00	1.000	1.57	0.787	1.71	0.488	1.86	0.378	0.3605	
Task12.5	T93	1.00	1.000	1.57	0.787	1.71	0.488	1.83	0.408	0.4166	
Task13.1	T94	1.00	1.000	1.80	0.447	0.67	1.155	2.00	0.000	**0.0723**	Canvas > Brightspace
Task13.2	T95	1.33	1.155	1.80	0.447	1.33	1.155	2.00	0.000	0.5535	
Task13.3	T96	1.33	1.155	1.80	0.447	2.00	0.000	1.60	0.548	0.6330	
Task13.4	T97	0.00	0.000	1.25	0.957	1.00	1.414	2.00	0.000	0.1208	

Task13.5	T98	1.33	1.155	1.80	0.447	2.00	0.000	1.80	0.447	0.7967	
Task14.1	T99	0.00	0.000	0.50	0.707	1.50	0.837	2.00	0.000	**0.0274**	Canvas > BB(All); Brightspace > BBOrig
Task14.2	T100	0.00	.	1.00	.	2.00	0.000	1.33	1.155	0.3683	
Task14.3	T101	1.00	1.000	1.50	0.577	1.40	0.894	1.60	0.894	0.7261	
Task14.4	T102	1.00	1.000	1.75	0.500	1.83	0.408	2.00	0.000	0.1276	
Task14.5	T103	0.67	1.155	0.33	0.577	1.83	0.408	2.00	0.000	**0.0104**	Canvas, Brightspace > BB(All)
Task14.6	T104	1.00	1.000	1.25	0.957	1.83	0.408	2.00	0.000	0.1071	
Task14.7	T105	0.67	1.155	0.50	0.707	1.00	.	1.33	0.577	0.6019	
Task14.8	T106	1.00	1.414	1.00	.	1.50	0.707	2.00	0.000	0.5519	
Task14.9	T107	0.00	.	1.00	.	1.00	.	2.00	.	.	
Task14.10	T108	0.00	0.000	1.50	0.707	1.50	0.707	1.75	0.500	0.1447	
Task15.1	T109	1.33	0.577	1.33	1.155	2.00	0.000	1.67	0.577	0.4020	
Task15.2	T110	1.33	1.155	1.33	1.155	2.00	0.000	2.00	0.000	0.6037	
Task15.3	T111	1.00	1.414	0.50	0.707	2.00	0.000	1.00	1.414	0.4663	
Task16.1	T112	0.33	0.577	0.60	0.894	1.00	0.707	2.00	0.000	0.0425	
Task16.2	T113	0.33	0.577	0.60	0.894	0.83	0.753	1.50	1.000	0.3227	
Task17.1	T114	1.50	0.707	1.00	0.816	1.25	0.957	1.17	0.983	0.9164	

Task17.2	T115	1.50	0.707	1.33	0.577	1.75	0.500	1.67	0.516	0.7147	
Task17.3	T116	1.50	0.707	1.33	0.577	1.25	0.957	1.25	0.957	0.9914	
Task17.4	T117	1.50	0.707	1.50	0.577	1.75	0.500	1.20	0.837	0.7055	
Task18.1	T118	0.67	1.155	1.00	0.894	1.33	1.033	1.50	0.837	0.5669	
Task18.2	T119	0.00	0.000	0.83	0.753	1.17	0.753	1.17	0.753	0.2260	
Task19.1	T120	1.33	0.577	1.00	0.894	1.00	1.095	1.57	0.787	0.5950	
Task20.1	T121	1.00	1.000	0.86	0.900	1.57	0.535	1.50	0.837	0.3422	
Task20.2	T122	1.00	0.816	1.14	0.900	1.29	0.756	1.50	0.837	0.7333	
Task20.3	T123	0.00	.	0.50	0.707	1.50	0.577	1.75	0.500	0.1231	
Task20.4	T124	0.00	.	0.50	0.707	1.50	0.577	1.75	0.500	0.1231	
Task20.5	T125	0.00	0.000	1.00	1.000	1.50	0.548	1.33	0.816	0.1881	
Task20.6	T126	0.33	0.577	0.83	0.983	1.50	0.548	1.17	0.753	0.1934	
Task20.7	T127	1.00	1.000	1.17	0.753	1.33	0.516	1.00	0.707	0.8623	
		1.22		**1.22**		**1.62**		**1.74**			
		n=4		**n=7**		**n=7**		**n=7**			