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SYSTEM

University of Hawai'i System
Learning Management System (LMS) Review
Report

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On behalf of the
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Executive Summary

Since the COVID-19 pandemic, higher education has experienced a dramatic increase in students taking all classes online, some classes online, and hybrid classes with a mix of in-person and online content. According to the [Student and Course Taking Modality - Special Daily Report](#) provided by the Institutional Research, Analysis and Planning Office (IRAPO), this trend is evident across the University of Hawai'i (UH) system as well. Digital learning environments play an essential role in higher education. Regardless of course modality, the Learning Management System (LMS) is frequently used for accessing course content, disseminating and submitting course assignments, testing and quizzing, electronic grade-book management, providing student feedback, and facilitating student engagement. The LMS also provides rich data for learning analytics.

The LMS is the cornerstone of the learning environment in fully online courses and serves as the environment where regular and substantive interactions take place. Student engagement with the instructor, peers, and the curriculum is facilitated through the LMS. Given the pace of educational technology innovation, and the shift in course modalities, it is important to periodically evaluate LMS products to determine the features that will provide efficiencies for both teaching and learning. Faculty and students are both essential stakeholders in ensuring that the LMS is the best fit, and provides consistency in the user experience for students, while supporting pedagogical freedom and creativity for faculty and instructional designers. The LMS is also part of a technology ecosystem that supports students across the lifespan of their educational journey. Therefore, integration with other systems such as the student information system (BANNER), and the student registration system (STAR) are also important considerations.

The UH System has benefited from having a centralized LMS, Laulima, since 2007. An LMS evaluation was conducted in 2016-2017, and concluded with the decision to remain with Laulima, with the caveat that the evaluation would be revisited in 3 years. This report is presented to the UH Officers based on an inclusive and transparent LMS review and is informed by extensive community engagement across the UH system. The LMS review process was designed to ensure that all stakeholders had an opportunity for their voice to be heard, and their perspective represented. The first goal of this LMS review process is to determine if the UH system should continue with Laulima, or if we have reached a point where UH will be better served by transitioning to a new LMS. The intent of this report is to inform the UH officers' decision with respect to this essential question.

As part of the LMS review process, three viable LMS products were identified,

- Blackboard Learn Ultra by Anthology
- Brightspace by D2L
- Canvas by Instructure

These three vendors were selected based on experience of the LMS within higher education, particularly demonstrating the capability to support a complex public university system. Should the UH officers commit to transitioning the UH system to a new LMS, this report provides feedback on the three LMS products that have been evaluated. All three vendors have engaged with the UH community throughout the review process, hosting weekly office hours, providing additional demonstrations of key features and supplementary products, and providing supporting documentation. Each vendor offers a modernized LMS platform, with mobile responsiveness, an accompanying mobile application, and functionalities that will improve efficiencies for teaching and learning.

The report includes both qualitative and quantitative data collected from students, faculty, instructional designers, and administrators across all ten campuses of the UH system. The report showcases the engagement of the UH community in this LMS review process. Additionally, a summary analysis of Sakai (Laulima), and each of the three LMS platforms under review are presented in this report.

Community Engagement

LMS Review Team

The process began by identifying representatives to serve on the UH Systemwide LMS Review Team. Faculty, instructional designers, student representatives from each UH campus, and UH system representatives served as a working group to help guide the LMS review process. The work of the LMS Review Team took place during the Spring 2023 semester. The team was charged with the following tasks:

- Carefully evaluating selected LMS products;
- Reviewing input from the broader community about each product;
- Providing a summary of the benefits and challenges of each product, as well as an overall recommendation regarding transitioning to a new LMS.

Members were selected by their constituent groups to serve on the LMS Review Team. Student representatives from each campus were appointed by their respective student government presidents. Faculty representatives were appointed by the chair of their Faculty Senate or Faculty Congress. Instructional Designers were appointed by their

Chief Academic Officer, or their designee. Additionally, UH System representatives from the UH LMS Administration team, UH Online Innovation Center, UH Online, the Office of the Vice President for Community Colleges, and the Office of the Associate Vice President for Student Affairs were selected to represent their respective UH System offices as well. The [full list of team members by campus and role](#) are listed on the LMS Review website.

LMS Evaluators

While the LMS Review Team members were selected by their constituents, some groups found it challenging to select just one representative to serve on the LMS Review Team. The LMS Evaluators provided an opportunity for anyone in the UH community to engage more deeply in the review of the three platforms by serving as an LMS Evaluator.

Individuals who wanted to serve as an evaluator self-registered through an LMS Evaluator Request Form. The registration form allowed the evaluator to identify the LMS platform(s) they were interested in evaluating and which of the three rubrics they were committing to complete. Each evaluator had a choice of evaluating 1 to 3 LMS platforms, using any combination of the three available LMS evaluation rubrics.

The [University of Hawai'i LMS Evaluation Rubric](#) contains the criteria for the LMS evaluation. The rubric is divided into three separate sheets including

1. **Functionality Rubric** - intended for faculty to evaluate the functionality of the LMS tools and user experience.
2. **Technical Rubric** - intended for LMS administrators, support staff, and instructional designers to evaluate the technical specifications of the LMS platform.
3. **Innovation Rubric** - intended for faculty, students, and administrators interested in the learning innovation potential of the LMS platform, including digital badging, e-portfolios, non-credit, and competency-based education.

In order to adequately evaluate the functionality, technical, and/or learning innovation potential of the platform, each evaluator was provided with access to the evaluation instance (sandbox) of the LMS platform(s) being evaluated. All evaluators with sandbox access were expected to complete and submit their rubric with an initial deadline of March 31, 2023, which was subsequently extended until April 14, 2023.

An LMS Evaluation site was developed on Lulima to facilitate the work of the review team and evaluators, and to coordinate the review for each of the LMS platforms under review. The LMS Evaluation site was created on Lulima for LMS Evaluators and LMS Review Team members to access the LMS sandbox environments, a calendar of virtual

office hours and events provided by the three vendors, recordings of events, and additionally to access all documents associated with the LMS Review process. The LMS Evaluation Laulima site was also used for uploading and managing submission of the completed evaluation rubrics.

Some members of the LMS Review Team also registered to serve as evaluators. LMS Review Team members were provided with access to the LMS Evaluation Laulima site, as well as access to the sandboxes for each of the three platforms. However, submission of the evaluation rubric was not an expectation of the members of the LMS Review Team. Nevertheless, some members of the LMS Review Team also committed to serving as an LMS Evaluator for one or more of the LMS platforms.

A total of 61 individuals registered to serve as LMS Evaluators, representing 8 UH campuses, the Office of the Vice President for Community Colleges, and UH System Information Technology Services (ITS). Six of the LMS Evaluators were also members of the LMS Review Team. LMS Evaluators included full-time faculty, instructional designers, undergraduate students, Academic Affairs staff, ITS staff, administrators and Data Governance staff. The pie chart in Figure 1 represents the primary role at UH in percentages. Table 1 provides the number of registered LMS Evaluators, as well as the number and percentage of evaluation rubric submissions for each of the three LMS platforms under review.

Figure 1: LMS Evaluators primary UH role

Count of What is your primary role at UH?

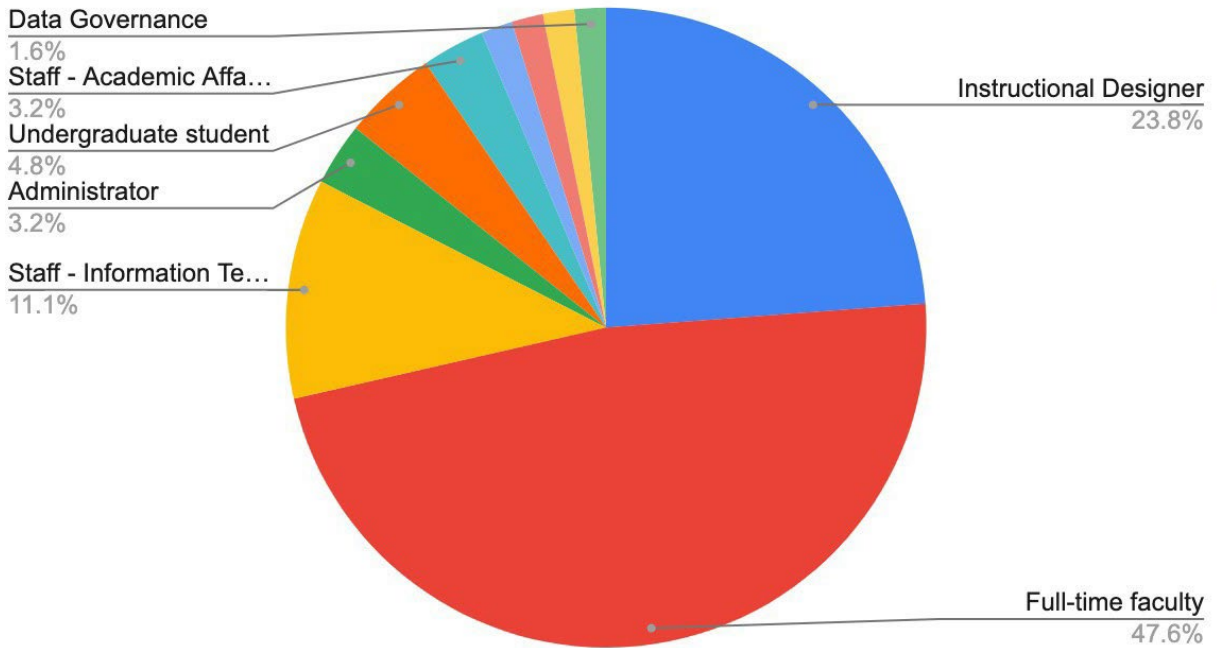


Table 1: LMS Evaluator Completion Rates

Platform	Registered Evaluators	Evaluation Rubric Submissions	Completion Rate
Blackboard Learn Ultra	43	29	67%
Brightspace	48	35	73%
Canvas	61	41	67%

Despite the discrepancy in the number of registered evaluators across the three LMS platforms, the submission of three types of evaluation rubrics had greater consistency across the three platforms as noted in Table 2.

Table 2: LMS Evaluation Rubric by Rubric Type

Platform	Functionality Rubric Submissions	Technical Rubric Submissions	Innovation Rubric Submissions
Blackboard Learn Ultra	26	15	13
Brightspace	32	17	18
Canvas	31	18	13

LMS Evaluation of Assessment Features

The UH Systemwide Assessment Coordinators Group evaluated each of the LMS platforms under review, as well as Laulima, on a total of 10 items including six crucial functions and four desirable functions related to learning outcomes assessment. The overall rating and discussion of the assessment functionality features will be discussed in the sections related to each of the LMS platforms. The full report of “Feedback on Potential Learning Management Systems for UH” is available in Appendix B.

Vendor LMS Platform Demonstrations

The three vendors each presented two demonstrations of their respective LMS platforms, including a demonstration targeted to faculty users and a demonstration targeted to student users of the LMS platform. All six sessions were presented in a hybrid modality from the University of Hawai'i Information Technology Center, with synchronous virtual participation available via Zoom webinar. All six demonstrations were also recorded and links to the recording are posted on the [LMS Review website](#) for asynchronous viewing.

Virtual synchronous attendees were able to ask questions via the Question and Answer (Q&A) or chat features in Zoom, and vendor teams had representatives available to address the questions live during the session. For the faculty-focused demonstrations, a summary document with screenshots and a log of the Q&A was also made available via the [LMS Review website](#). Table 3 presents the number of synchronous participants for each of the vendor demonstrations. These numbers do not include asynchronous views of the recordings of the demonstrations.

Table 3: Community engagement in vendor demonstrations

LMS Platform	Synchronous participation
Blackboard Learn Ultra Faculty-focused demonstration	102
Blackboard Learn Ultra Student-focused demonstration	40
Brightspace Faculty-focused demonstration	95
Brightspace Student-focused demonstration	38
Canvas Faculty-focused demonstration	86
Canvas Student-focused demonstration	30

Constituent Meetings with Vendors

While each of the vendor teams were onsite on the UH Mānoa campus, each team met with the following constituent groups to address specific questions and unique perspectives of a potential new LMS platform:

- **Technical Q&A**
Each faculty-focused vendor demonstration was followed by a 60-minute technical Q&A session. Instructional designers and the LMS Administration team were invited to attend these sessions.
- **Academic Strategy**
The Vice President for Academic Strategy, as well as the Associate Vice President for Academic Programs and Policy, the Associate Vice President for Student Affairs, and a representative from the Assessment Office at UH Mānoa met with the vendor teams to discuss how the LMS platform might support UH in the imperatives of the 2023-2029 Strategic Plan, assessment, reporting capabilities, and capabilities for integration with digital badging and micro-credential pathways.
- **LMS Administration and Help Desk**
The LMS Administration team, as well as the Director Of Client Services and Operations Center and ITS Help Desk managers met with the vendor teams to discuss

technical aspects of the LMS platform for the UH System, administrative functions, coordination of support services provided by UH and available vendor support services. Integration with BANNER, as the UH Student Information System, was also addressed.

- **UH Mānoa Outreach College**

Staff and administrators from UHM Outreach College met with each of the vendor teams to discuss LMS platform and the use for credit and non-credit offerings, as well as additional services to support enrollment and student information management for non-credit programs.

- **Data Governance**

The Data Governance staff met with the vendor teams to discuss how each LMS platform addressed matters related to FERPA compliance, data privacy and student identity concerns.

LMS Town Hall Sessions

Following the vendor LMS platform demonstrations, six LMS review town hall sessions were conducted via video conferencing between February 6, 2023, and February 24, 2023. A total of 138 members of the UH community including students, faculty, staff, and administrators pre-registered to attend at least one of the town hall sessions. Of the 138 registrants, 101 (73%) attended the town hall session(s). Table 4 represents the number of registrants and attendees for each of the town hall sessions.

Table 4: LMS town hall registrants and participants by session

Town Hall Session	Date	Registrants	Participants
1	February 6, 2023	42	28
2	February 8, 2023	14	13
3	February 14, 2023	30	22
4	February 16, 2023	17	11
5	February 22, 2023	18	12
6	February 24, 2023	17	15
		Total registrants 138	Total participants 101

Each town hall session followed the same agenda, which began with an overview of the LMS review process. Following the overview, participants had the opportunity to engage

in small group discussions about one of the LMS platforms under review. Breakout rooms were used for these 30-minute small group discussions. Participants were able to self-select their breakout room of choice based on the LMS platform they wanted to discuss. Several participants attended multiple town hall sessions to participate in small group discussions for more than one LMS platform.

Members of the LMS review team volunteered to serve as co-facilitators for the discussions; co-facilitator teams were assigned roles of either a note-taker facilitator or a discussion facilitator for one of the LMS platform discussions.

The breakout session discussions were based around the following four guiding questions:

1. What excites you about this LMS platform?
2. What concerns you about this LMS platform?
3. How could teaching and learning be different if this LMS platform is adopted across the UH campuses?
4. What questions do you have about this LMS platform?

A whole group discussion followed the breakout sessions, where co-facilitators shared an overview of the discussion that occurred in each of the breakout sessions. Participants also had the opportunity to ask follow-up questions, and voice additional thoughts, comments, or concerns during the whole group discussion.

Each town hall session concluded with a poll asking participants to rank the three LMS platforms and Laulima in their current order of preference from 1st to 4th choice. Figure 2 and Table 5 provide the aggregate poll results from all six town hall sessions, and represent the four LMS platforms by 1st, 2nd, 3rd, and 4th choice. Seventy-seven responses were submitted in aggregate across the six administrations of the poll conducted across the town hall sessions.

Figure 2: LMS platform preference poll aggregate data

N = 77 participants

LMS Platform Poll Aggregate Data

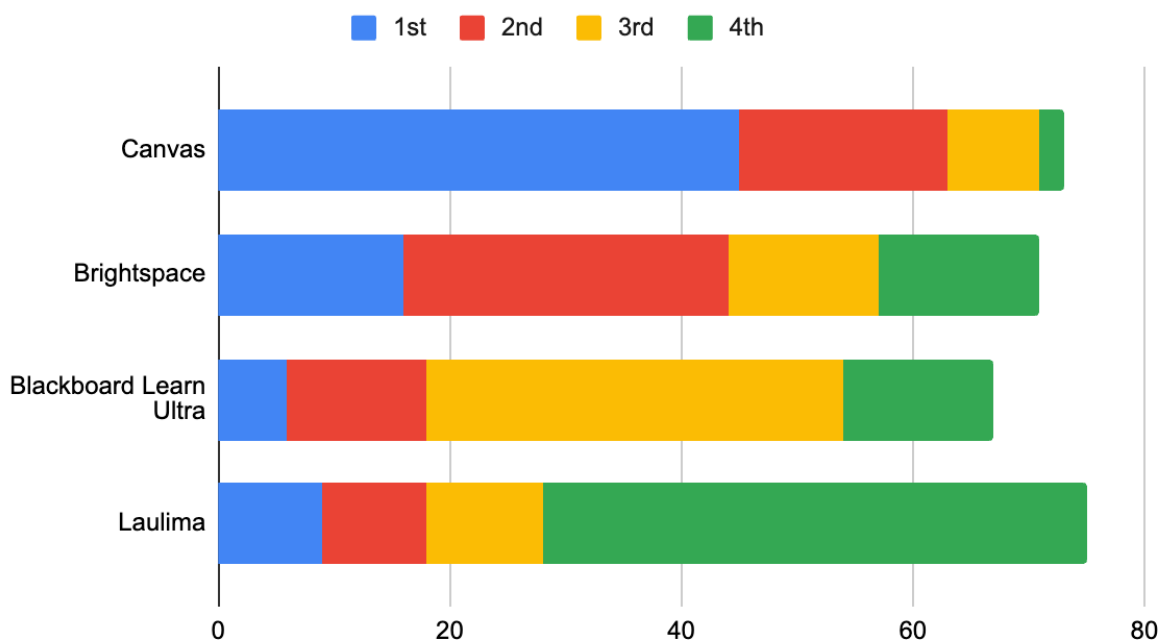


Table 5: LMS platform preference poll aggregate data by percentage

N = 77 participants

Choice	1st	2nd	3rd	4th
Canvas	59.2%	26.9%	11.9%	2.6%
Brightspace	21.1%	41.8%	19.4%	18.4%
Blackboard Learn Ultra	7.9%	17.9%	53.7%	17.1%
Laulima	11.8%	13.4%	14.9%	61.8%

LMS Review Consider.it Forum

In addition to participating in discussions and polling during the LMS review town hall sessions, the [LMS Review Consider.it forum](#) was available for community input. All UH stakeholders were able to provide opinions by indicating level of agreement or disagreement with six statements about teaching and learning, and rating each platform

on a scale ranging from weak to promising on 12 features of the LMS platforms. Each of the features or teaching and learning statements also provided an opportunity to elaborate with open responses identifying pros and cons. There were tabs for each of the three LMS platforms currently under review. While there was not a tab for responding to teaching and learning statements or features for Laulima, forum participants were instructed to use the pro and con open response entries to address comparisons to Laulima.

The LMS Review Consider.it forum was introduced during each LMS review town hall session, and the link was accessible from the LMS Review website between February 6, 2023, and March 10, 2023. A total of 83 users provided input to the LMS Review Consider.it forum. Table 6 identifies the 83 forum users by their primary UH role(s), with some users identifying more than one primary UH role. The users represented nine of the ten UH campuses, as well as UH System offices.

Table 6: LMS Review Consider.it forum by primary UH role

N = 83

Some users identified more than one primary role (i.e. faculty and instructional designer)

UH Role	Number of users	Percentage of users
Faculty (full-time & lecturers)	45	54%
Students (undergraduate & graduate)	16	19%
Instructional Designers	16	19%
Student Affairs faculty and staff	4	5%
UH system Information Technology Services staff	5	6%
Administrators	5	6%

The forum closed user submissions on March 11, 2023. However, the LMS Review Consider.it forum link remained available on the [LMS Review website](#) for viewing of anonymous opinions and responses. Access to the data from the forum was

consolidated and made available to all LMS Review Team members for review and consideration in their input regarding the three LMS platforms under review.

K16 Solutions Sample Course Set

When considering a transition from one LMS to another, arguably the primary concern for faculty is the process of migration of content from the legacy platform (Laulima) to a new LMS platform. Two vendors, D2L and Instructure, both suggested that UH consider the services of K16 Solutions, a company that specializes in migration of content across LMS platforms.

As part of the LMS review process for UH considering a potential migration from Laulima to a new LMS platform, K16 Solutions offered to migrate a sample set of 15 courses from Laulima into the sandbox instances of the three LMS platforms under review. This provided an opportunity for LMS review team members and LMS evaluators to observe the content of the same set of courses migrated from Laulima into each of the sandbox environments. K16 Solutions reiterated that the migrated content for the sample set of courses would represent the first iteration, and not the potential final migration level of teach-ready content, should K16 Solutions be contracted to provide migrations services from Laulima to a potential new LMS.

The selection process for identifying the 15 courses to include in the sample set was presented to the LMS Review Team. The faculty members serving on the team were offered the opportunity to include one of their Laulima course sites in the sample set, or they could work with the instructional designer representative team member from their campus to identify another faculty member who would be interested in including a Laulima course site in the sample set. UH Mānoa was offered the opportunity to identify 4 courses to include in the sample set. UH West O'ahu and UH Hilo were each offered 2 courses to include in the sample set. The seven UH community college campuses were each offered one course to include in the sample set. If a campus chose to select fewer than their allotted courses for the sample set, there were campuses with additional courses that were waitlisted for available slots. The campuses, and courses included in the K16 Solutions sample set are listed in Appendix A.

All LMS review team members and LMS evaluators were enrolled in the 15 courses included in the K16 sample set to observe the courses migrated from Laulima into each of the sandbox instances of the LMS platforms. However, 9 of the 15 faculty members with a course included in the K16 Solutions sample set were not serving on the LMS Review Team or as an LMS evaluator. These 9 faculty were provided access to the sandbox instance and asked to complete a form to provide feedback on the observation of the migrated content of their course across the three LMS platforms. The feedback

form was intended to determine how much additional work would be required for the course to be in a teach-ready state based on the migration services provided by K16 Solutions across the three LMS platforms.

The sample set of courses migrated by K16 Solutions were initially available in the UH Canvas sandbox on March 13, 2023. However, due to challenges encountered by K16 Solutions, migration of the sample set of courses into the Blackboard and Brightspace sandboxes was delayed until March 22, 2023. Once the sample courses were identified in the sandbox environments, the representatives for all three vendors were expeditious in enrolling LMS review team members, evaluators, and faculty with courses in the sample set into the migrated courses within 24 hours of the migrated courses being pushed into the each of the LMS platforms by K16 Solutions.

Given the delay by K16 Solutions in availability of the sample set of courses migrated across the three platforms, the deadline for evaluation rubric submissions and K16 migration feedback was subsequently extended from March 31, 2023, until April 14, 2023. Due to this setback, Anthology, D2L, and Instructure were asked to provide UH with all available options for course content migration, with or without the services of K16 Solutions. The findings related to course content migration options will be further discussed in the sections of this report for each vendor.

Feedback regarding K16 Solutions sample migrations.

Observations and evaluation of K16 Solutions' migration of a sample set of courses across the three LMS platforms currently under review by UH, made it apparent that there is a stronger relationship between Instructure and K16 Solutions. Additionally, K16 Solutions appeared to prioritize the migration of courses into Canvas over the other two LMS platforms during this evaluation process. This prioritization of migration into Canvas by K16 Solutions during this evaluation is reflected in the following quotes from two instructors with courses included in the K16 Solutions sample set who closely observed and assessed the amount of additional work that would be required for their migrated course to be in a teach-ready state.

“The imported Canvas site is the closest to my original Laulima site. [K16 Solutions import into] Canvas imported more quiz, assignment, and course content than Blackboard and Brightspace combined, and by a wide margin. Some effort would be needed to fully transition to Canvas, but it's not like having to practically start from 0 like Blackboard or Brightspace.”

“[K16 Solutions] Migration to Canvas maintained the best fidelity of 3 LMS, but still a lot of work to do so I rate Canvas the highest. Everything was simply pasted onto 1 page in a Module. This is the same with the other LMS, but it is not

conducive to good course design & LMS functionality = everything would still need to be pieced out.”

Feedback from the LMS review team members who also observed the sample set of course migrations felt there would be additional work required after migration in order for the courses to be considered teach-ready.

“I was really quite disappointed in the quality of some of the imported courses from Lulima into the new systems. It seemed that the imported courses would require a lot of tweaking to get them really looking and functioning good, rather than something that would be almost ready to go from the start.”

Lulima (Sakai LMS)

Sakai is an open-source learning management system (LMS) platform that was developed by a consortium of universities in response to commercial LMS platforms available in the early 2000s. The Sakai Project was a community source software development project founded by the University of Michigan, Indiana University, MIT, Stanford, and the uPortal Consortium with the support of the Mellon and Hewlett Foundations. The aim of the Sakai Project was to develop a pre-integrated collection of open-source Collaborative Learning Environment software for the higher education community. The first version of Sakai software, Sakai 1.0, was released in October 2004.

Since its inception, Sakai has been adopted by institutions worldwide and has undergone several updates and revisions to address changing technology and user needs. However, in recent years, Sakai has faced challenges with declining market share as institutions that were once members of the Sakai community, including the founding institutions, have transitioned to other LMS platforms. Sustainability and information security are significant concerns with the declining user community.

University of Hawai‘i System Legacy LMS

Since 2007, Lulima (Sakai) has been used systemwide across all ten campuses of the University of Hawai‘i. Every course record number (CRN) generated in BANNER is assigned a Lulima site. Instructor-level access is provided to the instructor of record for the CRN. Lulima sites are automatically generated for all CRNs regardless of course modality. Therefore, Lulima is utilized, to varying degrees, for all course modalities including in-person, hybrid, and online courses across all UH campuses. Automated enrollment of students into Lulima course sites is also well integrated between BANNER and Lulima.

As an open source LMS platform, Laulima is self-hosted on a UH server. LMS administration and support is provided systemwide by UH Information Technology Services (ITS). The ITS Help Desk provides tier 1 support for Laulima users 24 hours a day, 7 days per week, 365 days per year. The LMS Administration team responds to tickets escalated from the Help Desk staff.

Laulima offers a wide range of features and tools for managing course content and activities using tools such as lessons, gradebook, assignments, discussion forums, and assessment tools. One of the benefits of Sakai is its open-source nature, which is highly customizable by individual faculty and instructional designers.

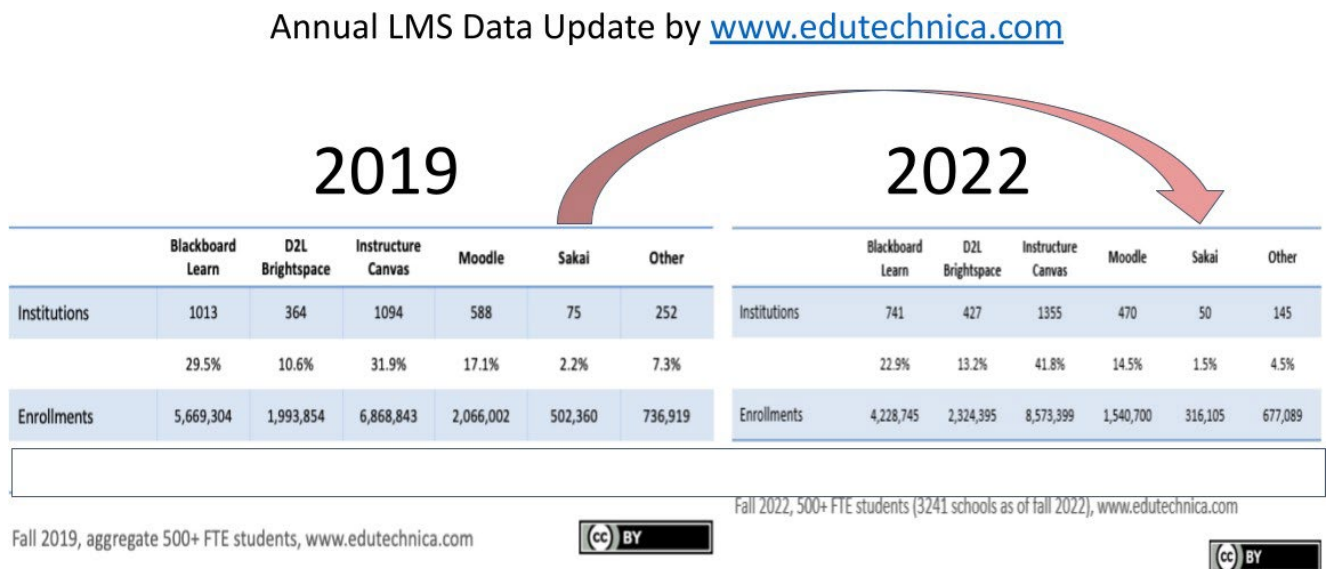
Several systemwide groups provide collaborative support and attention to Laulima as the systemwide LMS for the UH system. These groups include Instructional designers serving the UH system through the UH Online Innovation Center (UHOIC), as well as instructional designers for the UH Community Colleges. Instructional designers serving on individual UH campuses work collaboratively with UHOIC through the UH Instructional Designer Professional Learning Community (UH ID PLC). The UHOIC and UH ID PLC develop and deliver professional development for faculty and staff on best practices using Laulima. Additionally, Laulima course templates have been created by UHOIC, as well as through the UH ID PLC, to support a consistent and organized user experience in Laulima.

The Director of Online Learning convenes the Laulima Advisory Group which includes faculty and instructional designer representatives from all ten campuses, as well as LMS Administration team and UHOIC representatives. The Laulima Advisory Group meets four times per year to discuss common issues and concerns related to Laulima.

Sakai Declining Market Share

Use of the Sakai platform has diminished significantly in the last five years, now retaining only 1.5% market share in US higher education ([PhilonEdTech Post-Conference LMS Market News](#)). [Edutechnica](#) provides an annual LMS data update report. Figure 3 shows that in 2019, the 7th Annual EduTechnica LMS Data Update reported 75 Sakai institutions, accounting for 2.2% of the market share. However, in 2022, the [10th Annual Edutechnica LMS Data Update](#), reported that out of the 3,222 Higher Ed "schools" with over 500 FTE in the US, only 50 were still using Sakai, accounting for just 1.5% market share.

Figure 3: Annual LMS Data Updates by www.edutechnica.com



Source: [10th Annual LMS Data Update, edutechnica, November 10, 2022](https://www.edutechnica.com/10th-annual-lms-data-update/)

All of the original members of the Sakai community have transitioned to other LMS platforms citing the need for a more modern, user-friendly platform that could better support their teaching and learning goals, as well as the need for a more unified and integrated platform. Consequently, fewer developers, publishers, and third-party educational technology vendors are attending to Sakai, and this downward trend is likely to continue. The rapidly declining market share raises concerns about sustainability of the Sakai platform.

In addition to declining market share, with Sakai community institutions transitioning to other LMS platforms, information security is another concern with using an open-source LMS platform with a declining user community. With a smaller market share, there are fewer resources available to identify and address security vulnerabilities, as well as a smaller user base to share information and solutions for addressing these issues. Updating to newer versions of Sakai is a potential safeguard to address information security. However, given the continuous use of Laulima for active courses on a self-hosted platform, there is only one small window of opportunity in December between the fall and spring semesters when UH courses are not actively in session in order to upgrade Laulima to a new version of Sakai. Therefore, Laulima is typically updated with a new version of Sakai annually.

Sakai +

One of the founders of Sakai is responding to the declining market share of Sakai institutions with a [Learning Tools Interoperability \(LTI\)](#) product called [Sakai +](#). LTI is a standard developed by [1EdTech Consortium](#) that allows courseware and learning tools from different vendors to be launched within a learning platform, often an LMS. As an LTI provider, Sakai potentially could integrate with any of the LMS products currently under review by UH. Essentially, Sakai + functions like other 3rd party EdTech tools such as MyMathLab or course materials offered through a publishing company.

For the UH system, Sakai + as an LTI is noteworthy to consider as a component that could facilitate the potential transition from Laulima to a new LMS system. If a new LMS is deemed necessary for the UH System, using Sakai +, instructors with extensive course materials developed in Laulima could connect their Laulima content into the new LMS using the Sakai + LTI. Sakai + could be incorporated for a defined period of time as part of a transition plan.

There are potential precautions to consider for Sakai + as an LTI as well. Providing an opportunity to link existing Laulima course content into a potential new LMS for UH through Sakai + would ultimately require more UH students to navigate and function between two different LMS platforms. Functioning across multiple platforms is counterproductive to creating a streamlined LMS that is consistent across the UH system. The UH resources would also be required to maintain Laulima, in addition to navigating the transition to a new LMS platform. However, given that Sakai + is scheduled for beta testing in Summer 2023, the potential support of Sakai + as an LTI provider is a factor to consider and explore with the vendors should the UH System proceed with selecting a new LMS platform.

UH Community Support for Laulima

Consistent with the polling results from the LMS review town hall sessions presented in Figure 2 and Table 5, a small number of UH faculty advocated for the continuation of Laulima as the UH LMS platform. In a poll of the LMS Review Team represented in Figure 4 and Table 7, two of nineteen team members who responded to the poll identified Laulima as a viable option. However, multiple team members provided open response feedback related to maintaining Laulima. The reasons provided for supporting continuation of Laulima included a preference for the flexibility of customization, particularly provided through the Lessons tool in Sakai. The following quotes from two LMS Review Team members represent this perspective.

“There are courses that are elegantly built and maintained by the instructor, and carried forward from term to term, and these would require a large investment of that instructor's time and energy to rebuild in a new platform. However, these are

the instructors who would be best served by the improved capabilities of modern courseware.”

“As a FOSS [Free and Open Source Software] advocate, I think Sakai's open source model is admirable and worthy of note. Also, there are tools and features in Lulima that actually outperform the three alternatives (e.g., editing file details, gradebook options, the customization options of Lessons modules, etc.).”

Additionally, faculty who oppose an LMS change are concerned about the labor invested over the past 15 years learning the Lulima platform, and their investment in development of course materials in Lulima. The faculty learning curve and migration of content from Lulima into a new LMS platform are the primary concerns of faculty advocating for continuing the use of Lulima as the UH LMS platform.

“Changing the LMS presents a large amount of work for faculty who have already spent time developing courses in Lulima. It should not be changed without very good reason, as it effectively represents the destruction of a large amount of their work and institutional knowledge and expertise.”

UH Community Concerns with Lulima

The polling results from the LMS review town hall sessions indicated 61.8% preference for any of the three platforms being reviewed over Lulima. This is consistent with the input received from LMS review team members who had the opportunity to learn about the platforms from the vendor demonstrations, explore the sandbox environments of each platform, including the K16 Solutions migrated course content. Of the LMS review team members who provided feedback, 89% felt that Lulima is no longer a viable option for the UH system-wide LMS. The majority of open response feedback from review team members expressed concerns related to the declining market share, availability of resources, and a need for a modern LMS platform with features such as updated technologies, responsiveness and multimedia tools. The following selection of quotes from review team members reflect these sentiments.

“A very small percentage of higher education systems are currently using Sakai. There has been a tremendous departure from the platform recently. New tech tools will not make an effort to be compatible with Sakai with so few institutions using the service. In addition, tech support will likely be less readily available.”

“According to an April 10 article on EduTechnica.com (<https://edutechnica.com/2023/04/10/lms-data-spring-2023-updates/>), out of the 3,222 Higher Ed "schools" with over 500 FTE in the US, only 50 were still using Sakai as of Spring 23. It is unclear whether the UH System is represented in this

data as one school or ten, but either way this positions Sakai for increasingly degraded function and development stagnation as those who were maintaining it for their school or system move away to more modern platforms.”

“ I think an LMS that allows instructors to create multi-media content natively would be extremely beneficial. As students have expressed time and time again, they don't want to have to navigate multiple services and platforms (e.g., Flip, EdPuzzle, etc.) to complete their coursework.”

“Finally, the "Is there an app for that?" sentiment is extremely important today-- more than ever before. With the proliferation of smartphones, tablets, Chromebooks, and other ultra-mobile computing platforms, an LMS needs to be nimble and be able scale on the mobile browser and have a dedicated mobile app that ensures ease of navigation and the same (or at the very least, similar) look and feel of the desktop UI. Dedicated apps that allow for notifications and the ability to complete basic tasks are necessities, not "nice-to-haves.”

While supporters of Laulima favor the customization of Laulima, an LMS review team member noted the efforts entailed in making Laulima appear to be a modern LMS is reflected in the following quote.

“Continuing to use Laulima will increase the technical debt taken on by our faculty, instructional designers, and students. The amount of customization required to make Laulima appear to be a modern LMS is not sustainable, and will not allow us to innovate or build new capabilities into the future. We must leave Laulima behind.”

The “technical debt” of maintaining and enhancing Laulima also impacts the workload of ITS in the work of the UHOIC and the Laulima admin team.

Assessment - Laulima

The UH Systemwide Assessment Coordinators Group’s overall rated Laulima as “weak”. The Feedback on Potential Learning Management Systems for UH from is available in Appendix B. The group’s comments related to their evaluation of Laulima’s capabilities for learning outcomes assessment stated,

“Laulima lacks the functionality needed for UH campuses to summarize learning achievement data by learning outcome for courses, programs, and at the institution level. The ability to summarize is a basic requirement for compliance with institutional accreditation.”

Recommendations regarding maintaining Laulima

Members of the LMS review team were asked to provide feedback based on their assessment of the three platforms under review. Nineteen responses were received, representing all ten campuses. Instructional designers from each campus and faculty representatives from 8 campuses responded, as well as one undergraduate student member of the LMS review team.

Figure 4: LMS Review Team Member poll

N=19 (11 instructional designers, 8 faculty, 1 student)

Based on your participation in the evaluation process, please indicate the platform(s) you find as viable options for a system-wide LMS platform for UH.

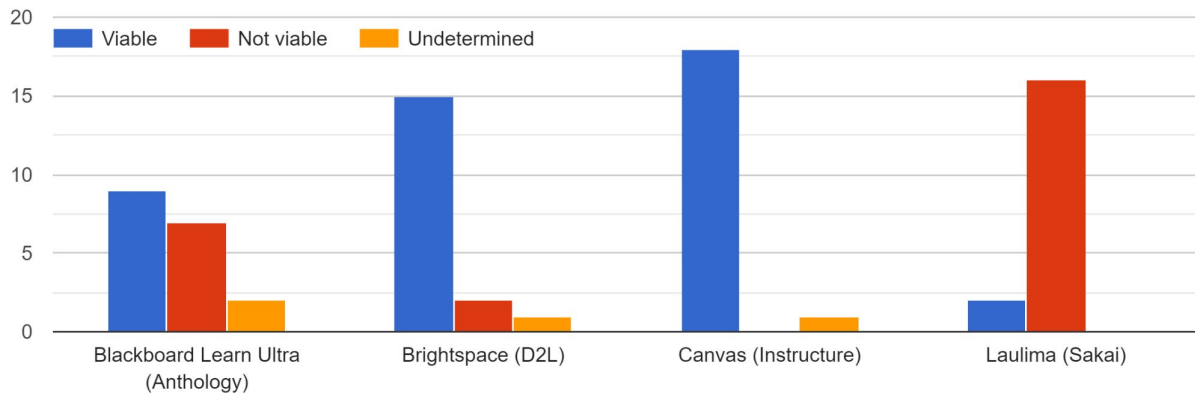


Table 7: LMS Review team member poll

Platform	Viable	Not viable	Undetermined
Blackboard Learn Ultra (Anthology)	9	7	2
Brightspace (D2L)	15	2	1
Canvas (Instructure)	18	0	1
Laulima (Sakai)	2	16	

Regarding faculty workload concerns with transitioning course materials from Laulima into a potential new LMS platform, migration options were explored extensively with each of the three vendors, with and without the services of K16 Solutions. The following sections will discuss migration in further detail for each of the LMS platforms under review.

Blackboard Learn Ultra by Anthology

Introduction - Anthology

While Blackboard is a familiar learning management system that was initially released in 1997, Blackboard Inc merged with Anthology in late 2021. Following the merger, the Blackboard Learn LMS was rebuilt into Blackboard Learn Ultra. In the Blackboard Learn Ultra faculty and student demonstrations, Anthology representatives introduced the UH community to Blackboard Learn Ultra as the newest, most modern, intuitive, and personalized Blackboard Learn user experience. Blackboard Learn Ultra is characterized by simplified workflows and an accessible, fully responsive design across mobile devices.

Anthology representatives also emphasized that Anthology provides an EdTech ecosystem with integrated solutions including Anthology Student, a student information system (SIS), Anthology Reach, customer relationship management (CRM), and Blackboard Learn Ultra LMS. The integrated Anthology products are designed to support the entire learner lifecycle. However, the nature of this review focuses solely on Anthology's LMS product, Blackboard Learn Ultra, as a stand alone Anthology product.

The Blackboard Learn Ultra suite includes the LMS, Blackboard Data, SafeAssign, a plagiarism detection software, and Anthology Ally, an accessibility tool that creates inclusive learning environments with the ability to tailor the user experience to specific needs and preferences. While Anthology Ally can be purchased to accompany the web-based application of other LMS solutions, Anthology Ally is only supported through the mobile application for Blackboard Learn Ultra.

Supplemental Anthology Products

Additional Anthology products designed to complement the features of Blackboard Learn Ultra include Anthology Milestone, a digital badging platform that can support micro-credentials, stackable micro-credential pathways, and digital badging.

Anthology Hawaiian Language Support

On February 7, 2023, Anthology's Senior Director of Academic Innovation emailed the following product development announcement regarding Anthology's commitment to the development of a Hawaiian language pack for Blackboard Learn Ultra.

"We recognize that the capability for the UH System's LMS to be represented in the Hawaiian language is paramount to the student and instructor experience and to the evaluation of LMS providers as a whole. To this point, we understand no vendor that currently offers that capacity has been identified.

Excitingly, and symbolizing the investment we want to provide to the Hawaii System's environment, our team has committed to a Hawaiian language pack for Learn Ultra's interface PRIOR to [a potential] contract signature. It would be our hope that UH's team would partner with and provide guidance to our team to idealize this end result, collaborating on quality insurance and testing.

To that end, our head of product would also like to offer regularly scheduled meetings with the UH System team to ensure that we are continually innovating and designing the product overall as best meets the needs of the UH System's community.

I'd be happy for you to share this news with the evaluation committee, as a sign of our commitment to continued improvement and this partnership."

Content Migration into Blackboard Learn Ultra

Anthology responded to the inquiry regarding migration options by requesting an additional meeting with both onsite and remote representatives from Anthology, specifically to discuss migration options using [Anthology Tailored Support + K16 Solutions](#). Through this recommendation, Anthology would partner with K16 for the automated conversion, and provide additional services including course design support, custom technical support, and faculty and administrative training provided through Anthology.

A sample of Anthology Tailored Support + K16 was provided by Anthology using the ECON 130 course included in the K16 Solutions sample set. Anthology provided a partial conversion that included the course overview and course syllabus which included embedding Google docs, and the course content for Weeks 1 through 4.

Assessment - Blackboard Learn Ultra

The Systemwide Assessment Coordinators Group evaluated the assessment features of Blackboard Learn Ultra based on the six crucial functions and four desirable functions. As described in the [feedback report](#), Blackboard Learn Ultra met four of the

six crucial functions. However, the assessment coordinators were unclear if Blackboard Learn Ultra accomplishes the desirable functionality for assessment of learning outcomes. The overall quality conclusion was that Blackboard Learn Ultra is “acceptable, not ideal” and ranked higher than Laulima. The full evaluation of Blackboard Learn Ultra by the Systemwide Assessment Coordinators Group is available on page 6 of Appendix B.

UH Community - Blackboard Learn Ultra Potential

Feedback from the UH Community regarding Blackboard Learn Ultra received through the LMS town hall session breakout room notes, LMS Review Consider.it forum opinions, and LMS evaluation rubric submissions, included positive feedback regarding accessibility for students, specifically with the features available through Anthology Ally.

“The best accessibility feature for students.”

“Ally Tool - strong accessibility tool. While all three provides an accessibility checker, knowledge base on issue, and assisting in correcting issue - the Ally Tool also provides alternative formats for documents for students. Faculty can also use these alternative formats to replace their unreadable documents.”

“The built-in accessibility features, which seemed comprehensive, flexible, and intuitive, were the most robust accessibility support of all platforms under consideration and actually attempt to educate course designers to empower them to make informed decisions.”

“ Accessibility, accessibility, accessibility! (What I mean is that the native accessibility tools are very welcomed and would allow faculty to improve the overall accessibility of their courses.)”

“ The alternative formats for files such as HTML, audio, immersive reader, etc. for files such as a PDF is amazing. “

“Strong emphasis on accessibility- documents can be read in many languages or in audio.”

LMS evaluators and review team members noted additional positive attributes of Blackboard Learn Ultra related to overall user experience and streamlined efficiency for both students and faculty as noted in the following statements.

“High-level overview (cross-course dashboard/stream of activity, deadlines, messages, etc.) for both student and faculty users could help users better manage info/tasks.”

“Feedback content library offers time-saving option for faculty to re-use common comments.”

“BBLU would give users an improved GUI (the “layered” interface is interesting).”

“Works well on all devices including mobile devices which many students use.”

“Utilizes various ways of interacting with students to increase engagement including text or push notifications- eliminates the need for an additional outside tool such as see-saw or Remind. Ability for students to change their name and add a pronunciation and pronouns- very inclusive. Student focused.”

UH Community - Blackboard Learn Ultra Concerns

Throughout the LMS review process, there was less attention among the UH community directed toward the Blackboard Learn Ultra platform, despite having the highest live participation attendance during the faculty and student demonstrations. There were fewer registered LMS evaluators for Blackboard Learn Ultra. Forty-three individuals registered to evaluate Blackboard Learn Ultra, with a rubric submission rate of 67%. Blackboard Learn Ultra, overall, scored lower among the three LMS platforms under review in nearly all criteria in the LMS evaluation rubrics. (Appendix C). There were also a lower number of pro or con responses in the LMS Consider.it forum for Blackboard Learn Ultra, including 5 responses to the 12 features statements, and 10 comments for the teaching and learning. The total of 15 responses for Blackboard Learn Ultra in the LMS Consider.it forum was significantly lower than the engagement on the forum for the other two platforms under review. The Summary of LMS Review Consider.it data is available in [Appendix D](#).

The two primary concerns with Blackboard Learn Ultra were related to the “newness” of the redesigned and rebranded Blackboard Learn Ultra since being acquired by Anthology. This concern was integrated with the trending decline in market share of Blackboard. The second primary concern was Anthology’s stronger partnership with Microsoft as compared to Google.

Caution was noted regarding consistently declining market share of Blackboard over the past seven years, which likely played a factor in the 2021 acquisition of Blackboard by Anthology. The subsequent “newness” of Blackboard Learn Ultra as a new LMS product also raised concerns among the UH community.

“This platform has made significant improvements over the last few years. It is at the early stage of a product life and, despite showing promise, the LMS lacks a significant competitive advantage over the other two platforms.”

“Blackboard Learn Ultra has a compelling package, which in my assessment, is just a bit ‘under cooked.’ There are a lot of promising features and tools, but there are too many unknowns at this time.”

“This LMS is relatively new and does not have a significant user community. It is a promising product but some of the important features (e.g. immature content editor, integration with Google apps) are still on the roadmap, which is a concern.”

“While Blackboard was a large player in the LMS market, it has been on a steady decline since 2016 and isn't showing signs of returning. Its features aren't as rich and well integrated as other platforms we evaluated.”

Anthology's demonstration of Blackboard Learn Ultra indicated a strong integration with Microsoft products, but not as well with Google apps. Although enhanced Google integration was noted as being on the product roadmap, the stronger partnership with Microsoft, as compared to Google, raised concerns.

“The platform seemed well integrated with Microsoft tools but less so for Google which is important for UH as a Google institution”

“Not fully integrated with Google. It can connect your Drive and pull in files but it doesn't fully integrate sharing and collaborating on google docs through the LMS.”

“The partnership with Microsoft makes Google integration seem like an add-on and not as inherent to the LMS experience.”

“When asked if certain features were available--e.g., integration with Google Workspace--too often the answer was “it's on the road map.” Although it's nice that things are on the road map, the fact it cannot do certain things, like integrate with Google, right now is a little concerning.”

Based on the LMS review team poll, 9 respondents identified Blackboard Learn Ultra as a viable LMS for the UH system, while 7 respondents concluded that Blackboard Learn Ultra is not a viable LMS platform for the UH system.

Brightspace by D2L

Introduction - D2L

Founded in 1999 and headquartered in Kitchener, ON, Canada ([D2L land acknowledgement](#)), D2L is the developer of the Brightspace learning management system, a cloud-based software suite. Brightspace has been gaining market share in the past couple of years with 55% of new market share for higher education institutions in North America in 2022. Recent higher education institutions that have migrated from the Sakai community noted that Brightspace provides modern features that are the most similar to popular tools in Sakai as one reason for their selection of Brightspace when transitioning from Sakai. In addition to the learning environment, Brightspace also includes a Learning Object Repository (LOR) and Portfolio as core features that would be included with Brightspace.

The Brightspace Learning Object Repository (LOR) is a shared online library within Brightspace for storing, managing, and sharing learning resources (learning objects). Creative Commons licensing can be attached to objects published in the LOR, supporting Open Education Resources and open pedagogy.

D2L's Brightspace Portfolio is a personal portfolio tool for storing, organizing, reflecting on and sharing items that represent their learning. Students and faculty can include items such as documents, graphics, audio files, videos, presentations, and course work to demonstrate skills in certain areas. Students can maintain their Portfolio year after year, as they progress through their learning journey and beyond.

D2L Hawaiian Language Support and Fulfilling Kuleana

On February 9, 2023, D2L provided the following update from their Localization and Product Team [D2L Brightspace Hawaiian Language Update](#) announcing the commitment to the development of the Hawaiian language pack for Brightspace. Additionally, in support of the UH 2023-2029 Strategic Plan Imperative, "Fulfill kuleana to Native Hawaiians and Hawai'i", the "[Fulfilling Kuleana Powered by Brightspace](#)" document was received on April 7, 2023, announcing D2L's commitment to help provide funding and technical assistance to support University of Hawai'i System's imperative to fulfill kuleana to Native Hawaiians and Hawai'i.

Supplemental D2L products

There are standard and premium tier versions of Brightspace. According to the [comparison chart](#), premium tier features include enhanced video assignment features. Additional premium tier solutions including [Creator+](#) for creating interactive multimedia content, and Performance+ Learning Analytics Dashboard as supplemental enhancements to complement the Brightspace Learning Environment. A two-year trial of Performance + Learning Analytics Dashboard would be included within a potential Brightspace contract for UH.

Content Migration into Brightspace

D2L did provide course content migration options that include K16 Solutions, as well as options that do not require contracting services of an additional vendor to support the transition from Laulima to Brightspace. D2L provides a Sakai conversion tool that facilitates moving courses from Sakai into Brightspace. The [D2L Implementation Guide](#) presented to the University of Hawai'i indicates that D2L also offers a bulk migration tool that can migrate 1,000's of courses.

Additionally, the D2L team connected the UH LMS Administration team with the University of Cape Town, a former Sakai community member that recently transitioned from Sakai v. 21 to Brightspace. University of Cape Town developed code for single course migrations from Sakai to Brightspace that faculty can use to self-manage single course migrations. The University of Cape Town and D2L have worked closely with the UH LMS Administration team to verify through proof of concept that using the migration tool created by the University of Cape Town is a viable option for single course migrations from Laulima into Brightspace.

The combination of bulk migration services provided by D2L and the single course migration that can be self-directed by faculty provide the greatest amount of flexibility for a potential transition from Laulima. UH campuses, colleges, schools, divisions, or departments could be scheduled for a bulk migration. However, individual faculty could migrate their course individually using the single course migration code and supporting documentation guidance for addressing any issues following the content migration.

Assessment - Brightspace

The Systemwide Assessment Coordinator Group found Brightspace to be promising with respect to assessment of learning outcomes at the student, program, and institutional level. The initial feedback report (Appendix B) noted Brightspace as meeting four of the six crucial functionalities, with two of the six functions being unclear. However, following an April 13, 2023, meeting with D2L VP of Architecture and a member of the UH system-wide assessment coordinator group, further clarification was received confirming that Brightspace meets all six crucial functionalities. The following

feedback from the assessment coordinator was submitted providing further insight into the clarification of these two crucial functionalities.

5. The LMS reporting function can produce a report of SLO achievement at the overall course level

(i.e., individual student data in the course are aggregated).

“Yes. D2L can operationalize this in two ways. In individual instructor’s course interface, they can build UH a customized data dashboard that shows course SLO achievement. At the Insight reporting admin portal, they can build a customized data report for individualized access to course SLO achievement data, meaning, each instructor can see their own course SLO data but not other instructor’s data. Program lead can see their own program level data but not other programs. This is what we need to gather SLO achievement data without compromising confidentiality.”

6. The software allows a data export of assessment data by each aligned SLO.

“Yes. Allows the export of assessment data with the aligned SLO. This can be operationalized through their Insight portal customized report.”

Highlighted benefits noted in the feedback on Brightspace assessment features include:

- Company responsiveness
- Rubric scoring
- Learning support provided to students
- Multiple permission levels
- Reporting functionality
- Alignment and inputting of outcomes across levels
- Templates

Additional details on the benefits, drawbacks, and comparisons can be found on pages 3-5 of Appendix B.

UH Community - Brightspace Potential

The demonstration of Brightspace as a potential new LMS was new and exciting for many members of the UH community. Initially, Brightspace had less name recognition or previous user experience among the UH community compared to the other two LMS platforms under review. Of the 48 registered LMS evaluators who requested to evaluate Brightspace, 73% submitted the Brightspace evaluation rubric.

Based on the analysis of the feedback compiled from the UH community, the primary potential benefit that stood out for Brightspace was the student-centric approach to

student engagement. Additional potential was noted in the robust features of Brightspace, including the ability to support STEM disciplines.

The student-centered learning environment of Brightspace was noted in features such as learning analytics, and the intelligent agent tool for automating messages to students based on criteria set by the instructor. The following quotes represent the value noted in the student centric features of Brightspace.

“Brightspace emphasizes on student engagement. Some of the tools that Brightspace featured that is geared towards the student: 1)replacement string - makes it more personable when addressing the students (ex. "Hello Dave!") rather than to the group (tho' it does provide faculty the choice to address the class or student), 2) Video notes gives a "human touch" within the LMS and tool is available for both students and faculty to use, 3) "@mention" in the discussion tool, 4) word count feature.”

“From a student perspective: Liked the ability to monitor class progress: 1) ability to check the progress in each class, 2) able to see the courses in a visual dashboard, 3) able to see overall rubrics, 3) able to see rubric, and able to be notified if grade drops below a threshold that instructor places. As a student, this will help alot to be aware of during the semester.”

“ Student retention & success - Learner analytics and Intelligent Agent (IA) are amazing tools that could help us track, alert, and guide our learners. IA tool even allows embedding of advisors, ensuring that multiple points of support students who might "fall through the cracks.”

“Intelligent Agent feature offers means for faculty to share just-in-time info and additional support materials for students who meet specified conditions.”

“The Intelligent Agents tool would be particularly useful for personalizing a student's course experience and increasing engagement and achievement levels. This tool makes possible a kind of tailored feedback and follow up (or referral) that can enable a learner to develop a sense of how to succeed in all their classes (and in a workplace, and life in general) by shifting focus away from interpreting an assignment or test grade as a concrete representation of their performance, and instead framing it as a communication about where they are with the material and how to increase their understanding of the content that may be unclear.”

The ability to create video content and generate video notes as a communication tool was also noted as having the potential benefit of “humanizing” the digital learning environment. An additional potential is to reduce reliance on 3rd party tools into the LMS based on the wide variety of tools incorporated with Brightspace.

“Video content creation/management seems robust.”

“I particularly appreciated the video assignments tool (additional cost). I like the ability to ‘rate’ the speaker and embed questions in videos. I also like that you can create group and peer-response video assignments. With a tool like this, there is no need for EdPuzzle and Flip.”

“The sheer breadth of tools available to mimic or replace functions we currently rely on 3rd party tools for would be lovely to have in an integrated cohesive way. Creator+ seems completely worth having.”

LMS evaluators representing STEM disciplines also found promising potential in support for mathematical formulae in Brightspace. This is particularly noteworthy, as support of mathematical expressions and scientific symbols has historically been a challenge for transitioning STEM teaching and learning into LMS platforms.

“For STEM instructors, the D2L support for mathematical formulae was by far the best, both in terms of flexibility, ease of input, and being universally available in all tools. It has easy GUI systems for mathematical input that novices and students will find easy to use, and crucially, it also has seamless text-based input of math for expert users that does not require any clicking or additional popups. The mathematical input was available in all tools that I tested, and worked the same in all of them, something that is not true for any of the competing systems.”

“The math support is a very strong point in favor of Brightspace for me. If it was up to me, as a math instructor that uses a non-traditional mastery-grading system these two points would be the decisive factors in favor of the D2L LMS product.”

The robust features of Brightspace present a learning curve that faculty would need to navigate. However, some faculty members felt the challenges of learning Brightspace would be worthwhile. The following quote compares the robust features of Brightspace to the current flexibility in content creation in Lulima.

“As an instructor who would have to learn a new platform, then adjust my courses to the new platform (a daunting task, even for someone comfortable teaching online), I think it is important to find a platform that is a little similar to

Laulima (not something so unfamiliar that it is not accessible to all faculty). To me, that seems to be Brightspace. It has similar features that I like in Laulima and has a modern look and a few more tools to learn.”

UH Community - Brightspace Concerns

While the robust features of Brightspace were identified as having positive potential, the subsequent learning curve for faculty was embraced by some, there were also concerns about the steep learning curve. The modern look and feel of the platform was also received with mixed reviews.

“I feel that there will be a big learning curve for faculty in learning how to use Brightspace as it’s so different from Laulima in layout and content creation. Also, some of the faculty may look at some of the features as more bells and whistles and either won’t use them or won’t use them correctly.”

“Too many clicks to get somewhere, not easy for faculty or students to figure out instantly, too much steps to set up, asyc. classes may face difficulty in following to set up with lots of details”

D2L’s recent growth in the LMS space, while impressive, also raised concerns among the UH community.

“ D2L grew very quickly in the last year or two, but they seem very organized and clear about where they are headed. Just a small concern whether or not they can continue to adapt to the growing pains well.”

“It is at the early/growth stage of a product life cycle and has many features that can support student success but has a smaller user base than Canvas.”

Canvas by Instructure

Introduction - Instructure

Founded in 2008, Instructure is an educational technology company based in Salt Lake City, Utah. It is the developer and publisher of Canvas, a web-based learning management system. Canvas has been the leading LMS provider with [Edutechnica](#) reporting Canvas accounting for 41.8% of the market share in 1,355 higher education institutions in 2022. Canvas now serves as the official LMS across all three sectors of public higher education in California, including the University of California, California State Universities, and California Community Colleges. Instructure has successfully maintained higher education institution partnerships over the past decade. According to

[Phil Hill](#), “There have been sub-institutional defections, where a specific program at a Canvas school chose to go with another LMS, but nothing in higher ed for an entire institution.”

In the 2017 UH evaluation of a potential new LMS, Canvas was a strong contender. The Senior Regional Director of Sales who is currently serving as the primary UH contact for this LMS review also represented Instructure during the 2017 LMS evaluation process. Similarly, to the 2017 evaluation, Canvas presents as the popular choice among the UH community in this LMS review process as well. Canvas had the highest attendance in each of the breakout room sessions during each of the LMS town hall sessions. The LMS Preference Aggregate Poll presented in Table 5 shows that Canvas was the first choice for 59.2% of participants and 26.9% selected Canvas as their second choice. Of the 13.4% of participants who selected Laulima as their second choice, all selected Canvas as their first choice. This suggests that the strongest supporters of Canvas would prefer not to transition to a new LMS unless Canvas is selected.

Canvas had the highest rate of participation in the LMS Review Consider.it forum, with a total of 63 pro and con responses, and a combined total of 590 opinions recorded between the 12 features statements and 6 teaching and learning statements. Additionally, Canvas had 61 registered LMS evaluators, with a 67% submission rate of Canvas evaluation rubrics.

As noted in the LMS Evaluation Rubric Average Scores (Appendix C), Canvas had the highest scores in most categories across the three evaluation rubrics. On the Functionality rubric, Canvas scored highest in 17 of 19 criteria, with Brightspace taking a very slight lead in two categories. Similarly, for the Technical rubric, Canvas scored highest in 18 of 19 criteria, tied with Brightspace on 1 criteria, and was a close second to Brightspace in 1 criteria. For the Innovation rubric, Canvas scored highest in all 5 criteria.

Supplemental Instructure Products

Instructure offers a suite of supplemental products that integrate with the Canvas LMS. The following four products were presented to the UH Community during the review process

- [Canvas Studio](#) - A communication tool that allows instructors and students to actively collaborate through video and audio media by engaging directly on the media timeline.
- [Canvas Catalog](#) - A customized online course catalog that is native to Canvas and used primarily for non-credit, continuing education offerings. Canvas Catalog

includes a branded marketplace with a course registration system, payment gateway, and learning platform.

- **Canvas Credentials** - A subscription service that allows digital badge program administrators to advance their digital badging system using Canvas Credentials Pathways, QR and claim codes. Canvas Credentials can be used with LTIs for Canvas and other LMSs.
- **Canvas Student Pathways** - Custom, stackable pathways that help students navigate their academic and co-curricular journeys, and provides a roadmap for acquiring new skills.

Hawaiian Language Support

Canvas currently supports [41 languages](#) including 31 languages that are professionally translated and maintained by Instructure, and 10 languages translated through crowdsourcing. Instructure has expressed interest in partnering directly with UH resources in the development of a Hawaiian language pack for Canvas. This commitment was confirmed in an email correspondence received from Instructure Sr. Regional Director, Sales on April 10, 2023.

“If Canvas LMS is chosen for your statewide LMS evaluation, Instructure is committed to building the Hawaiian Language pack at no charge. As discussed, we could build it using our 3rd party partners or partner directly with UH's resources (staff, professors, students, community experts, alumni, etc...) on a project that reinvests and awards your community.”

Content migration into Canvas

Based on Instructure’s previous experience with LMS migrations from Sakai to Canvas, Instructure strongly recommends the services provided by K16 Solutions as the most efficient option for supporting a potential transition from LauLima to Canvas. With the only option offered by Instructure for content migration between LauLima and Canvas requiring contracting services of an additional third-party vendor, there would be additional cost implications for UH in order to facilitate the course migration process. Additionally, the timeline for content migration will need to be coordinated with both K16 Solutions and Instructure.

Assessment - Canvas

The Systemwide Assessment Coordinators Group’s feedback indicated Canvas as promising. Canvas was found to provide all six of the crucial functions, and one of the four desirable functionalities.

Benefits

- Allows instructors to add users (e.g., program assessment coordinator) to access the course to create rubric and download test/rubric scores.

- Has a rubric easy-scoring interface with the automated feedback option for each performance level on each rubric criterion.
- Through a download of CANVAS's raw data and a manual process to connect the data from the student information system, it is possible to disaggregate students' achievement results based on student characteristics (e.g., international students, out-of-state students, females/male/non-binary, full-time/part-time) for equity investigation.
- Can connect to third-party products such as Tableau and PowerBI for the shared data dashboard to show within the CANVAS admin account.
- Program and institutional assessment can be done in two ways: Program and institutional level assessment coordinators can input program/institutional level outcomes, rubrics, and assignments for faculty to choose and use.
- We can develop a course template with existing outcomes, rubrics, and assignments built-in.

Additional details of the feedback provided on the assessment features for Canvas can be accessed on pages 2 and 3 of Appendix B.

UH Community - Canvas Potential

Some of the popularity of Canvas was connected to prior experience with Canvas within various sectors of the UH community coupled with the large user community, as noted in the following quotes.

“We have had experience with canvas before at our school, and I am sure at other UHC institutions, so there is some familiarity with canvas.”

“Canvas has already been piloted by several departments around the system with success.”

“Used Canvas for many years. Seems to be the most user friendly for faculty. Has a short learning curve, especially when working with new faculty who have not used LMS prior. “

“Canvas is popular, many people may have other experience with Canvas. FERPA compliance is easier to opt out of sharing of private info.”

“There is a large user base, and Canvas Commons provides access to great resources like course templates. Because of its current market share, Canvas has established support materials that new adopters would find extremely useful. Canvas is a known entity and would undoubtedly provide a solid LMS.”

“Has the largest number of institutions and uniquely enrolled students.”

“Canvas is probably the biggest, most well-known modern LMS in Education, and as such serves as a bit of a “gold standard” for design, functionality, and community. Having our course content built with that level of universality would undoubtedly be beneficial for our students' experience with navigation of courses, but might erode our ability to distinguish ourselves as a system (and as individual institutions)...Instructure is a big company with a gigantic community. If there's a function or feature that we can imagine, chances are good that they either already have it in development or that we could propose it and they'd have the capability to develop it.”

Canvas also was perceived to be the simplest LMS platform to implement, facilitating a smoother transition process for both students and faculty. Additionally, Canvas integrates more seamlessly with current technologies used by the UH community.

“Student perspective on canvas: like the UI better than Laulima/Sakai. Dashboard easy to follow. Timeline of activities. The gradebook is easier to understand than Laulima.”

“The interface may not be as spiffy as the other two, but it's still modern, easy to use and a well-designed platform which the tools work seamlessly together.”

“The migration from Laulima to Canvas also seems more feasible than the other two platforms. Full Google Drive integration in the LMS with sharing and collaboration. It's a more open platform in being able to connect different tools and platforms.”

“This system has an initial look and layout that is the most similar to Laulima among the three options and so would be most familiar to current users.”

“Canvas allow integration of important technologies used by UH, e.g., Google Workspace, H5P, and Office 365.”

Canvas LMS features were noted as providing improved, modern functionality for both students and faculty.

“Canvas has a user interface that in ways is closer to Laulima, it's easy to create content, and give users multiple ways to upload files so the learning curve may not be as difficult for faculty and students. Other positive aspects are their ‘To Do’

and 'Coming Up' lists, Outcomes tool, analytics, an immersive reader, and a mobile app. The Mastery Paths and having the features of the Canvas Studio (interactive videos and editing) would be game changers."

"Many reading supports: Microsoft immersive reader is built-in for most pages, machine translation of text in many languages, assistive technologies like guided reading"

"Calendar - The ability to change assignment dates in one place, and it will change in all places in the platform."

"Speed Grader- Robust feedback on documents between instructor and student (annotation capabilities, video or text comments between instructor and student). Similar to Google docs which UH students would have used before and familiar with. Learning curve wouldn't be so deep for the student."

"Mastery paths - additional feedback/additional resources for optional remedial or added work for students. Very useful from the instructional standpoint. Students who are failing behind will be noticed more quickly."

"Easier grading and workflow for faculty - Speed Grader handles many file types, grading with annotations, tight integration of Microsoft or Google."

"Useful calendar tool that aggregates and updates events and dates for the entire course site - easy for faculty to manage dates and could also help learners stay on track."

Collaborative content potential through Canvas Commons, as well as the large Canvas community were noted as having positive potential for UH as well.

"The Canvas Commons in particular has exciting implications for collaboration and OER. The ability to publish courses to the UH space (or greater learning community, or even publicly) allow us to consider things that weren't previously possible (e.g., making self-directed writing & math placement test prep materials available that a student could utilize on their own initiative for free before taking a placement test-- or perhaps their completion of those materials could even be factored into a placement decision)."

UH Community - Canvas Concerns

While the dominance of Canvas in the higher education LMS market space was noted as a strength, there were alternative perspectives that raised concern about the UH community partnering with such a large, established vendor.

“Being the “top dog” worries me a bit. How responsive will Canvas be? Will there be any incentive to grow and get better? Will we be just another feather in their cap? I found their initial interactions a bit off-putting. They seemed cavalier and were quick to minimize legitimate concerns--e.g, when it was pointed out that their log-in instructions were erroneous or when a faculty member asked a question comparing Canvas modules to Laulima Lessons. When Blackboard and D2L were quick to commit to developing a Hawaiian language pack, Canvas seemed to drag its heels. Although we're a fairly large system, I feel we would be a little lower on the Canvas totem pole.”

“Canvas may be at their peak in the product life cycle and could mean that they have fewer years left as a leader in the LMS industry. The potential result is that this vendor may not be able to offer the latest for many years to come. I feel that Blackboard Learn Ultra and D2L seemed much more committed to customer service and support. If we are spending money for an LMS, ideally, we should be able to count on quick, friendly, efficient, and reliable customer service and support. Since Canvas holds the largest percentage of the market, I am concerned that they will not value our business as much as the Blackboard Learn Ultra and D2L.”

“This option seems like the most “out-of-box” experience, in the sense that we'd be a drop in their bucket. This was the vendor that was the least invested in customizing the presentations to us as an audience. We'd be a Canvas school, instead of Canvas being our LMS... if that makes sense.”

There were also concerns raised with respect to the functionality of Canvas for STEM disciplines.

“The experience of inputting mathematical formulae into most Canvas tools is also terrible for experienced users, requiring multiple mouse clicks and popup windows to create or edit a math expression. This represents a significant waste of faculty time for STEM instructors, and severely limits the ability to export things in the system to other formats. The math input GUI that they have for novice users is fine, but for those that already know LaTeX, it is a huge waste of time.”

“The "New Quiz" system in Canvas has math input that is more in line with how the D2L system works, and is much better than what is found in all the other tools in Canvas. While it is nice to have the better input method in "New Quiz" tool, this also means that there is an inconsistent UI experience across the Canvas platform for how math works.”

Pathway Forward

The decision to transition to a new LMS for the University of Hawai'i System is complex and must be made with careful consideration. As presented in this report, the consensus of the data from the majority of the UH community is in agreement; there is good reason to proceed with transitioning from LauLima (Sakai) to a new LMS platform. This is not based on “shiny new object syndrome” or chasing the latest bells and whistles of commercial LMS products. Rather, this recommendation is based on the significant concerns around sustainability, information security, and innovation resulting from the status of Sakai. These concerns suggest a genuine need for a new LMS that will support the UH System as we strive toward fulfilling the imperatives of the 2023-2029 UH Strategic Plan.

In Fall 2021, the National Council for State Authorization Reciprocity Agreements ([NC-SARA](#)) reported that 11,649 students located in Hawai'i enrolled in online programs at higher education institutions outside of the state of Hawai'i. Aside from providing online programs on a large scale, one commonality among the top five receiving institutions is the use of one of the three LMS platforms currently under review. UH students and faculty deserve to have the advantages afforded through modern technological efficiencies that support teaching and learning. Each of the three LMS products provides these affordances and have product roadmaps that will continue to advance the innovative functionalities.

Each of the three LMS products currently under review have identified potential as well as concerns that have been expressed through the LMS review process. Should the UH System commits to transitioning to a new LMS, the following are important factors for the UH officers to consider in the vendor selection process.

1. An LMS platform that will be embraced across the ten UH campuses.
2. An LMS platform with modern functionality for teaching and learning efficiency, robust accessibility features, and learning analytics that will enhance assessment at the student, course, program, and institutional levels.
3. A vendor that is committed to honoring and supporting the unique culture and vision of the University of Hawai'i, and our kuleana to the Hawaiian community.
4. A vendor that provides a cost-effective, comprehensive, ongoing, and collaborative plan to support content migration from LauLima into the new LMS platform.
5. A vendor that provides a comprehensive plan for professional development, training, and ongoing partnership with the UH community.
6. A vendor that demonstrates actionable responsiveness based on community feedback.

It is apparent to the UH community that the transition from a self-hosted, open-source LMS platform to a proprietary LMS product will be a significant financial investment. Members of the UH community have inquired about cost, and how a new LMS would be funded. Since this review was not a formal request for proposals, pricing has not been discussed formally with any of the vendors. This discussion is premature prior to the UH officers first deciding if an LMS change will occur. As much transparency regarding the strategy for funding a potential LMS change is recommended, as deemed appropriate by the UH officers.

Finally, should a vendor be selected for a new LMS for the UH System, a systemwide collaborative LMS transition and implementation strategy with representatives from all constituencies across the UH community will need to be involved in facilitating the process in a carefully planned, inclusive, and transparent manner.

Appendices

Appendix A - K16 Solutions Sample Course Set

Appendix B - UH Systemwide Coordinators Group Feedback

Appendix C - LMS Evaluation Rubrics Average Scores

Appendix D - LMS Review Consider.it Forum Summary Data

Appendix A - K16 Solutions Sample Course Set

Campus	Subject Code/ Course Number	Course Title
Haw CC	HAW 202	Intermediate Hawaiian Language II
Hon CC	ECED 110	Developmentally Appropriate Practices
Kap CC	LAW 101	The Hawai'i Legal System
Lee CC	AG 104	Produce Safety and Post-Harvest Handling
UHMC	ECED 105	Intro to Early Childhood Education
Win CC	ECON 130	Principles of Microeconomics
Win CC	HWST 107	Hawaiian Studies
UH Hilo	PSY 450	Child Behavior Therapy
UH Mānoa	SPED 304	Foundations of Inclusive Schooling
UH Mānoa	PH 602	U.S. Healthcare Services and Policy
UH Mānoa	PHYL 141	Human Anatomy and Physiology
UH Mānoa	SUST 112	Into Environmental Climate Change and Sustainability
UH Mānoa	MAN Substitute Teacher Course	Mānoa Substitute Teacher Course
UH West O'ahu	HLTH 242	Medical Terminology
UH West O'ahu	PSY 352	Varieties of Sexual Expression

Appendix B - UH Systemwide Assessment Coordinators Group Feedback

Feedback on Potential Learning Management Systems for UH

Submitted by the [Systemwide Assessment Coordinators Group](#).

March 2023

The Group's rank order of the LMS vendors (and the quality descriptor from the *Learning Outcomes* (row 14) on the [Evaluation Rubric](#)):

1. Canvas (promising)
2. D2L Brightspace (promising)
3. Blackboard (acceptable, not ideal)
4. Laulima (weak)

Our group evaluated each LMS on the following 10 items related to learning outcomes assessment:

Six crucial functions:

1. Instructors can align each test question with a particular course learning outcome/goal/standard.
2. Instructors can enter rubric scores for each rubric criterion.
3. Each rubric criterion can be aligned with a course outcome/goal/standard.
4. The LMS reporting function can produce a report of SLO achievement by student.
5. The LMS reporting function can produce a report of SLO achievement at the overall course level (i.e., individual student data in the course are aggregated).
6. The software allows a data export of assessment data by each aligned SLO.

Four desirable functions:

7. Instructors may add users to access the course to create rubrics, download achievement results, etc. (e.g., add program assessment coordinators).
 8. The LMS allows
 - a. import of program learning outcomes,
 - b. the function to align course learning outcomes to the program learning outcomes, and
 - c. has a reporting function to produce a report on both course and program learning outcome achievement.
 9. The LMS allows juried assessment by giving limited access to the course (e.g., one assignment) to multiple instructors for them to input rubric scores. Note: the additional instructors added to the course cannot see students' grades (per FERPA regulation).
 10. The LMS connects to the student information system, so that instructors can pull reports on disaggregated students' scores based on student characteristics (e.g., international students, out-of-state students, females/male/non-binary, full-time/part-time) for equity investigation.
-

Canvas

Crucial Functionalities

Does it include the six crucial functionalities?

1. **Yes** - Allows the instructor to align each test question with a particular course learning outcome/goal/standard. [Instructors don't have to do it but the functionality needs to exist.]
2. **Yes** - Allows the instructor to enter rubric scores for each rubric criterion.
3. **Yes** - Allows the alignment between each rubric criterion with a course outcome/goal/standard.
4. **Yes** - Produces a report of SLO achievement for each student.
5. **Yes** - Produces a report of SLO achievement at the overall course level.
6. **Yes** - Allows the export of assessment data with the aligned SLO.

Desirable Functionalities

Does it include the four desirable functionalities?

7. **Yes** - LMS allows instructors to add users (e.g., program assessment coordinator) to access the course to create rubric and download test/rubric scores.
8. **No. Does not align outcomes; however, instructors can use outcomes at all levels** - LMS allows import of program learning outcomes, has the function to align course learning outcomes to the program learning outcomes, and has the report on both course and program learning outcome achievement
9. **Unclear, but allows peer assessment** - The LMS allows juried assessment by giving limited access to the course (e.g., one assignment) to multiple instructors for them to input rubric scores. However, the additional instructors added to the course cannot see students' grades (per FERPA regulation).
10. **No, not a built in function. However, similar to D2L Brightspace, we can export the raw data at the program or institutional level and do whatever we want with raw data** - The LMS connects to the student information system, so that faculty can pull reports on disaggregated students' scores based on student characteristics (e.g., international students, out-of-state students, females/male/non-binary, full-time/part-time) for equity investigation.

Additional comments

Benefits

- Allows instructors to add users (e.g., program assessment coordinator) to access the course to create rubric and download test/rubric scores
- Has a rubric easy-scoring interface with the automated feedback option for each performance level on each rubric criterion.
- Through a download of CANVAS's raw data and a manual process to connect the data from the student information system, it is possible to disaggregate students' achievement results based

on student characteristics (e.g., international students, out-of-state students, females/male/non-binary, full-time/part-time) for equity investigation.

- Can connect to third-party products such as Tableau and PowerBI for the shared data dashboard to show within the CANVAS admin account.
- Program and institutional assessment can be done in two ways:
 - Program and institutional level assessment coordinators can input program/institutional level outcomes, rubrics, and assignments for faculty to choose and use. (same as D2L Brightspace)
 - We can develop a course template with existing outcomes, rubrics, and assignments built-in (same as D2L Brightspace)

Drawbacks & Comparisons

- **Rubric feature.** It is not intuitive to enter automated feedback for each rubric performance level. Compared to D2L Brightspace, when you set up the rubric in D2L Brightspace, there is a feedback box for each performance level there already. In CANVAS, the user has to right click on the performance level for the comment popup box to show. This is not intuitive.
 - **Data visualization.** Does not have a built-in data visualization tool. Compared to D2L Brightspace: D2L Brightspace has their built-in data visualization tool that we don't need to worry about licensing (e.g., Tableau). While D2L Brightspace has an innate feature for viewing privileges (e.g., department chairs can only view their own program information), for CANVAS, the permissions to view can only be set within the third party tool (e.g., Tableau).
 - **Assessment reporting.** An assessment reporting feature is almost non-existent in CANVAS and overall much weaker than D2L Brightspace. The only data report from CANVAS is the massive raw data download (Excel or csv file) that includes all the assignment scores and outcome scores. This is not a report. It requires intensive data cleaning and preparation. All reporting will need to be done through external tools such as PowerBI or Tableau. In addition, users have to log in the CANVAS admin account to view the report. On the contrary, D2L Brightspace can accommodate customized report building and can push out data reports to be sent to assessment coordinators on an automatic and periodic basis. (You can't beat that convenience!)
-

D2L Brightspace

Crucial Functionalities

Does it include the six crucial functionalities?

1. **Yes** - Allows the instructor to align each test question with a particular course learning outcome/goal/standard. [Instructors don't have to do it but the functionality needs to exist.]
2. **Yes** - Allows the instructor to enter rubric scores for each rubric criterion.

3. **Yes** - Allows the alignment between each rubric criterion with a course outcome/goal/standard.
4. **Yes** - Produces a report of SLO achievement for each student.
5. **Unclear**. Produces a report of SLO achievement at the overall course level.
6. **Unclear**. Allows the export of assessment data with the aligned SLO.

Desirable Functionalities

Does it include the four desirable functionalities?

7. **Yes** - LMS allows instructors to add users (e.g., program assessment coordinator) to access the course to create rubric and download test/rubric scores.
8. **Yes**. - LMS allows import of program learning outcomes, has the function to align course learning outcomes to the program learning outcomes, and has the report on both course and program learning outcome achievement.
9. **No (but the company claims it is working on it)** - The LMS allows juried assessment--give limited access to the course (e.g., one assignment) to multiple instructors for them to input rubric scores. However, the additional instructors added to the course cannot see students' grades (per FERPA regulation).
10. **Unclear** - The LMS connects to the student information system, so that faculty can pull reports on disaggregated student scores based on student characteristics (e.g., international students, out-of-state students, females/male/non-binary, full-time/part-time) for equity investigation.

Additional comments

Benefits and Comparisons

- **Company responsiveness.** The greatest benefit for this product is its responsiveness to user feedback. If we, as an assessment community, request certain changes to happen, there is a high chance that it will happen. (Personal experience tells that it's more responsive than CANVAS)
- **Rubric scoring.** The rubric has an easy-scoring interface with the automated feedback option for each performance level on each rubric criterion. (Better than CANVAS)
- **Learning support provided to students.** There is the function of auto-release of additional learning support material if a student does not meet a threshold score on the rubric or on a test--> It allows automated support for learning improvement using assessment data! (Same as CANVAS)
- **Multiple permission levels.** D2L Brightspace allows different levels of access to data. Department chairs or program assessment coordinators can be given the permission to pull out student data for all programs, or data specific to their programs if the institution sets up an "advance data export" function and assigns an access code to each program. (This is better than CANVAS.)
- **Reporting function.** D2L Brightspace has a bundled reporting product: Insight Report, which was included in the price proposal. Insight Report provides the most robust reporting functionality amongst three LMS products.

- We can build customized data reports (e.g., institutional SLO achievement reports, program SLOs achievement reports) within the system. No need for external licensing.
- The reports can be generated and distributed to users on an automated schedule.
- **Alignment & inputting of outcomes across levels.** Allow inputting of hierarchical levels of student learning outcomes (SLOs) by people with different levels of permissions. (Probably same as CANVAS)
 - At the institutional level, one office/person can input institutional learning outcomes (ILOs) which will permeate all courses. Course instructors can align learning activities with ILOs. It is possible to specify discrete skills under each ILO (e.g., access materials, evaluate information, use information ethically for Information Literacy) and have learning activities aligned with discrete skills. Multiple layers of hierarchy of the outcomes/skills are allowed.
 - Department leaders can input program learning outcomes and rubrics into courses with admin level access. Program leaders can extract data for all courses in the program to Excel.
- **Templates.** Provide a variety of ways for programs to set up templates with built-in assessment features. A program can offer rubric templates or assessment templates as options for faculty to choose to use, or can make it mandatory for faculty to use. A program can also set up a template course with rubrics, assignments, scoring structure, benchmarks, standards all set up for faculty to use. (Functionality is the same as CANVAS but the interface is much better.)
- **Integration with an AMS.** Integration with Assessment Management Software (AMS such as *Weave Online*) was reported to be much easier than CANVAS, according to representatives of Weave Online for West O'ahu .

Drawbacks and Comparisons

- **Reporting function.** Individual instructors cannot see course learning outcome achievement at the overall level (like what CANVAS can do). This can be circumvented by generating customized reports in Insight Report and to work with developers who seem to be responsive to user feedback.
 - **Export data.** individual instructors cannot easily export all assessment data for their course, like what CANVAS can do. They can export only the quiz data. They can see data reports (e.g., number and percentages of students at each performance level) for each rubric/assignment.
-

Blackboard

Crucial Functionalities

Does it include the six crucial functionalities?

1. **No** - Allows the instructor to align each test question with a particular course learning outcome/goal/standard. [Instructors don't have to do it but the functionality needs to exist.]
2. **Yes** - Allows the instructor to enter rubric scores for each rubric criterion.
3. **No** - Allows the alignment between each rubric criterion with a course outcome/goal/standard.
4. **Yes** - Produces a report of SLO achievement for each student.
5. **Yes** - Produces a report of SLO achievement at the overall course level.
6. **Yes** - Allows the export of assessment data with the aligned SLO.

Desirable Functionalities

Does it include the four desirable functionalities?

7. **Unclear** - LMS allows instructors to add users (e.g., program assessment coordinator) to access the course to create rubric and download test/rubric scores.
8. **Unclear**. LMS allows import of program learning outcomes, has the function to align course learning outcomes to the program learning outcomes, and has the report on both course and program learning outcome achievement
9. **Unclear** - The LMS allows juried assessment--give limited access to the course (e.g., one assignment) to multiple instructors for them to input rubric scores. However, the additional instructors added to the course cannot see students' grades (per FERPA regulation).
10. **Unclear**- The LMS connects to the student information system, so that faculty can pull reports on disaggregated students scores based on student characteristics (e.g., international students, out-of-state students, females/male/non-binary, full-time/part-time) for equity investigation.

Additional comments

None at this time.

Laulima (Sakai)

Crucial Functionalities

Does it include the six crucial functionalities?

1. **No** - Allows the instructor to align each test question with a particular course learning outcome/goal/standard. [Instructors don't have to do it but the functionality needs to exist.]
2. **Yes** - Allows the instructor to enter rubric scores for each rubric criterion.
3. **No** - Allows the alignment between each rubric criterion with a course outcome/goal/standard.
4. **No** - Produces a report of SLO achievement for each student.
5. **No** - Produces a report of SLO achievement at the overall course level.
6. **No** - Allows the export of assessment data with the aligned SLO.

Desirable Functionalities

Does it include the four desirable functionalities?

7. **Yes** - LMS allows instructors to add users (e.g., program assessment coordinator) to access the course to create rubric and download test/rubric scores.
8. **No** - LMS allows import of program learning outcomes, has the function to align course learning outcomes to the program learning outcomes, and has the report on both course and program learning outcome achievement.
9. **Yes** - **however, requires manual workaround; not a built-in feature.** The LMS allows juried assessment--give limited access to the course (e.g., one assignment) to multiple instructors for them to input rubric scores. However, the additional instructors added to the course cannot see students' grades (per FERPA regulation).
10. **No** - The LMS connects to the student information system, so that faculty can pull reports on disaggregated students scores based on student characteristics (e.g., international students, out-of-state students, females/male/non-binary, full-time/part-time) for equity investigation.

Additional comments

Laulima lacks the functionality needed for UH campuses to summarize learning achievement data by learning outcome for courses, programs, and at the institution level. The ability to summarize is a basic requirement for compliance with institutional accreditation. For details on institutional accreditation requirements, please visit the WSCUC and ACCJC accreditation standards.

Appendix C - LMS Evaluation Rubrics Average Scores

[University of Hawai'i LMS Evaluation Rubric](#)

LMS Evaluation Submission by Rubric Type

Platform	Functionality	Technical	Innovation
Blackboard Learn Ultra	26	15	13
Brightspace	31	17	18
Canvas	31	15	13

LMS Evaluation Rubric Average Scores by LMS Platform

Functionality	Blackboard Learn Ultra	Brightspace	Canvas
Accessibility	4.08	4.38	4.35
Assessments	3.35	3.73	4.27
Assignments	3.90	4.30	4.76
Calendar	3.81	4.28	4.39
Collaboration	3.32	3.79	4.15
Communication	3.44	4.23	4.48
Content Authoring	3.46	4.31	4.50
Copyright management	2.72	3.00	3.93
Design and Layout	3.52	3.73	4.27
Discussions	3.64	3.81	4.57
Gradebook	3.76	4.22	4.35
Learning Outcomes Assessment and Reporting	3.88	4.14	4.12
Pedagogical Design	3.48	4.05	4.28
Sections and groups	3.64	3.87	4.34

Selective release	4.15	4.42	4.52
Textbooks, Publisher/3rd party content support	3.90	4.12	4.34
Responsive Mobile Experience	3.98	4.55	4.70
User profiles and preferences	4.16	4.14	4.38
Technical			
Archiving and completed courses	3.32	4.00	4.75
Browser set up and support	4.42	4.54	4.77
Campus resources	3.75	4.42	4.17
Content sharing and organization	3.33	3.81	4.23
Course export	2.86	3.90	4.27
File storage and cloud integration	3.77	4.08	4.85
Integration with campus authentication	3.75	4.60	4.60
Integration with Student Information System	3.89	4.30	4.90
Migration of existing courses	3.17	3.70	4.29
Online help and training materials	3.79	4.36	4.93
Primary course and template management	3.46	4.33	4.73
Scalability	4.63	4.56	4.90
Server requirements	4.56	4.56	5.00
Student tracking, analytics and retention	3.61	4.40	4.62

System reliability	3.95	4.09	4.36
System management and customization	3.57	3.50	4.67
System updates	4.13	4.50	4.90
Use of open standards	4.00	3.82	4.45
Vision and product roadmap	3.88	3.92	4.67
Innovation			
Artificial Intelligence (AI)	2.45	2.65	3.23
Digital badging	2.27	3.78	4.23
E-portfolio	3.17	3.53	3.92
Gamification	2.15	2.94	3.00
Non-credit and Competency Based Education	2.80	3.13	3.82

Appendix D - LMS Review Consider.it Forum Summary Data

Link to LMS Review Consider.it Forum Summary Data