



Learning Management Systems

Choosing the Right Path For Your Organization

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Chapter 1

What in the World is a Learning Management System?

Amy Rottmann, Daisyane Barreto, & Salena Rabidoux

Learning Management Systems, referred to in short as LMS, is a platform that assists the delivery of content online for learning purposes. If we want a technical definition, a Learning Management System (LMS) is a web-based software used to facilitate the delivery of online, face-to-face, and blended courses, whether in an academic setting or in the world of business. Each method of delivery is defined below:

- **Online Learning:** a form of learning that occurs via the Internet, often through a web-based platform.
- **Face-to-Face:** a form of learning that happens in person between teacher-student and student-student.
- **Blended Learning:** a form of learning that happens partially face-to-face and partially online.

No matter the delivery method, an LMS is supposedly designed to foster learner-centered approaches with integrated learning activities grounded in learning objectives making it the most advanced tool for facilitating learning. Still, there are some criticisms to the philosophy

behind LMSs. Critics emphasize that the LMS structure is designed to foster traditional views of education, e.g., teacher-centered approach or an administrative tool (Bousbahi & Alrazgan, 2015; Siemens, 2004). In a LMS, the course designer or instructor controls the design of the instruction (e.g., sequence of content) and the nature of interactions (i.e., to whom, when and how learners interact), so they have the ability to determine how the LMS will function. Designers and instructors can create courses that are learner-centered through numerous strategies such as open-discussion forums, learner choice in assignments, and video messaging to name a few. Although there are critics, LMS are “currently the climax to which educational technology is applied in the planning and execution of transformational teaching-learning experiences interactively and collaboratively to best capture and maintain the students’ attention via a wide range of platforms that most suits the briskly changing world of globalization and internationalisation” (Kpolovie, & Lale, 2017, pp.81). In chapter four, you will further explore learner-centered design using xAPI.

How was the LMS Born?

LMS have redefined the way instruction is delivered. The first step towards LMS began in 1924 with something referred to as the teaching machine. Sidney Pressey invented the teaching machine which replicated the typewriter with the ability to facilitate a multiple choice assessment (Quizworks, 2017). The teaching machine created a boom in inventions for furthering what we know today as learning management systems. It was not until the invention of the HP computer that LMS inventions skyrocket. Interestingly, the first ever software-based LMS came with the HP competitor Macintosh, which was launched by SoftArc in 1990. In 2002, Martin Dougiamas launched the first open-source internal network for facilitating learning on a global digital platform, which birthed Moodle. However, it was not until 2012 that LMS became cloud-based releasing the

burden of server maintenance (Quizworks, 2017).

Who Uses LMS?

Today, LMS have become essential for various educational and training settings. Educational institutions, public and private, are using LMSs to not only create learner-centered instruction, but foster global inclusion and increase revenue (Kpolovie, & Lale, 2017; Smith, 2016). Educational institutions have been the frontrunner for adopting LMSs, but consulting companies and businesses have also seen its power. Corporations have been adopting LMSs for onboarding new hires, continuing education of employees, and facilitating workplace safety training (Mindflash, n.d.). To get a little more in-depth, below is a list of stakeholders who may adopt LMSs, but it is not comprehensive:

- Businesses, large and small like law firms, healthcare institutions, insurance agencies, home improvement stores, etc.
- Non-profit Organizations like the Charles Koch Foundation or the Red Cross
- Federal Government Agencies for training the military, CIA, FBI, etc.
- Traditional educational institutions like community colleges, universities both public and private, and virtual public schools.
- Online/eLearning-based institutions like Khan Academy, Lynda.com, etc.

Why Use an LMS?

There are many reasons for institutions, organizations or companies to adopt an LMS. One of the reasons is the faster distribution of content. Content is centralized in an online environment where learners can access and download information from any location, at any time, as long as the internet and computer technologies are

available. In addition to the faster distribution of content, LMS can cut costs for organizations and companies as there is no need to travel to a physical location to deliver content. This also means there are no fees associated with amenities and facilities as the content is being delivered virtually. LMS also do the following:

- Streamlines processes such as communication, centralizes content, improves tracking of student progress
- 24/7 access to content for learners
- Offers better academic outcomes through the integration of engagement and gamification
- Flexibility for on-demand learning
- Data collection concerning student learning
- Multimedia content offerings
- Integrated assessments of learning

If a business or educational institution needs to measure learning, then an LMS is the best option as it tracks and houses results/grades of learners' retention of information. However, there are instances when businesses and educational institutions need to provide resources without measuring learning. In those instances, the best distribution platform would be a Content Management System.

A Content Management System (CMS) is any software that stores content. CMS use metadata for tagging content, which helps increase efficiencies when searching for content (Dubow, 2013). A CMS offers the most basic way to store content. Often times a CMS looks like a static website full of information or a “download the required documents in a standard style such as Microsoft Word, PowerPoint, etc. when switching to web content” (Qwaider, 2017, p.589). In fact, most websites are designed through the basis of a CMS because a CMS hosts the content in folders (Ninoriya, Chawan, & Meshram, 2011). Users are able to click on different links throughout the platform and pull up the appropriate content. Here is a list of the main function of a CMS:

- Content Management
- Create Content
- Search Engine for Content

What Happens When a CMS and LMS are Combined? LCMS is Born

Now we know what an LMS is and what a CMS is, what about an LCMS? A CMS is a tool that stores content, but when you add the component of learning to a CMS, you get a Learning Content Management System (LCMS). A LCMS in essence covers both the CMS and LMS, which means it is “a computer program that facilitates computer and Internet learning and has a branch within a broader family known as e-learning” (Qwaider, 2017, pp.589).

The focus with LCMS is content as “it tackles the challenges of creating, reusing, managing, and delivering content” (Oakes, 2002, p. 74). It allows many authors to create, store, and reuse learning content modules; “it gives and supports authors, instructional designers, and materials specialists the ability to create, develop and modify learning content more efficiently. So that it is easy to control, collect, distribute and reuse them to suit the elements of the educational process: from the trainer, trainee, instructional designer and expert to the course” (Qwaider, 2017, p.588). Think about an LCMS as a library. As you walk through the bookshelf isles, you will find books (content) from different subject areas that can inform your knowledge. You decide which books are relevant to inform your learning, but learning is not assessed.

There can often be confusion around LMS and LCMS because the two are closely related. Think of it this way, the main user of the LCMS is the instructional designer or course creator and the main user of the LMS is the learner (Dubowy, 2013). The efforts that go into the creation of resources in an LCMS can be integrated into an LMS.

LCMS and LMS certainly have a different focus but integrate very well; the LCMS allows for the creation and delivery of learning objects (LO) while LMS manages the learning process as a whole, incorporating the LCMS within it (Greenberg, 2002). The table below clearly outlines the differences between LMS and LCMS.

Table 1

Differences between an LMS and LCMS

	LMS	LCMS
Primary target users	Training managers, instructors, administrators	Content developers, instructional designers, project managers
Provides primary management of...	Learners	Learning content
Management of classroom, instructor-led training	Yes (but not always)	No
Performance reporting of training results	Primary Focus	Secondary Focus
Learner Collaboration	Yes	Yes
Keeping learner profile data	Yes	No
Sharing learner data with an Enterprise Resource Planning (ERP) system	Yes	No
Event Scheduling	Yes	No
Competency mapping-skill gap analysis	Yes	Yes (in some cases)
Content creation capabilities	No	Yes
Organizing reusable content	No	Yes

Creation of test questions and test administration	Yes	Yes
Dynamic pre-testing and adaptive learning	No	Yes
Workflow tools to manage the content development process	No	Yes
Delivery of content by providing navigational controls and learner interface	No	Yes

Note. Retrieved from Hall, B. (2004). LMSs and LCMSs demystified [PDF document]. Retrieved from <https://edtechbooks.org/mai>

Table 1 clearly outlines the differences between LMS and LCMS. LMS provides trainers and instructors the ability to manage learner outcomes, which is why instructional designers use it when creating trainings and courses. However, not all LMS are the same, and as designers, you must be aware of the differences to determine which LMS meets your designing needs. In the next chapter, you will learn about the different types of LMS to help you gain an understanding of what LMS is best for your designing needs.

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Chapter 2

Types of LMS Deployment & Common Features

Daisyane Barreto, Amy Rottmann, & Salena Rabidoux

In cooking, you have many different types of tools you can use to make a meal. For example, you have mixers, measuring cups, cutting boards, and so many other tools. Each tool is designed to meet the needs of the cooker and serve a specific purpose in the cooking process. An LMS is not different in that sense. There are several types of LMSs in the market being used for educational as well as training purposes, and one of the most difficult choices for organizations and institutions to make is deciding the type of LMS to select based on deployment or license (Pappas, 2014). Of course, many other factors (e.g., pricing, support, additional features, and others) must be considered and weighed in this decision. Still, the cost combined with financial and technical requirements are still the main focus when selecting an LMS (Croitoru & Dinu, 2016). Indeed, it is important to analyze and examine the type of LMS deployment because of its influence in the overall cost as well as other relevant requirements that can inform the decision about an LMS.

There are two main types of LMS deployment you need to be familiar with: (1) proprietary, and (2) open-source. Within those two solutions,

there are two other distinct categories to be considered: (a) Software as a Service (SaaS) or cloud-based system and (b) Installed LMS. In order to determine what type of LMS is beneficial to an organization or institution, a clear understanding of the advantages and disadvantages of each solution must be reviewed. The following sections of this chapter will provide a definition for each main type of LMS deployment, compare their features based on the benefits and drawbacks, and discuss additional components/apps that can enhance an LMS.

Defining Proprietary (or Commercial) LMS

Imagine that you came up with an amazing recipe on your own, now you are faced with the dilemma: do I share this recipe with everyone? Or do I charge a fee to share my recipe partially with others? Well, if you choose the latter option, you follow a proprietary software model. In a proprietary software model, the "recipe," which is the source code, is composed of written commands developed by a programmer, and is often hidden from user's view not only as a technical, but also as a legal matter (Zittrain, 2004). The reason for this secrecy on the source code is to prevent others from developing new software without the proper permission from the copyright holders.

In the case of an LMS, a solution is considered proprietary, also known as commercial, when its software is licensed under an exclusive legal right of the copyright holder (Pillai & Kevin, 2013). For example, if your organization has adopted an LMS such as Blackboard, which is a popular commercial LMS at the time this chapter has been written, then its company gives your organization the right to use the software under certain conditions based on a license fee. The conditions are stipulated by the LMS company in the form of a contract or agreement between the parties involved and the cost of the licensing fee is often based on annual per-user licenses.

The license fees usually vary their cost between \$15-\$100 per user (Yupangco, 2018). In addition to the licensing fee, other fees might also be included for operation, maintenance and technical support of the LMS software.

In summary, the nature of a proprietary LMS is for profit, as schools and organizations pay a fee to use the software. And a proprietary software follows a “closed” source model in which the source code is kept in-house, i.e., within the company, and not released to the public (Pillai & Kevin, 2013). Going back to our cooking analogy, you can think of the software code as a famous restaurant’s secret recipe. The restaurant keeps that recipe “closed” in-house without sharing any particular details or information to the public. This closed information allows the recipe to be intact without any consumers/users’ alterations or any addition to the original recipe. The same goes for proprietary LMS. The company that developed the LMS software will not allow users to modify or add to their software source code. The LMS company either creates and manages the courses (Bran, 2017) or gives permission for an LMS administrator at the organization to do so, without sharing any access to the source code. This means that users cannot make any personal adjustments to the software because the LMS company controls its structure as well as the activities within their system (Wright, Lopes, Montgomerie, Reju, & Schomoller, 2014).

Furthermore, proprietary LMS solutions can either be installed or adopt a SaaS or cloud-based approach. Given that cloud-based LMS will be discussed in a separate section of this chapter, we will cover installed LMS in this part. An installed LMS is a software hosted on an organization’s local server (Pappas, 2017). After purchasing an LMS from a vendor and obtaining its license for a determined time, the organization’s internal IT team is usually in charge of installing and maintaining the LMS in-house (Johnston, 2015). This maintenance also includes making any additional upgrades and solving any technical issues within the LMS internally. Although it seems like a

time-consuming and costly endeavor to an organization, this option can provide more customization, controlling and storing of data locally as well as compatibility with third-party applications (Pappas, 2017). Some drawbacks with this option involve the scalability of the LMS, which falls under the responsibility of the organization’s IT team organization. These considerations need to be analyzed and assessed by the organization’s team before deciding on an installed approach. If selecting this option, an organization should have an IT team in place to administer, provide support, customize the LMS as well as manage any other technical needs.

There are many proprietary LMSs available in the market. Some examples can be found in the Table 1 below:

Table 1

A List of Examples of Proprietary LMS

LMS	About
Blackboard	Is one of the largest LMS companies, serving approximately 100 million users around the globe (Blackboard Inc., 2020).
Desire2Learn	Is a growing LMS company with customers in K-12, higher education, healthcare, government, and the corporate sectors (D2L Corporation, 2020).
Litmos	Is a fast-growing LMS with approximately 21 million users in more than 130 countries (SAP Litmos, 2020).
Topyx	Is a global LMS company that provides engaging and interactive learning experiences to learners from different sectors, including businesses and nonprofit organizations (Interactyx, 2020).
Saba	Provides personalized learning experiences and limitless options for customers’ learning programs (Saba, 2020).

Defining Open-Source LMS

Now, imagine that you want to share with others the amazing recipe you created. In fact, you want others to modify and create new versions of that recipe and share it with other people. Well, that means you are following an open source model. Open-source LMS allows anyone to have access to the source code, so they can make modifications or enhance the software. Overall, many LMSs are open source as they initially emerged as a university project instead of a business model (Croitoru & Dinu, 2016). In essence, open-source involves a community of users who collaborate with the focus “on teaching and pedagogy on top of the technical proper functioning of the system” (Bran, 2017). Collaborators of the open-source have to accept the license terms when they access the software, and generally, it grants users permission to modify, use, study and distribute the software (Opensource, 1999; Wright et al., 2014). According to the GNU General Public License, any individual or company can modify the open source code as long as they do not prevent others from further modifying the code either by charging them or licensing them (Pillai & Kevin, 2013). With that license requirement, there is a “copyleft” stipulation that requires anyone who made modifications to the software must share the source code of those changes (Opensource, 1999).

In summary, the nature of an open-source LMS is non-profit, as schools and organizations can use the software without paying any fee. An open-source software follows an “open” source model in which the source code is open to the public and can be “re-distributed for free provided credit is given to the original manufacturer” (Pillai & Kevin, 2013, p. 4). Going back to our cooking analogy, you can think of the open source code as a generic recipe that is shared to the public by a cooker. People can take this recipe and customize it by making modifications or adding ingredients for dietary needs. They can share the recipe with their modifications to the public as long as they do not prevent others from modifying the recipe further or

charge them for using it. Additionally, the recipe should give credit to the original creator. The same goes for the open-source LMS. For example, the developer(s) of the LMS software create and allow other users to modify or add to their software source code. Users can make personal adjustments to the software and redistribute to other users as long as they do not profit from it or prevent others from making modifications. Giving credit to the original creators of the source code is also a common practice. Some drawbacks with open-source LMS include the need to purchase servers to host the LMS platform as well as trained personnel and staff to operate, optimize and maintain the servers (Yupangco, 2018).

There are many open-source LMSs available in the market. Some examples can be found in the Table below:

Table 2

A List of Examples of Open-Source LMS

LMS	About
Moodle	Is a platform created to provide educators and learners with a personalized learning environment, which can be downloaded onto their own web server. This platform involves a robust, secure and integrated system (Moodle, 2020).
ATutor	Is a web-based LMS developed to create and deliver courses online, allowing for quick installation or update as well as the development of customized themes (ATutor, 2020).
Sakai	Is an LMS that contains standard online learning, teaching, and collaboration tools as well as community-based contributions. Its open-source flexibility allows for customization and configuration of the software to meet the needs of the organization (Sakai, 2020).

Forma LMS The initial LMS program was created by Docebo Srl and released to the public. Once Docebo switched its business model to a commercial distribution, a group of partner companies worked to create a new identity and workflow to the software as well as continue the open source project (Forma.lms, 2020).

Defining Cloud-based LMS

Cloud-based LMS is a true gumbo because there are many cooks in the kitchen when making this type of LMS. Each cook has the ability to use an array of different cloud-based tools and software they believe will enhance their instruction, and consequently the learning process (Wright, Lopes, Montgomerie, Reju, & Schomoller, 2014). A more formal definition of cloud-based software proposes a model to enable convenient and on-demand network access to “a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction” (Mell & Grance, 2011). In other words, cloud-based LMS provides a service to organizations that allow them to access the LMS “on-demand without investing a lot in setting up the IT infrastructure” (Lal, 2015).

A cloud-based LMS focuses on the teachers and pedagogy practices like in an open-source model; however, it also provides a direct focus on the learners (Bran, 2017).

What does it mean? It means that this type of LMS follows socio-constructivist premises in supporting a “collaborative learning environment for individual and collective learning through interactive learning activities” (Kumar & Sharma, 2016, n.d.). Although a cloud-based LMS is hosted on the web under a vendor, it allows learners to access it from anywhere and on any device (Dufresne, 2017). That is,

users can access this type of LMS from any mobile technology (e.g., computers, smartphone, tablets, etc.) independent of their location as long as they have access to the internet. Cloud-based LMSs are often a low-cost solution for organizations because there is no need to invest in sufficient/heavy IT infrastructure. Thus, this type of solution is more appropriate for small and medium-size organizations (Dobre, 2015). This solution also allows instructional designers to upload courses, learning paths and implementation of an array of web-based tools. Students have the ability to use web-based tools that they may be familiar with as a result of social networking or workplace use.

Although many cloud-based LMSs can be free for users, there are some that charge a fee according to the usage (i.e., pay-per-user or pay-per-use) or a regular license fee. In a pay-per-user model, the LMS vendor can charge an organization in the following manner: (a) for each user that is actually registered to use the software, or (b) for each user that logs in and uses the software. Conversely, in the pay-per-use approach, a charge fee is made everytime that the organization uses (i.e., the definition of use in this context will vary according to the vendor) the LMS (Simpson, 2017). Overall, cloud-based LMS involves “paying a fee to a 3rd party for the use of its software, computing power, and technical expertise instead of maintaining on your own” (Curran, 2011, n.d.). Interestingly, cloud-based services are not limited to proprietary software, some vendors also operate open source software as well (Curran, 2011). However, when using an open source LMS, the user only pays for the “cloud” uptime and support services. Some examples of cloud-based LMS can be found in the Table below:

Table 3

A List of Examples of Cloud-Based LMS

LMS	About
------------	--------------

DigitalChalk	Is an LMS that provides customers with tools to build their online business quickly, safely, and effectively (DigitalChalk, 2020).
Canvas	Is one of the most widely adopted LMS in North America with its market increasing across 70 countries (Instructure, 2020).
Docebo LMS	Is an LMS that uses learning-specific artificial intelligence algorithms to produce more effective learning experiences (Docebo, 2020).
TalentLMS	Is an online platform created to provide a lean, intuitive and hassle-free learning experience to learners (Epignosis, 2020).

Comparing the types of LMS

When deciding which meal to cook, you probably weigh the strengths and weaknesses of the tools you have available in your kitchen. The purpose is to select optimal tools that will help your work, making it more efficient and effective. In the case of LMS, the goal is the same. You need to compare and contrast the LMSs available in the market before making a decision. Usually, people assess the LMS based on its features, flexibility, cost, and other important LMS functions. One way to start this process is by analyzing the main types of LMS before deciding the type that will meet your needs. For example, when selecting a proprietary LMS, customers might select this option because this type of LMS usually provides high support; however, the cost associated with this option might be a downside. A better comparison and contrast of each option can be found in the table below:

Table 4

Comparison of the Types of LMSs

Category	Proprietary	Open-source	Cloud-based	Sources
Service/ Support	Usually provides: <ul style="list-style-type: none"> • Software Training • Templates • Technical support • Maintenance • Warranty service 	Has limited support: <ul style="list-style-type: none"> • In-house technical support is needed • Lack of security and privacy settings <ul style="list-style-type: none"> • No accountability for technical issues 	Usually has: <ul style="list-style-type: none"> • No set privacy and security measures 	<ul style="list-style-type: none"> • Lynch (2018) • Bran (2017) • Wright et al. (2014) • Pillai & Kevin (2013)
Cost	Usually expensive: <ul style="list-style-type: none"> • Enrollment-based • Annual license fees • All-the-time service payment 	Usually free or free for basic packages. Advanced features will have extra cost such as: <ul style="list-style-type: none"> • Hosting • Maintenance • Back-ups • Extra storage space • Upgrades • Tech support 	Cost-negligible or low: <ul style="list-style-type: none"> • Transparency of future expenses • Advertisements may be included to help the software remain free 	<ul style="list-style-type: none"> • Bran (2017) • Wright et al. (2014)

Reliability	<p>Usually a reliable source:</p> <ul style="list-style-type: none"> • Built by professionals who provide further training • Research supported and current technology • LMS or features/tools adopted by the company may be discontinued 	<p>Reliability is limited as code quality, accuracy, and update may not be maintained.</p>	<p>Reliability is on internet connection. It also offers scalability, as the software will work the same independent of the number of learners or instructors.</p>	<ul style="list-style-type: none"> • Bran (2017) • Wright et al. (2014)
User-Friendly	<p>Customization is limited:</p> <ul style="list-style-type: none"> • Few possibilities to try new features or tools • Customization delivery and appearance are challenging 	<p>Usually has high customization:</p> <ul style="list-style-type: none"> • Source codes can be customizable • User can change and add new features or tools • Broader range of themes for delivery and appearance 	<p>Customization is moderate and it needs familiarity with the tools.</p> <ul style="list-style-type: none"> • Activity focused, as tools are designed to engage and promote learner-centered activity. • Easy to store and arrange documents and date into an excel or PDF report • Lack of authentication-limited methods of determining enrollment, assessment or grades 	<ul style="list-style-type: none"> • Lynch (2018) • Bran (2017) • Gawliu Jr (2015) • Wright et al. (2014)

Data Sharing	It usually links to other enterprise software systems, but data can be lost if the course leaves the hosted LMS.	Software updates are available; however, there is a possibility of stagnancy if community members are no longer developing.	Learners can access material anywhere and at anytime and can easily collaborate or share information	<ul style="list-style-type: none"> • Lynch (2018) • Bran (2017) • Gawliu Jr (2015) • Wright et al. (2014)
Flexibility	Usually limited - inability to adjust the software, add features, or address issues immediately by users and their organization	High flexibility - allows for adjustment of the software, adding features as well as collaboration because of the software and source code being accessible to anyone. Open - allows for suggestions and new ideas because of collaborative community development. Software may not be maintained for current treads/uses.	High to moderate flexibility - variety of tools and features available.	<ul style="list-style-type: none"> • Lynch (2018) • Bran (2017) • Wright et al. (2014)
Software	Constrained- it can be restrictive and difficult to use or add new features. Software may not be maintained for current treads/uses.	Software updates are available; however, there is a possibility of stagnancy if community members are no longer developing.		<ul style="list-style-type: none"> • Bran (2017) • Wright et al. (2014)

Device Installation/Use	Software might need to be installed on a server instead of personal devices	May need integration with existing administrative systems or the need to establish an administrative system. Software can also be installed on personal devices	No need to install software. There is no need for a server or IT expertise. Easy distribution of course, mobile device friendly and real time reporting/ access to documents.	<ul style="list-style-type: none"> • Bran (2017) • Gawliu Jr (2015) • Wright et al. (2014)
License Agreements	License agreement may be restrictive in how the software is implemented, distributed, and administered			<ul style="list-style-type: none"> • Bran (2017) • Wright et al. (2014)

Compents/Apps that Enhance LMS

Most LMSs include user management features such as user account and profiles, authentication as well as roles and permissions (Foreman, 2018). In addition to user management features, LMSs also include some general features that assist the operation of the platform such as: (a) content, in which instructional materials are upload or displayed for learners, (b) communication, in which instructors and learners interact via email, discussion, announcements, etc., (c) assessment, in which instructors can create assessment materials to learners such assignments or tests, and (d) administrative, in which instructors and students can manage the courses and even customize individual courses. Although those features are common in the LMSs, customers might want to add extra components and apps to enhance the online environment.

Adding a little extra seasoning to your LMS never hurts. Thus, there are a few free cloud tools that can be used to create a kind of personalized LMS. These tools work well with open-source and cloud-based LMS.

1. Facebook: a popular social media tool that could be integrated with the LMS for personalization such as common interests, hobbies, etc.
2. Google Drive: a cloud-based storage that could allow instructors and students to store and share large documents/files online.
3. Dropbox: another cloud-based storage that could allow instructors and students to store and share large documents/files online.
4. Skype: a video conferencing system that allows instructors and students to meet synchronously.
5. Flickr: an online photo management that allows instructors and students to use and share photos.
6. YouTube: a video streaming platform that allows instructors and students to share videos.
7. Camtasia: a video editing and production tool that can be used in video creation and sharing.

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Chapter 3

Stakeholders and Usability

Lisa Kidder

As previously discussed, a learning management system (LMS) is designed to organize and manage course creation; provide appropriate access to certain users; create and organize learning activities; and provide reports for all users (Mabed & Kohler, 2012). For any LMS implementation there are a number of people or stakeholders that will be impacted by the LMS. While some individuals may have a variety of roles within the LMS, each role has a unique perspective on what is expected from the LMS and what would make the LMS usable. If you want your LMS to be used, you need to look at usability from the perspectives of your various stakeholders.

Stakeholders

Your stakeholders will be anyone affected by the LMS (Wagner, 2008). As you begin listing the various individuals, it is important to consider their roles within the system, as well as the purpose, goals, and intentions of your institution. In addition to learners and instructors, there are instructional designers, system administrators, and technology support to consider. Each of these groups of stakeholders will approach the LMS based on their specific needs and goals.

Usability

According to the International Organization for Standardization, usability is “the extent to which a product can be used by specified users to achieve specified goals, with effectiveness, efficiency and satisfaction in a specified context of use” (n.d.). In order to look at the usability of an LMS, you will need to identify your users (stakeholders), and their goals; and then determine how effective and efficient the system is in meeting those goals. In addition, you need to look at your stakeholders’ satisfaction throughout the process; even if two system have equal ratings on effectiveness and efficiency, they may have very different satisfaction ratings (Kauffman, 2015).

Usability is related to the two strongest predictors of technology use - perceived ease of use and perceived usefulness (Davids, Halperin, & Chikte, 2015). Where “perceived ease of use” is how the technology appears to not require much effort, and “perceived usefulness” is how beneficial the technology appears to support the user in accomplishing their work (Davis, 1989). We can look at these two predictors through the lenses of user interface design (UI) and user experience (UX). The UI will have the strongest impact on how effective and efficient the system is, whereas the UX will impact overall satisfaction.

The User Interface (UI)

The user interface (UI) of a system encompasses the visual elements displayed to the user and define how a user interacts with the system (Ming, n.d.). The UI will determine “the degree to which a person believes that using a particular system would be free of effort” or “perceived ease of use” (Davis, 1989, p. 320). In addition, it is the UI that dictates the common quantitative measures of usability related to effectiveness and efficiency such as, the number of clicks, the time on task, error rates, and deviation from the optimal path (Hornbæk & Law, 2007).

While there continue to be many opportunities for further research on usability guidelines for an LMS, a commonly used heuristic for interface design is Nielsen's 10 Usability Heuristics for User Interface Design (Nielsen, 1995).

Nielsen's 10 Usability Heuristics for User Interface Design

1. Visibility of system status

Is the system available? If not, when will it be back up?

2. Match between system and the real world

Does the language used match the real world?

3. User control and freedom

Can users recover from mistakes?

4. Consistency and standards

Are the pages, words, menus, etc. consistent across the system?

5. Error prevention

Does the system support the user in optimal practices and prevent mistakes such as incomplete information?

6. Recognition rather than recall

Does the user have access to all the required information without having to remember?

7. Flexibility and efficiency of use

Do the background functions support efficient use?

8. Aesthetic and minimalist design

Are the system menus and dialogues direct and to the point, not adding additional cognitive overload and distracting users from their goals?

9. Help users recognize, diagnose, and recover from errors

Do the error message use plain, non-technical language to enable quick and efficient recovery from errors?

10. Help and documentation

Are the help resources easy to locate when needed?

These 10 broad guidelines can apply to a wide range of interfaces including an LMS. In terms of achieving specific goals, obstacles and issues in these areas make a system ineffective and inefficient.

In contrast to Nielsen's 10 items, Krug (2006) uses a common-sense approach to interface design with his first "law of usability" being "Don't make me think." The word usage, visual display of clickable items, organization, and consistency across pages should support the individual in using the system, as opposed to trying to figure out how to use it. Thus, cognitive effort is reserved for goal attainment.

All of these broad guidelines would apply to an LMS. However, the purpose of a company's website is generally to invite user's to become customers, while the purpose of an LMS is to provide a platform for learning. Additionally, as each of your stakeholders has a different role in the learning process so they will also have varying goals. For example, the learner needs to learn specific content; the instructor needs to facilitate and provide appropriate feedback; the LMS / IT support needs to troubleshoot a wide range of issues. This difference means that not only do you and your stakeholders need to look at the UI, but to also identify explicit and implicit connections to educational

theories.

The User Experience (UX)

The user experience (UX) includes the interaction with the interface, but looks more at the individual's overall satisfaction with the experience. While the goals of the individuals are important, an individual's overall experience with a system includes the look and feel of the interface as well as the emotions and motivations provided by the system. The satisfaction that contributes to a system's usability is tied to the more qualitative measures such as preference, talk alouds, observations, and interviews. Also tied to satisfaction is the technology acceptance model predictor of "perceived usefulness" which is "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320). You can have an effective and efficient system, but if the overall experience is not seen as helpful, or high in satisfaction, individuals will be reluctant to use the system.

In a review of education theory and strategies, Peters (2014) focused on developing heuristics for the design of learning interfaces (see figure 1). These guidelines consider education theory and research as well as the UI, so that they better address the UX of a learning system.

Peters (2014) 11 Heuristics for the Design of Learning Interfaces

1. Relevance of media and reduction of extraneous load
2. Learner control and freedom
3. Support for learning objective(s)
4. Alignment with specific learner needs
5. Appropriateness of look and feel
6. Support for the cognitive aspects of learning
7. Support for the affective aspects of learning

8. Appropriateness of media and tools
9. Accessibility
10. Usability
11. Feedback and responsiveness

For each of the heuristics, some of the design aspects will fall under the role of the instructional design and as well as the underlying architecture of an LMS. An instructional designer will have the most control over the following: “relevance of media and reduction of extraneous load”; “support for learning objective(s)”; and “alignment with specific learner needs.” All three of these areas are dependent on information outside of the LMS. The architecture of the LMS will dictate the following: “learner control and freedom”; “appropriateness of look and feel”; and “usability.” It is interesting to note that the one heuristic “usability” speaks specifically to the interface design, while all the others incorporate educational theory.

Both the LMS architecture and the instructional designer will have impacts in relation to the following: “support for the cognitive aspects of learning;” support for the affective aspects of learning;” “appropriateness of media and tools;” “accessibility;” and “feedback and responsiveness.” The LMS needs to have the functionality, and ability to meet these needs, but it is up to the instructional designer to implement them. For example, the instructional designer will select the media and tools to use in a course, while the LMS provides the functionality to add media and has a list of tools which can be used. Another example is with accessibility, the LMS needs to provide the option to add alt-text to an image, but it is up to the instructional designer to determine what text to add.

The effectiveness, and efficiency from an LMS is dependent upon the structure and functionality of the UI; whereas satisfaction is dependent upon the UX. Due to the nature of an LMS the role of the instructional designer can either enhance the positives of the underlying structure of the system, or detract from the overall

experience when designing learning. Thus, usability is not solely dependent upon the system. An understanding of all stakeholders and their goals will help the instructional designer build upon the usability of the LMS.

Making it Real

Whether you are looking to implement an LMS in an educational institution, such as a college, or in a corporation, the roles of your stakeholders will be similar. In some cases, you will have one individual or group that takes on several roles. For example, often the instructor role and the instructional designer role are performed by one person, or the LMS administrator and LMS / IT support are handled by one person or group of people. In this section we look at each of the main roles for any LMS implementation. For each role there is a short description; at least one persona (see figure 2); a close-up look at the actions and goals for that group in relation to one specific activity - a quiz; and a summary of the questions this stakeholder group would ask in relation to an LMS adoption and implementation.

Learners

Who are your learners? Your learners will be the largest group using the LMS in terms of headcount. The goals of your learners will be to efficiently access their learning. This includes the ability to see all their courses, track their progress within each course, and know what they need to do next. Your learners should always be front and center, however, they are the group that will see the least in terms of the overall functionality of the LMS, and their access is controlled by the course design.

As learners will be the most widely varying stakeholder group, four personas were created to highlight key differences across various

LMS implementations. All the names are fictitious.

What is a Persona?

A persona is based on real statistics about your stakeholders; it is a fictional character that is created to help identify specific needs and wants, as well as what motivates an individual and what they value (Dam & Siang, 2018). While this strategy is often used in the creation of a system, it can be helpful in the broad evaluation of systems and in the selection of your stakeholder representatives. A persona brings a real-world layer to your initial evaluation (Usability.gov, n.d.). To consider the goals and needs of each of your stakeholders, one or more personas were developed for each of the main roles in an LMS. While the personas used here may not match your specific stakeholders, they should give you an idea of who you should consider when gathering a group of your stakeholders together for adoption and implementation of an LMS.

Learner Personas

Matt Smith is a traditional undergraduate student who has not yet decided on a major. He is excited to explore a wide variety of subjects. He expects to see a wide range of courses and finds the variety motivating. He is comfortable with technology and accesses his courses on his phone, tablet, and computer depending on what he needs to accomplish. He prides himself in being self-sufficient and does not feel the need to bother his instructors or the IT department for much help.

Emily Barnes is a graduate student who has finally saved up enough money to complete her M.B.A. She has been working in a small family-owned company but would like to branch out on her own, or perhaps take her family's company into a new area. She feels the M.B.A will build upon the skills and knowledge she has gained through real world experience. She was happy to find the nearest university is

finally offering their M.B.A. program online so she can still continue to work and go to school. At the same time, the university is close enough that she can easily meet with her instructors or classmates on campus when she has questions.

Samuel King is a brand-new employee who needs to better understand the expectations of the institution. He brings with him a wealth of industry experience and is looking forward to applying his skills and knowledge in his new position. He was hoping to hit the ground running, but has quickly realized that there are some unique aspects of the company that he needs to better understand. He is concerned that training will take away from his work.

Amanda Williams has been working at the company for over ten years. She struggles with keeping track of all the required annual training. Additionally, she looks forward to continued learning opportunities to expand her skills.

Learner Taking a Quiz

Select one of the personas, and consider the following actions related to taking a quiz from that individual's perspective. Where would obstacles occur? What specific tasks would hinder that learner from having a positive experience?

In taking a quiz, here are the needs and actions of your learner stakeholder group:

- Identify the need to take the quiz.
- Navigate to the quiz.
- Read instructions.
- Ask questions, if needed.
- Start the quiz.
- Answer each question.
- Track the time left, if there is a time limit.

- Submit responses.
- Receive a score.
- Review feedback.
- Identify how the quiz contributes to determining the final course pass/fail status.
- Identify what to do next.

Learner Perspective Summary

In looking at the actions for taking a quiz, the overall needs of the learner stakeholder group can be extrapolated into the following goals. They are presented as questions to help guide you in the evaluation and implementation of an LMS from the learner perspective.

- Where are my courses?
- What is required of me and what is optional?
- How do I know exactly what needs to be done and when?
- What do I need to do next?
- What is my grade? or How do I know if I passed?
- How can I access help with the content?
- How can I access help with technology?

Instructors [Delivery Aspects]

The role of the instructor will vary and depend upon the design of the course. This stakeholder group is looking specifically at the delivery aspects of a course, in other words, aspects in play when there are actual students in the course. The design aspects are addressed in the instructional designer stakeholder group.

Your instructors will have the highest interaction rate with the LMS, of all your stakeholders. For example, a learner will submit an assignment thus accessing the tool just enough to understand the

instructions and upload a file; while the instructor will have to grade each learner's submission, thus accessing the tool multiple times. This workload can be reduced by tools that automatically grade and provide feedback. However, your instructors while smaller in number than your learners, will be accessing your LMS the most.

Katelin Chow is a tenured professor who appreciates the opportunity to teach online as it affords her the opportunity to travel for her research. She has appreciated working with the university's instructional designers to create online courses she enjoys. She misses the interaction of a traditional campus course, but feels the benefits for her research outweigh her concerns.

Arthur Richardson is responsible for conducting the majority of the continuous training required by his company. He has been pressured to move many of the traditionally lead courses to an online format. He has moved a couple of the trainings to the online format but does not feel that this new format will work for all the courses he currently teaches.

A Quiz - Instructors [Delivery Aspects]

Generally speaking, most question types in a quiz are automatically graded by the LMS. However, depending on the objectives of the course, the instructor may need to manually grade essay-type question. Additionally, the instructor may need to override automatically graded questions. Here are the needs and actions of the instructor stakeholder group in relation to a quiz:

- Identify the open and close dates.
- Identify a time limit, if set.
- Determine if students can access the quiz.
- Update instructions, if needed.
- Identify when quizzes have been submitted
- Provide feedback, if needed.

- Review questions and responses.
- Override question scores, if needed.
- Determine grade for each student.
- Ensure that the grades are determining the final course pass/fail status appropriately.

Instructor Perspective Summary [Delivery Aspects]

In looking at the delivery aspects for a quiz, the overall needs of the instructor stakeholder group can be extrapolated into the following goals. They are presented as questions to help guide you in the evaluation and implementation of an LMS from the instructor perspective.

- Can I see what is available to students?
- What items need grading and feedback?
- How do I communicate with my students - individually, in groups, and as a whole class?
- Can I add or update information or materials?
- How can I override automatically graded items?
- How do I access, update, and/or modify the gradebook?
- How do I provide feedback?

Instructional Designers [Design Aspects]

Your instructional designers will play a pivotal role in your LMS in how they maximize the tools and underlying structure. Even with the best tools available, the design of the course will determine the experience of the learner and the instructor. The instructional designer has the responsibility to use the strengths of the LMS. In some cases the instructor and instructional design roles may be performed by the same individual. As noted in the UX section, the instructional designer plays an important role in the design of the user experience in the context of learning.

Michael Rodriguez did not intend to become an instructional designer, but through a series of opportunities he discovered that he loved not only participating in, but developing the training for the employees of the bank. What began as a banking career took a few turns and he now works for an international company providing training around the world. He prefers to use a mix of options in developing training, but the well-developed self-paced modules are the easiest to modify for the many languages used in the company.

Jacqueline Stewart gained her first experience with instructional design when she was hired as a student worker in the center for teaching and learning. She easily picked up on the technology side of things and quickly found herself helping more and more faculty. When she looked for graduate programs she sought a program with a strong foundation in educational theory. She enjoys working with faculty on strategies for integrating technology, but looks forward to the opportunities where she can design online courses based on sound educational theory.

A Quiz - Instructional Designers [Design Aspects]

In selecting the use of the quiz tool, the overall design aspects will need to meet the course objective(s) and provide logical checkpoints for learning. If the instructional designer is working with a subject matter expert, some of the aspects of designing and creating a quiz will be performed collaboratively with the subject matter expert. Here are the needs and actions of the instructional designer stakeholder group in relation to a quiz:

- Identify the types of questions available.
- Select appropriate question types based upon the course objective(s).
- Create questions within the LMS question bank.
- Designate the quiz settings such as open and close dates/times, time limits, review options, etc.

- Create instructions for the learner.
- Designate grading for individual questions.
- Connect the quiz to the gradebook.
- Designate completion tracking, if available.

Instructional Designer Perspective Summary [Design Aspects]

In looking at the design aspects for a quiz, the overall goals and needs of the instructional designer stakeholder group can be extrapolated into the following goals. They are presented as questions to help guide you in the evaluation and implementation of an LMS from the instructional designer perspective.

- What tools and options are available?
- How can I organize a course?
- How can I create, edit, and modify information, instructions, and materials?
- How are items connected to the gradebook?
- Can I create dependencies?
- Can I designate completion tracking for the activities?

LMS Administrator

In addition to the design and delivery of courses to your learners, there are a wide range of functions that need to be maintained behind the scenes. Your LMS Administrator may be someone in your organization if you have a self-hosted solution, or a designated contact person if your LMS is managed by a vendor. This is the person that ensures that your LMS is running, secure, and updated.

Melissa Lee has worked in both higher education and in corporations in managing a variety of technologies. She has a solid background in information security and has been involved in several large-scale technology implementations. She discovered her love for LMS

implementations while working for a human resources department. Having experience with both hosted and self-managed systems, she understands the pros and cons of each type of management. While she appreciates the access to additional support personnel with a hosted system, she likes the ability to control updates and minor changes with a self-managed system.

A Quiz - LMS Administrator

Your LMS Administrator will not necessarily be involved with a specific quiz. However, this role is responsible for ensuring that the system as a whole is maintained and supports the instructional designers, instructors, and learners in their goals in relation to a quiz. Here are the needs and actions of the LMS Administrator stakeholder group in relation to a quiz:

- Assign appropriate users (learners, instructors, and instructional designers) to their designated courses.
- Identify issues in the efficiency of the system.
- Archive older materials.
- Manage the system backup and recovery plan.
- Perform updates and maintenance.
- Maintain the security of the system, and user data.

LMS Administrator Perspective Summary

In looking at the responsibilities of the LMS Administrator in relation to a quiz, the overall needs of the LMS Administrator stakeholder group can be extrapolated into the following goals. They are presented as questions to help guide you in the evaluation and implementation of an LMS from the LMS Administrator perspective.

- How are students enrolled?
- How are instructors assigned to courses?
- How efficient is the system?

- How are old courses archived?
- What is the backup and recovery plan?
- What kind of reports can I run to tell how well the system is running?
- When and how are updates released?
- How does the system maintain security?

LMS / IT Support

All your users will need access to technology help. This role may be provided by other stakeholder groups such as instructors for learners, provided by the institution's IT department, or by the LMS vendor. This stakeholder group will actually see the LMS through all the other stakeholders' perspectives.

Casey Jordan has worked in IT for over 20 years. He has a talent for asking the right questions to help users overcome technology hurdles. He manages a team that supports the entire institution with any and all technology questions. With the conversations of implementing an LMS he has concerns about adding yet another system to the list that his team supports.

A Quiz - LMS / IT Support

Your LMS / IT Support will need to be available to all users involved with a specific quiz. They are responsible for ensuring that all the other stakeholders - the institution, LMS Administrator, instructional designers, instructors, and learners are able to meet their goals in relation to a quiz. Here are the needs and actions of the LMS / IT Support stakeholder group in relation to a quiz:

- Ask questions about the issue.
- Identify if the system is having an issue.
- Determine if the user is accessing the LMS with a recommend device and browser.

- Identify whether the user has the correct access.
- View the system from the user’s perspective.
- Distinguish between user and system caused issues.

LMS / IT Support Perspective Summary

In looking at the responsibilities of the LMS / IT Support role in relation to a quiz, the overall needs of the LMS / IT Support stakeholder group can be extrapolated into the following goals. They are presented as questions to help guide you in the evaluation and implementation of an LMS from the LMS / IT Support perspective.

- Can I see what a specific user sees?
- Can I access system information?
- Does the LMS work on a variety of devices and browsers?
- What issues can be fixed without consulting the instructor, instructional designer, LMS Administrator, or the institution?

The Organization

This role may not seem a true stakeholder role; however, there will be reasons why an organization would invest in an LMS. In this context “organization” can be a college, a company, a department, human resources, etc. In exploring potential individuals in your organization, there will be someone who could represent the interests of the organization.

Anne Martin is the human resources director at her company. While she vast experience with all the aspects of human resources, the favorite aspect of her job is creating learning opportunities for employees. She is looking forward to working with the new instructional designers recently hired as part of the LMS implementation. She is hoping that the new LMS will be able to generate the reports she needs, as well as providing adequate information for employees to track their own learning.

Andrew O'Connor works in the Registrar's office. His current responsibilities include coordinating with the LMS Administrator to ensure that both students and instructors are appropriately enrolled in the correct courses. He has also been tasked to work with the LMS Administrator to create reports related to retention efforts. He understands the need for these reports, but has concerns about the abilities of the LMS.

A Quiz - The Organization

Your organization will not necessarily be involved with a specific quiz. However, the organization has an invested role in the results of the quizzes in relation to determining successful completion. Here are the needs and actions of the organization as a stakeholder group in relation to a quiz:

- Track successful completion of quizzes.
- Identifying successful completion.
- Extracting reports for institution-wide requirements.

The Organization Perspective Summary

In looking at the role of the organization in relation to a quiz, the overall needs of the organization stakeholder group can be extrapolated into the following goals. They are presented as questions to help guide you in the evaluation and implementation of an LMS from the organization perspective.

- How to determine if the right learners are completing the needed courses?
- How to run reports on system usage?
- How to pull reports on specific institution requirements?
- What data is available to help determine if the learning is successful?

Conclusion

The usability of an LMS will partially be determined by the effective and efficient attainment of the goals of each of your stakeholder groups. It is important to carefully consider how each role will be affected by your LMS in order to identify those goals. While an LMS is designed to organize and provide learning opportunities, not every stakeholder group is focused only on the learning. Understanding the goals of each group will help you identify obstacles to your users' satisfaction with the LMS.

In addition to the effective and efficient attainment of the goals of your stakeholders, the design of the interface will affect the overall user experience. General guidelines for interface design and heuristics specific to learning environments were provided to guide you in examining an LMS.

The descriptions and questions provide in the second half of this chapter will help you identify individuals in your organization who will best represent your stakeholder groups. In terms of an LMS evaluation you will want to make sure that each of your stakeholder groups is represented.

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Chapter 4

All About the LMS

Standards and Specifications

Colleen Griffiths

With the advent of the Learning Management System (LMS) came the need to standardize the requirements for online learning content. Two standards were developed: SCORM and xAPI. As the first standard created, SCORM turned the LMS into a repository for online content, where learners could retrieve specific content such as online courses or curricula. SCORM is a content-centered standard, and tracks data about online content such as test scores and course completion status. For nearly two decades, SCORM was the cornerstone of the LMS. However, as the Internet adopted Web 2.0 technologies, SCORM became insufficient to meet the needs of a new generation of online learners. The xAPI standard was developed to address SCORM's shortcomings, specifically on the relationship between learners and the learning experience. xAPI is able to track both formal and informal learning experiences, such as test scores, simulations, and group work. For the first time, xAPI provided instructional designers with robust data about what learners were doing with content. As the second iteration of the LMS, xAPI-integrated systems are able to track learning that occurs outside of the LMS. However, neither SCORM nor xAPI provide a full picture of the learning experience. The LMS is at the start of its third evolution, into an open, adaptive system that

supports learning across a variety of frameworks and services.

Background of LMS Standards

A brief history of the development of LMS standards

The rise of computer-based and online learning in the 1990s resulted in the availability of a large number of Learning Management Systems (LMS) and online course authoring software. However, each system and software had its own technical specifications, which meant that the software used to create online courses was often incompatible with the LMS systems meant to host the course. These differing technical requirements made developing and delivering online content time-consuming, cumbersome, and costly (Advanced Distributed Learning, “SCORM Overview”, n.d.)

In 1999, the Advanced Distributed Learning (ADL) initiative was created by the United States’ Department of Defense (DoD) to develop common standards and specifications for online learning (Lundy, 2003). One of the goals of the ADL initiative was to create an interoperable learning specification that would let eLearning software and LMS systems “talk” to each other. The Shareable Content Object Reference Model, or SCORM, was the result (Advanced Distributed Learning, “SCORM Overview”, n.d.).

Released in 2000, SCORM was the first set of standards and specifications for online learning. It defined how online content should be published, launched, and tracked (U.S. Department of Defense, “SCORM Users Guide for Instructional Designers”, 2011). For the first time, any online content developed with SCORM-compliant software could be hosted on any LMS, as long as the LMS was also compliant with the new standards. This greatly reduced the time, effort, and cost to develop and publish online content. Additionally, SCORM gave greater insight into user interactions with online content. SCORM’s

ability to track online content allowed instructional designers to see what content users were accessing, what their quiz scores were, as well as how many users were completing a course.

However, emerging technologies of mobile learning and cloud computing exposed limitations in the SCORM standard. SCORM was developed for self-paced, asynchronous online learning content that was accessible through an LMS. Such content did not work well on mobile devices, and the demand for learning content that was easily accessible from anywhere and on any device led to the need for a new set of online standards and specifications (Miller, Soh, Riley, & Samal, n.d).

The Experience API, or xAPI, was the result of this second initiative. Created by Project TinCan, the xAPI was designed to meet current and future requirements for online learning (“Project Tin Can Requirements”, 2018). Released in 2013, the xAPI allows learning content to be launched from any application, on any device. Additionally, the xAPI tracks any learning-related activity done by a user. These learning experiences can include traditional eLearning courses, as well as informal learning activities, games, simulations, and group-based or social learning.

The xAPI went beyond reporting on test scores and course completions, and gave instructional designers specific, detailed information about what users were doing with learning content. For example, with the xAPI, instructional designers were able to see where in an online course users clicked, what content they are accessing or ignoring, and whether or not users went to a website to get more information after they completed the course.

Unlike SCORM, with xAPI all learning experience data is stored in a Learning Record Store (LRS) instead of an LMS. A growing number of instructional designers used xAPI in developing their courses, and the DoD added the xAPI as an online learning standard in 2017.

Currently, SCORM and xAPI are the two online learning standards recognized by the DoD (U.S. Department of Defense, 2017). As such, SCORM and xAPI have been adopted by the learning industry as the standards and specifications to use when developing and deploying any online learning content.

What is SCORM?

SCORM stands for Shareable Content Object Reference Model. SCORM is a standard specification for publishing, launching, and tracking eLearning content such as course completions, quiz and test scores, and the number of pages or slides viewed. SCORM was the first specification developed for eLearning content. It is used to track self-paced, asynchronous eLearning content (Ostyn, 2003).

What is xAPI?

Experience API, or xAPI, is a technical specification for tracking and sending learning statements to an LRS (Learning Record Store). The xAPI specification is the second-generation specification for eLearning content. It focuses on the relationship between the learner and the learning experience, and tracks all components that make up a learning activity. Examples of learning activities that xAPI can track include: games, simulations, real world performance, group work, and traditional eLearning content such as online courses, quizzes, and materials (Torrance, 2016).

LMS Standards and Specifications

Two standards used by Learning Management Systems today are SCORM and xAPI.

SCORM

SCORM Standards

These explain what SCORM enabled content should do:

1. **Be accessible.** All SCORM content can be uploaded to and accessed from any SCORM-compliant LMS that uses the same version of SCORM.
2. **Operate in multiple LMS systems.** All SCORM content delivered in one LMS can also be delivered in another LMS, either at the same or different times.
3. **Function independently of system or software changes.** Content can be launched despite upgrades to the LMS or content-authoring software.
4. **Be re-used or repurposed depending on learning needs.** SCORM content can be used by or altered to fit the needs of different learning audiences.

Source: U.S. Department of Defense, “SCORM Users Guide for Instructional Designers”, 2011.

SCORM Specifications

These are the technical requirements that make SCORM content work with an LMS:

1. **Interoperability:** defines how web-based content and LMS systems communicate with each other. SCORM uses a combination of a common data model and application program interface (API) that standardizes communications between learning content and the LMS.
2. **Portability:** defines how to package online content for publishing to an LMS. All SCORM content is saved and uploaded to an LMS as a ZIP file.
3. **Reusability:** defines how to build lessons, modules, courses,

and curricula; and how to attach metadata tags to content. All SCORM content is organized from the smallest learning object (lesson) to the largest (curricula). Metadata tags are added to each piece of content so that the content is easily located and accessed from an LMS.

4. **Sequencing:** defines how content is delivered to learners through navigation, and how to set the order in which learners receive content. Content can be set so that it is required, optional, or taken in a prescribed order.

Source: Advanced Distributed Learning, “SCORM Overview”, n.d.

xAPI

xAPI Standards

These explain what xAPI enabled content should do:

1. **Access eLearning content using modern technology devices.** This includes desktop computers and mobile devices such as tablets and phones.
2. **Track and report any learning experience.** Learning experiences range from test scores, to downloading documents, or even visiting a museum exhibit.
3. **Launch content, and send and retrieve eLearning data without an LMS.** xAPI uses JavaScript Object Notation (JSON), a common computer programming language, to execute commands and track data. All data is stored in an LRS.
4. **Adaptable for current and future learning performance needs.** With a common programming language that can be enabled to track nearly every learning experience taken both online and offline by learners, xAPI-enabled content can be adjusted to meet changing learning needs.

Source: Rustici Software, “Project Tin Can Requirements”, 2018.

xAPI Specifications

These are the technical requirements that make xAPI content work:

1. An LRS must meet three levels of compliance to work with xAPI:
 - **MUST** requirements are absolute; if a service or system does not meet this requirement they will not work with xAPI.
 - **SHOULD** are recommended requirements for systems to work with xAPI; an LRS does not have to include these requirements to work with xAPI.
 - **MAY** are optional requirements; an LRS does not have to include these requirements to work with xAPI (Bradner, 1997).

Example:

- The LRS **MUST** reject requests to store Statements that contain malformed signatures, with 400 Bad Request (Creighton et al., 2017).
 - An LRS **SHOULD** include a message in the response of a rejected statement. (Creighton et al., 2017)
 - An LRS **MAY** reject (batches of) Statements that are larger than the LRS is configured to allow (Downes, Johnson, Yang, & Richard, 2017).
1. **JSON:** xAPI uses the JSON programming language to write the statements that are used to gather data about the learner's experience (Downes, Johnson, Haag, Yang, Castro, & O'Connell, 2017). JSON is a common language that works with the majority of computer programs.

Figure 1

JSON Example

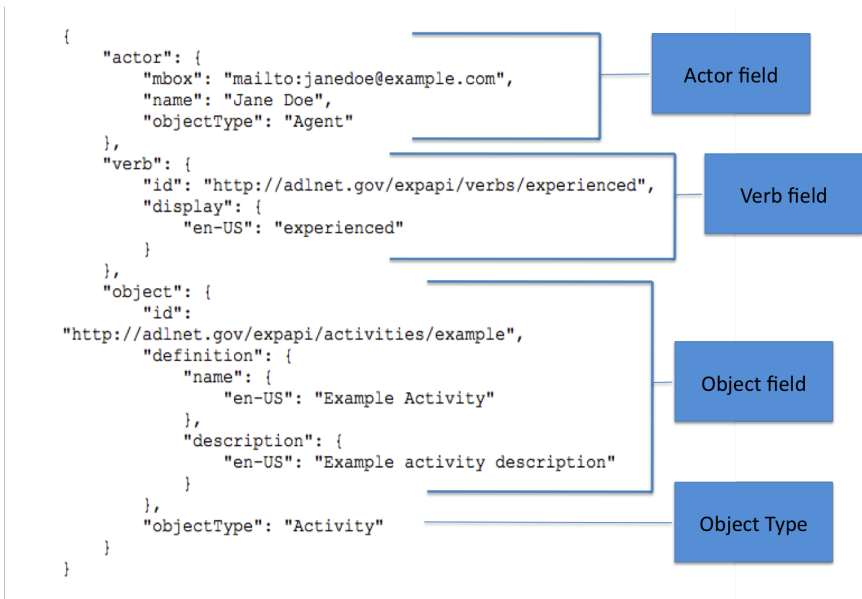
```
{  
  "actor":  
    "mbox": "mailto:janedoe@example.com",  
    "name": "Jane Doe",  
    "objectType": "Agent"  
}
```

1. **xAPI statements:** Statements are used to gather data about a user's learning experience. Statements must follow a basic format of actor-verb-object, such as "Learner did activity" ("Parts of an xAPI Statement", 2018). For example, a xAPI statement may look like, "Mary experienced Skydiving 101 Intro Course".
 - **Actor:** describes who is doing the activity. This field contains the learner's name and an email address. An email address helps to tell learners with the same or similar names apart, so instructional designers can track the right data for the right learner ("Parts of an xAPI Statement", 2018).
 - **Verb:** describes the action of the learning experience. Some verbs used in xAPI statements include: experienced, completed, and answered. A registry of all verbs used in xAPI statements is available online at the Experience API Registry ("The Experience API Registry", 2018).
 - **Object:** describes the learning activity that is taking place. Activities can be anything from an online course to skydiving. The type of activity is described in the Object Type sub-field. Each activity has a unique identifier, so that the right activity is tracked and not confused with a similar activity ("Parts of an xAPI Statement", 2018).

xAPI statements can include additional fields, such as Results or Attachments, to gather more information about the learning experience. However, all statements must include an actor, a verb, and an object to work.

Figure 2

Example of Actor-Verb-Object xAPI statement



Similarities and Differences Between SCORM and xAPI

At first glance, SCORM and xAPI appear to be the same: instructional designers use both standards to develop their online learning content, and both standards achieve the same goal of making content available to learners. However, the method of content delivery, and what they can track about content is what sets SCORM and xAPI apart from each other.

Similarities

Content development: Both SCORM and xAPI drastically reduce the

time needed to develop learning content. The specifications for both standards clarified how learning content should be built and packaged (Advanced Distributed Learning, “SCORM Overview”, n.d.; Rustici Software, “Project Tin Can Requirements”, 2018). Additionally, most content authoring software, such as Articulate Storyline and Captivate, are compatible with both SCORM and xAPI. This means that instructional designers don’t have to worry about the technical requirements of SCORM and xAPI, and can instead focus on developing the actual learning content.

Accessible and reusable: Both standards allow learners to easily access compatible learning content. This means that learners can locate, launch, and revisit content made with SCORM and xAPI. Both standards also ensure that content is reusable. SCORM or xAPI-compatible learning content can be uploaded to multiple LMS’s or systems. Additionally, content is not affected by software and system updates (Advanced Distributed Learning, “SCORM Overview”, n.d.; Rustici Software, “Project Tin Can Requirements”, 2018).

Differences

System requirements: SCORM and xAPI have very different technical requirements to deliver learning content. SCORM-packaged content must be uploaded to an LMS in order to work; otherwise learners cannot access the content. Additionally, all SCORM content needs to be sent to and retrieved from an LMS, using an Internet connection; SCORM does not work offline (Nguyen, 2017). xAPI-enabled content does not need an LMS, or even an Internet connection, to be delivered to learners. Although it can work with an LMS, xAPI only requires an LRS to store activity statements (Anderson, 2017).

Mobile compatibility: SCORM content does not work well on mobile devices, although improvements with mobile compatibility are being made. Unlike SCORM, xAPI-enabled content does work on mobile devices (Nguyen, 2017).

Content format: Because of its specifications, SCORM content must be defined as a lesson, course, or curricula (Advanced Distributed Learning, “SCORM Overview”, n.d.). Learning content that falls outside of these parameters either does not work with SCORM, or must be re-purposed to fit one of SCORM’s content formats. xAPI does not define content, but rather the learner experiences or activities that occur (Torrance, 2016). Any type of content can be enabled with xAPI, including eLearning courses, group activities, or simulations.

Tracking and reporting: SCORM is able to track different information, depending on what version is used. There were earlier versions of SCORM, but only SCORM 1.2 and SCORM 2004 are in use today. SCORM 1.2 tracks quiz and test scores, as well as the number of slides viewed. This version reports whether or not a learner completed the content. SCORM 2004 dives deeper, and tracks the response on individual quiz and test questions (Rustici, “SCORM Versions - an eLearning Standards Roadmap”, 2009). Detailed score reports let instructional designers know exactly what questions are being missed. This can provide insight into improving the assessment, or whether additional training on a particular topic is needed.

xAPI can track almost anything: quiz and test scores, completion status, what buttons or links learners clicked on, what materials or websites they viewed, and more. The drawback with xAPI is that since learning is often unpredictable, learning experiences can be missed, giving the instructional designer an incomplete picture of the learning event.

Refer to Table 1 for more information about the requirements and capabilities of the current versions of SCORM and xAPI.

Table 1

What SCORM and xAPI Can Do

Version	Release Date	Web Browser Needed?	LMS needed?	Cross-Domain Functional?	Tracking & Reporting	Works on Mobile Device	In Use?
SCORM 1.2	2001	Yes	Yes	No	<ul style="list-style-type: none"> • Course completions • Slides viewed • Quiz and test scores 	No	Yes
SCORM 2004	2004	Yes	Yes	No	<ul style="list-style-type: none"> • Course completions • Slides viewed • Quiz and test scores • Correct/incorrect question choices • Course completions, quiz and test scores 	No	Yes
xAPI	2013	No	No	Yes	<ul style="list-style-type: none"> • Correct/incorrect question choices • Buttons clicked on • Materials accessed • Sites visited • Offline activities 	Yes	Yes

Source: Rustici, “SCORM Versions - an eLearning Standards Roadmap”, 2009.

Application of Current Standards with LMS















How it Works: SCORM and the LMS

Online courseware authoring tools, such as Articulate Storyline and

Captivate, simplify publishing and uploading learning content to an LMS. When the content is ready to be published to an LMS, the authoring tool will package the content in a SCORM wrapper. A SCORM wrapper is a set of files that make it possible for a SCORM-compliant LMS and any digital content to communicate back and forth (Johnson, 2011).

Figure 3

SCORM 1.2 Package

Name	Type
 html5	File folder
 lms	File folder
 mobile	File folder
 story_content	File folder
 adlcp_rootv1p2	XSD File
 ims_xml	XSD File
 imscp_rootv1p1p2	XSD File
 imsmanifest	XML Document
 imsmd_rootv1p2p1	XSD File
 index_lms	Firefox HTML Document
 index_lms_html5	Firefox HTML Document
 meta	XML Document
 story	Firefox HTML Document
 story_html5	Firefox HTML Document

Next, the content is uploaded to an LMS. The LMS will host the content and make it available for learners to download. When a learner launches the content, the LMS uses the SCORM wrapper files

to track the learner's progress. Data from the learning content is reported back to the LMS, where it is logged and stored. When a learner finishes the learning content, a completion status and any quiz scores are reported back to the LMS.

SCORM is able to track and report on the following:

- Number of slides viewed
- Completion status
- Quiz scores
- Quiz questions answered (SCORM 2004 only)

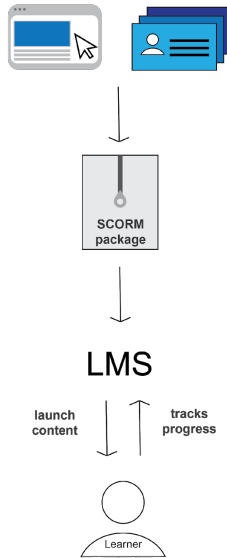
The below graphic visualizes how SCORM-enabled content works with an LMS.

Figure 4

SCORM and the LMS

SCORM and the LMS

web-based learning content



SCORM: Advantages and Disadvantages

Advantages

- Easy to migrate courses between different LMS systems.
- Easily reuse course content in any LMS.
- Manage, track and report content from a single host.

Disadvantages

- Static content, such as documents, videos or website links, do not work well in LMS systems.
- SCORM is limited in what type of user activities it can track and report on.
- Does not work well on mobile devices.

How it Works: xAPI

xAPI tracks formal and informal learning as it happens. This can be done online or offline, and so an LMS is not always needed for xAPI content to work; only xAPI statements and an LRS are required.

First, xAPI statements are attached to learning content. The xAPI statements track specific actions or activities that a learner may experience. The learning content is then hosted online, in the Cloud or in an LMS that has an LRS. Each time a learner accesses content or does an activity that has a xAPI statement attached to it, the statement is triggered and is sent to the LRS for storage. The LRS then aggregates all of the learner's activity statement data into a format that is easy to understand.

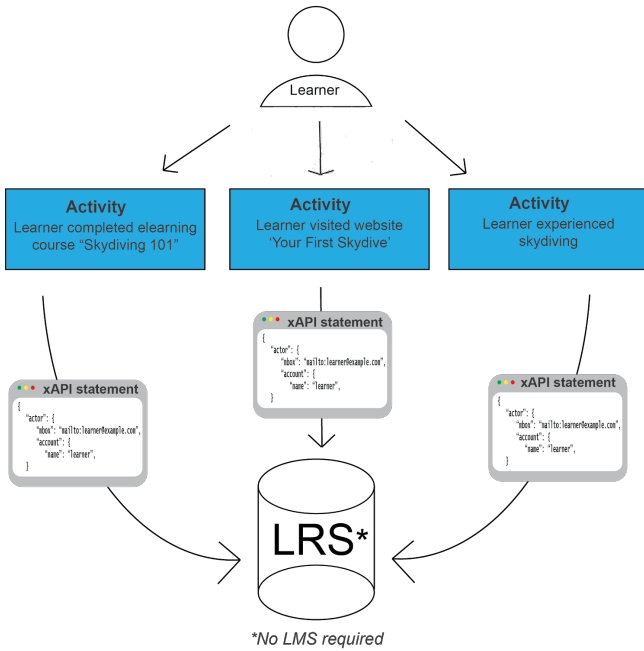
xAPI tracks and reports on the following:

- Quiz scores
- Quiz questions answered
- Completion status
- Online learning activities (elearning courses, simulations, websites visited)
- Offline learning activities (learning content accessed on mobile devices)
- Social learning activities (games, online forums, group discussions)
- Videos watched
- Documents downloaded or read

Figure 5

xAPI and the LMS

xAPI and the LMS



xAPI: Advantages and Disadvantages

Advantages

- An LMS is not needed to launch or store content.
- Gather detailed data about learning experiences.
- Works with social and mobile technologies.

Disadvantages

- Need basic knowledge of JavaScript to implement.
- Need an LRS to store xAPI statement data.
- Few defined best practices on how to use xAPI.

Which should you use: SCORM or xAPI?

There are three things instructional designers should consider when deciding between SCORM and xAPI to create learning content: *Will the content work without an LMS? What information needs to be tracked? and How will the content be used?*

Will the content work without an LMS?

If an LMS is needed to launch and store learning content, use SCORM to create the content. Although xAPI-created content can also be stored on an LMS, it can be hosted elsewhere. However, SCORM-created content will not work without an LMS.

What information needs to be tracked?

Deciding which standard to use depends largely on what data should be tracked. SCORM will only track data related to the learning content, such as course completions, the number of slides viewed, and quiz or test scores. xAPI tracks data about learning activities, such as what the learner is doing with the content, where they accessed it, and what the learner did both online and offline.

When it comes to deciding what data to track, instructional designers should approach this in two ways: first, decide what information is essential to collect. Then, determine what information is not essential, but would be nice to have. Instructional designers should use the answers to these two questions as guides in selecting SCORM or xAPI to create their content.

How will the content be used?

Will the learners be taking an online course or an instructor-led training? Will they need to access the content on a computer or a mobile device? Knowing how the intended audience will use the

content is important when deciding which standard to use. SCORM works best with online, asynchronous content that is accessed through a desktop computer. xAPI works best when learners need to connect online and offline learning activities, or when they need to use multiple systems that support xAPI, such as social media sites and other learning platforms (Martin, 2018).

It is important to note that each project or set of learning content has different needs. What worked for one project or set of content may not work for another. Before content is created, instructional designers must carefully consider how their content will function with an LMS, what the data needs are, and how learners will interact with the content in order to determine whether SCORM or xAPI is the best standard to use. Thinking ahead clarifies content needs, saves development time, and minimizes the potential for content redesign.

Impact of Current Standards on the LMS

The Traditional LMS

SCORM has been the cornerstone of the traditional LMS for nearly 20 years. Developed at a time when learning content was beginning to move online, SCORM bridged the gap between content development and its online administration. SCORM's standards of content interoperability, packaging, organization, and delivery, are reflected in the traditional LMS's focus on content management.

Traditional LMS systems view learning management as a means of keeping track of data about the learning content. This is not surprising, since these systems are fully compliant with the deeply content-centered SCORM standard. In traditional LMS systems, learning is not distinguished from information or data (Alavi & Leidner, 1999). Instead, traditional LMS systems serve specific requirements for managing online courseware assets, tracking results

of student tests and content completion, and making sure that the content used to represent the course itself is accurate and available on demand (Davis, Carmean, & Wagner, 2009).

Each of these primary functions of the traditional LMS is reflected in the SCORM standard: SCORM defines how to publish, organize, and deliver online learning content; it specifies what components are tracked and reported; and it sets guidelines for content accessibility and reusability across multiple systems and software. Many of the traditional LMS's functions and features are driven by the SCORM standards.

Traditional LMS systems give instructional designers insight into content-related data. With SCORM, an LMS is able to track and report on what content is being accessed by learners; how many slides they are viewing, or what their test scores were; and what progress learners have made in a course or curriculum. This data helps instructional designers make decisions about how to structure online learning content in the LMS. For example, should the content be in one course, or multiple courses? Should these courses be part of a curriculum? Should the courses standalone?

SCORM data also helps instructional designers decide how the LMS should track content. For example, should there be a graded assessment? Or can the learner get what they need from the content by going through a required number of slides?

Nearly every LMS in use today follows the SCORM standard (The eLearning Industry, "SCORM 1.2 Compliant Learning Management Systems", 2018). Instructional designers are familiar with SCORM, and it is well implemented across LMS systems and supported software. However, SCORM presents only a partial picture of the entire learning experience. Content and its related data are no longer sufficient to meet the needs of emerging technologies and those of learners who are used to a more robust and responsive online

experience. In turn, the LMS is slowly adapting to the demands of Web 2.0 technologies and audiences.

The New LMS (LMS 2.0)

Learning is not a one-time event. Today, when learners have a question or want to learn something, they use a variety of tools to find an answer: they search online, watch instructional videos, read forums and wikis, post to social media, or ask their friends and colleagues. The xAPI standard was developed in recognition that learning is ongoing, and occurs through a variety of interactions and resources (Rustici, 2013). Reflecting a shift from managing content to managing learning, LMS systems are increasingly adopting xAPI to provide a more complete picture of the learning experience.

The Internet is not the same today as it was 20 years ago, when LMS systems first began to adopt standards for its online content. Learners are increasingly comfortable switching between a wide range of tools and sites, making simultaneous use of locally installed applications, books, and the Internet, and participating in a variety of online and face-to-face communities of practice (Sclater, 2008). Standards that worked 20 years ago no longer meet the needs and expectations of today's online learners. Traditional LMS systems appear dull and non-responsive to today's learners, who want to be able to move uninterrupted between systems and activities (García-Peñalvo & Forment, 2014; Sclater, 2008).

Administrators and instructional designers who recognize these needs have started integrating xAPI with existing LMS systems. xAPI enables learners to move fluidly from one activity to another, while simultaneously tracking each learning experience that occurs both online and offline. In turn, xAPI is transforming the LMS. Now LMS systems have the potential to track learning beyond the content it hosts on site. This includes traditional online learning, such as online assessments and course completions, but also learning that occurs

outside of the LMS. With xAPI, LMS systems can track both formal and informal learning activities such as visiting websites, viewing or downloading documents or images, reading a blog post, real world performance, group work, and more (Torrance, 2016).

xAPI focuses on the relationship between the learner and the learning experience. The data it gathers provides instructional designers and LMS administrators with a deeper understanding of what learners are doing and how they learn. Additionally, instructional designers can use the data from xAPI to identify learning gaps, and ways to improve the learning experience. With the help of xAPI, the LMS has started to shift from managing content, to managing learning.

However, xAPI is altering the LMS in another way: by removing the LMS altogether. Although xAPI can work with an LMS, it can track, report, and store data without one. Many instructional designers are using xAPI, without an LMS. Instead, they use an LRS to store activity statements. Additionally, since xAPI statements can be adjusted to meet changing learning needs, xAPI offers a level of flexibility that is currently unavailable in most LMS systems. In this way, instructional designers and their content are freed from the constraints of an LMS. Learning content does not have to conform to the strict parameters of a traditional LMS. xAPI provides unprecedented possibilities for customization that are currently impossible in traditional LMS systems (Sclater, 2008).

Future of the LMS

The LMS is changing. As eLearning standards continue to evolve with emerging technology and learner needs, so will the LMS. SCORM turned the LMS into a powerhouse for storing online learning content, and for the first time gave instructional designers insight into how learners were interacting with online content. xAPI broadened the LMS's definition of online content, and provided a deeper understanding of the learning experience. Combined, these data on

learning content and the learning experience are creating a new understanding of what learning is, which in turn informs new standards for online learning.

The LMS is at the precipice of its next iteration. The standards of SCORM and xAPI are changing the LMS into a more learner-centered, adaptive environment with content that is easily accessible to learners through multiple devices, systems, and services. What the third evolution of the LMS will look like is yet to be determined, however it is evident that the integration of Web 2.0 tools, social networks, and cloud computing will be a key part in the LMS's next phase.

The application of Web 2.0 tools to educational concepts will continue to open new ways to carry out learning activities and learning services (Conde et al., 2014). These tools will open up the LMS, so that it becomes an adaptable and flexible framework for supporting the learning process (García-Peñalvo & Forment, 2014). Finally, it is even possible that LMS's will become service-oriented systems that can be integrated into a variety of different learning scenarios (Ros et al., 2015).

While the LMS of the future is yet to be realized, what is certain is that the LMS and the standards that drive it will continue to seek methods that will support learners, instructional designers, and LMS administrators throughout the entirety of the learning experience.

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Chapter 5

LMS Evaluation and Selection

Beth Oyarzun & J. Garvey Pyke

The purpose of this chapter is to define stakeholders and process surrounding the selection and adoption of a Learning Management System (LMS). Stakeholders are those individuals or groups that will have an interest in participating in the decision. These groups and individuals will be involved in the funding, use, support, and management of the new system. Prior to selection, the LMS options must be evaluated by the stakeholders to determine the best fit solution for the institution. This evaluation should involve representation of all stakeholders which will vary depending on the type of institution selecting an LMS.

Stakeholders and Roles

The LMS is the centerpiece of software for delivering electronic learning at any institution including k-12, higher education, corporate or military. Electronic learning may be present in face-to-face training or courses, hybrid training or courses, and fully online training or courses that are delivered for academic credit, professional development, or continuing education. Therefore, there are more stakeholders involved than the leadership, learners, and instructors or training facilitators. This section of the chapter will identify and define the major LMS corporations in addition the LMS stakeholders

in and around an institution of higher education. Types of LMS software such as proprietary or open source, cloud based or local installation, in addition to other needs such as support options, functions and features will be discussed.

Proprietary LMS software is distributed by for profit corporations whereas open source LMS software is distributed by non-profit organizations. The choice between these two is often based on the resources available. For example, proprietary software is often harder to customize; but if the institution does not employ programmers that are able to write code to customize the system, then proprietary might be the better option. Conversely, if the institution does employ programmers that are able to customize the system, then open source might be a better option.

Cloud-based LMS software is hosted as a web service, while locally installed LMS software is installed on a local server machine either at the institution or with the corporation that agrees to house and manage the server. The choice of these two options depends on the level of control and information security the institution wishes to have. Cloud-based is less secure but minimizes downtime for software upgrades. Locally installed is more secure but less stable as a far as downtime.

- How will the LMS be hosted, supported, and updated? Types of hosting was discussed previously. However, costs can also vary with different hosting scenarios. Support can be outsourced or done in-house. Many vendors offer tiered support packages that come at an additional cost to the software license, which is also tiered based on the level of service. Updates to the software are usually included for the duration contract unless the vendor releases a new version and the client (institution) wants to upgrade prior to the contract expiration.
- What plugins or customizations can be done and how? Many services such as Dropbox, Google Drive, YouTube, and other

third-party applications can be integrated into an LMS so a user would have access across platforms with a single sign-on. Some vendors allow programming customizations such as porting grades from the LMS to an institutional system for reporting purposes.

- How will the content from the existing LMS (if applicable) be imported into the new one? If the institution has an existing LMS, this is one of the most important questions. Can the content be moved and what functionality will be lost or need to edit after the move? For example, if a higher education campus was moving from Blackboard to Canvas, Canvas does not have the same Blog tool that Blackboard has.
- Can publisher produced materials be integrated? Many publishers are creating electronic materials to coincide with their textbooks. They also have their own LMS systems.
- What reporting options are available? Data-driven decision making is essential as we have access to more and more data. However, mining that data and being able to generate a meaningful report becomes the important feature. Different stakeholders will have needs for different kinds of reports.
- Is the LMS compatible with mobile devices? More and more mobile devices are being used to access content via the LMS (Hu et al., 2016). Therefore, this is an increasing need.

List of Stakeholders

1. Instructors - The instructors drive the use of the LMS by learners. If the instructors use the LMS efficiently and effectively, displays a positive attitude, and is confident with the LMS, the more likely the learners will have a positive experience. This requires instructor buy in, effective training, and a good change management plan for an LMS transition. Reporting functions are important for instructors to track learner progress and address issues when necessary.
2. Learners - Learners are the end users. They rely on the LMS for

instructional material and progress reports. The stability of the LMS and support provided are key issues for learners.

3. Leaders- Leaders have a stake in the LMS as far as cost both initial and recurrent; personnel needed for management, support and training; and integration with other institutional systems.
4. Support personnel - support personnel will be involved with supporting the LMS regardless of whether the LMS vendor provides a support package or not. The transition will also require additional personnel and time. The people include the technology support personnel such as the information technology office or educational division such as instructional designers.
5. Administrative personnel - There is usually an LMS administrator if an LMS existed prior to the new selection. There may be a team that is involved with the administration and support of the LMS depending on the size of the institution and the level of use of the LMS.

Selection Philosophy and Considerations

The governance of information technology (IT) services and support is an important consideration in how an LMS is selected. The amount of shared governance around the selection of academic technology tools is a reflection of the institution's culture, the levels of IT staffing available, and the amount of stakeholder's involvement in institutional decision making in general. Some institutions involve various levels of stakeholders a great deal in the design and selection of all kinds of services, while other institutions have clearly defined roles for stakeholder involvement in only portions of the selection of services; yet other institutions may not include various level of stakeholders at all IT decisions. For example, a smaller institution with limited IT staff capacity may typically choose IT services at the CIO or leadership-only level from full-service vendor partners who offer a complete

“turnkey” service offering. Larger, well-resourced institutions may have more of a “DIY” culture, where the expectation is that IT services will be more centrally managed by the institution itself. Most institutions fall somewhere in-between and are seeking IT solutions which best fit their needs, regardless of support structures required, levels of existing or future staffing levels, amounts of vendor support, and so forth: in other words, the institutional needs are placed first and strategic decisions are made in light of those needs. Therefore, such institutions must weigh all of these considerations in selecting the right LMS.

Given that the LMS is a mission critical system that affects the heart of the learning enterprise for the institution, it is best to seek as much input from all stakeholders as possible in determining which LMS to deploy. Switching from one LMS to another is an arduous process with many complex aspects for staffing, IT resources, stakeholder time and effort, and so forth, which makes picking the right one an important task that deserves quite a bit of visibility within the institution. The criteria for this selection will be discussed later in this chapter. At the end of the process, everyone involved should strongly feel a sense of ownership in the decision, that there was truly a theme of openness, transparency, and shared governance. To accomplish this successfully, an LMS selection committee with fair representation of all stakeholders will need to be established.

Establishing the Selection Committee

The Role of the Chairs. When determining how the selection committee should be chosen, there must be a project sponsor or leader who will coordinate most or all of the activities of the selection process. These activities will include soliciting the members, working with IT staff, contacting vendors, assembling documentation, and leading the communications strategies. The committee chair, therefore, should be someone who is well connected to leadership and

to instructors, such as director of the IT unit in charge of the LMS or the training unit. In the interest of shared governance, an influential member of the institution should serve as co-chair to ensure that institutional interests are always kept at the forefront. These two co-leads, ideally, will have the trust of the institution to lead the process in a fair and open manner.

Committee Membership. Depending on how big the institution is, the committee membership will vary in size, but the important factor is that the major stakeholders are adequately represented. These would include:

- Instructors
 - Different departments ensuring each major unit is represented with representation equating to size of the unit
 - Range of usage types, from those who are LMS super users who create and deliver fully online instruction to the casual users who leverage the most basic features to support face-to-face instruction
 - Mix of comfort levels, from innovators and early adopters through late-majority and laggard temperaments (Rogers & Shoemaker, 1971)
- IT Staff
 - Instructional technologists
 - Support personnel
 - Security and server professionals
- Professional Development Staff
 - Instructional designers
 - Online learning specialists
 - Pedagogy consultants/experts
- Support Services Staff
 - LMS Administrators
 - Personnel that support the LMS
- Learners

A representative sample of end users of the LMS. In all, it would not be unusual but highly advisable to have a committee comprised of 20-30 people. Understandably, this can make scheduling difficult, but the selection of the LMS is so important that members will make meetings a priority. Administrators receive the recommendations and reports from this committee and are represented by the chair and co-chair, if they do not elect to serve on the committee.

Recruiting the Committee. There are two main options for recruiting the members of the committee. The first is for the chairs to directly solicit members personally. The second is for the chairs to ask a senior leader to appoint the members to the committee. Depending on the institution's culture, the latter can be a fruitful way to get involvement established quickly and raise the visibility of the work. If that option is not a viable, the appointment option can also be filtered through the next layers of leadership such as the department chairs.

Timeline of Committee Activity & Length of Service. In order to maximize committee members' participation, they will need to know exactly what they have signed up for. First, the chairs must determine what the "drop dead" decision date is for making the selection and work backwards from there. This date is usually determined by considering the academic calendar, the IT staff capacity to ramp up a new system, the instructor training required, funding deadlines, and so forth. A suggested way to simplify this is to establish that the new LMS will be rolled out at the beginning of the next academic or fiscal year, like August 1 for academic, and determine every step or milestone leading up to that date. In this academic example, the system would need to be purchased and in place by March 1, to allow time for training and migration, which means that contracts and licensing processes would need to be completed by February 1, which means that the decision would have need to have been made and widely vetted by all stakeholders by December 15 and so on. This is an aggressive timeline. Many institutions elect to have a year overlap of the two LMS systems to ease transition and training timelines.

Whatever the rollout date is, the major operational and implementation milestones must be determined so that the selection committee can complete its process plenty of time. Considering these factors and timetables, the committee should start and finish its work within as a short timeframe as is practical. When conducted correctly, a single semester or fiscal quarter should be sufficient. This may seem like an accelerated pace to many academic stakeholders, since academic committees are often long, slow, infrequent, and lacking in clear mandates or deliverables. If the institution has a longer horizon until adoption, the process could be extended by the committee meeting less frequently. However, the danger is that the committee may never establish momentum, create fatigue, suffer participant mortality through scheduling conflicts, and other issues that might arise. Thus, meeting weekly or bi-weekly for three months is short, simple, and to-the-point.

Communication Strategies

The activities of the selection committee need to be communicated widely and frequently to a variety of audiences. It is recommended to establish a simple communication channel for all activities to be noted, such as a website that is frequently updated and shared with constituents. This website should contain the names of the committee members, the charge from the leadership, the meeting minutes, and all supporting documentation such as summaries of data collection.

The committee members should also serve as personal communicators within their departments, in committees, and so forth. They are ambassadors for their colleagues' needs and ambassadors for the selection process itself. Likewise, the co-chairs need to regularly communicate to leadership about the progress of the committee through written and oral reports, both formal and informal.

Selection Criteria

Research

A quality committee is a well-informed committee. Prior to gathering data about the infrastructure and culture of the institutions and the needs of the stakeholders, the committee must first conduct some research in order to be well informed about the charge. How this research takes place is up to the chair and or a collaborative committee decision. However, the committee members should all become informed about LMS vendors, features, transitions at other institutions, and support issues. A variety of sources should be evaluated such as industry publications, professional organization publications, research publications, and published LMS transitions reports and surveys. A large committee can be helpful in this area because the research effort can be divided, conquered, and reported back to the committee. Sometimes, sub committees responsible for different research topics are formed.

IT Staff Capacity & Service Model

One of the first things that needs to be determined is what the institution's IT service model is for providing and supporting the LMS. A large IT staff may be able to self-host the LMS, but a smaller staff will require vendor hosting. There are other considerations beyond hosting, too, such as who will do the integrations, upgrades, security patching, and so on. And not to be overlooked is to determine who will provide 24/7 tier I helpdesk support. Support is often defined in tiers based on the ease of solving the issue. A tier I issue would be a simple one such as a forgotten password. The bottom line is to know what the right mix will be between IT and vendor service provision. Without ever digging into the desired instructional features, one or more LMS offerings could be removed from committee consideration based on IT capacity alone. And even if self-hosting is desired by institutions with

smaller IT staffing, this may limit LMS customizations that instructors and learners may need. Institutions must carefully weigh the opportunity cost of such decisions.

Stakeholder Needs

In order to understand the needs of the different stakeholder groups, the selection committee should establish some data collection methods to garner input. This helps ensure the feeling of inclusion and a quality selection process. An electronic survey to all stakeholders, committee listening sessions, and selected or random interviews could all be viable options to gather input regarding preferences of features, desired support, and integration of other instructional tools. The committee should take into consideration time constraints, leadership preferences, and data analysis/reporting techniques when selecting these methods of data collection. Careful consideration should also be taken with the content of the data collection instruments used. Some key issues to consider in the content of the questions are reliability (downtime), extensibility (integrating external tools), usability (ease), and mobile friendliness. LMS evaluations and selections of the past also included desired features. However, as LMS software has evolved the major players tend to have the popular features needed. Therefore, this might not be as needed as it was previously. The committee needs to gather a clear picture of the stakeholders needs to make the selection of the best fit LMS.

Gather data

Once the committee has the data collections plan in place, the plan should be followed. Data analysis should take place and a needs assessment report generated. This report will be reviewed and submitted to chair of the committee and administrators. The data will be used to write the RFP (Request for Proposals) that is then sent out to vendors. The vendors will respond with their proposals based on

the RFP. The RFP should include the following details: Company information, LMS needs, desired or projected usage statistics, and a draft project timeline.

Conduct Cost Benefit Analysis

Determine the Total Cost of Ownership

Cost is an important part of any IT service offering. To make a true comparison of costs between possible LMS offerings, decision-makers need to look beyond only the direct cost of buying the service itself to find out the total cost of ownership. For example, open source IT products are often touted as “free,” though the cost of hardware, staff, support, and others could all add up to a hefty price tag. Furthermore, costs should be calculated on a three- to five-year basis to get a clearer picture of ongoing costs, since the ramp-up costs in the first year are typically greater than the subsequent years. Vendors often present tiered pricing for years or lengths of contracts.

The following items comprise the direct and indirect costs that make up the total cost of ownership:

1. LMS licensing fee - usually the largest single cost item; could be hundreds of thousands of dollars; often calculated on learner usage at the institution.
2. Hosting - vendor hosting versus self-hosting; self-hosting involves hardware (and hardware replacement cycles), file storage servers, staff costs for patching and upgrades, and more.
3. Support - in-house versus outsourced or a combination of both; consider staffing levels and needs, including salary and benefits (when thinking about outsourcing, compare with current cost of each call to your university IT help desk, e.g., determine how many calls are LMS related, how many calls a staff member can

- answer annually, etc.)
4. Training - initial training during migration and ongoing training needs in year two and beyond.
 5. Technical integrations - staff time and costs to integrate other systems with LMS, such as video streaming, authentication, and other needed systems

Some costs will be one-time costs, though most should be considered on an annual, recurring basis. A special note should be paid to instances where straight “apples-to-apples” comparisons are not possible and whether the cost differential in such instances is justified or provides a new service level offering. For example, some LMS providers offer 24-hour/7-day support. If the current IT support environment is not 24/7, then this is not just a new cost but truly a new service, an expansion beyond the old capability. This should be considered as a benefit and have a different justification tied to it when doing cost comparisons.

Concluding Actions

Once the vendors have been solicited through the RFP process, which is handled through the purchasing department, the committee will review the proposals received and select a small number of vendors (1-3) to come and present/demo the product to the committee and invited stakeholders. These presentations are usually sales pitches that highlight the positive statistics and testimonials of the LMS, but there is a question and answer period at the end of the presentation for stakeholders to determine if the LMS will suit their institutional needs. The committee should be ready with questions for the vendors that relate to the specific institutional needs. If other stakeholders, who are not on the committee, were present, then feedback should be solicited from them to inform the committee. This can be done informally or formally through electronic survey. Once presentations are complete and all data has been gathered, the committee will make

a selection and develop a recommendation report. If the leadership agrees with the recommendation, then the LMS will move into a pilot phase in which support personnel will gain access and training followed by a select group of stakeholders who will pilot the system before it is widely released to the institution.

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Chapter 6

LMS Implementation and Transition

Thomas Dorgan

Migrating from one Learning Management System (LMS) to another can be a big undertaking, depending on the size of your organization as well as the number of people using the LMS and how they use it. The implementation truly begins with a conversation: defining what a LMS is, what is the core functionality and why are we considering this? To explore these questions a committee should be formed and composed of key stakeholders (Wright, Lopes, Montgomerie, Reju, & Schmoller, 2015). Asking the aforementioned questions while engaging in conversations, especially with the stakeholders, brings people together and gives everyone a voice. When it comes to implementing a new system as big and as far reaching as a LMS, a grassroots approach is helpful. Giving a voice to as many people as possible will help with adoption and buy-in from the people that use the LMS regularly (Levasseur, 2001). This chapter will cover a case of an LMS implementation and transition at a public higher education institution. The next sections of this chapter will discuss the steps taken in the LMS implementation and transition process.

The LMS Evaluation Committee and their Charge

First, a committee was established for the overall process. The committee was co-Chaired by the director of the Office of eLearning and the LMS manager. The committee was composed of 17 members representing all organizational units. Specifically, ten instructors and seven staff members. The instructors were selected based on the different areas of the organization they represented. The staff members consisted of additional representatives of the organization that either utilize the LMS within their group or help support the LMS (Wright et al., 2015).

The charge of the committee was to review the current learning management system, which had been in place for approximately seven years at the time. On average, universities evaluate LMSs approximately every 8 years (Brown, Dehoney, & Millichap, 2013), and this review gave the organization an opportunity to reassess its learning management needs and evaluate alternatives.

The objectives of the review were to:

- Identify the organization's current academic community needs for a LMS.
- Evaluate options to meet current needs and best position the organization for a rapidly changing future.
- Recommend an LMS to pilot at the organization.

The committee met multiple times to discuss, analyze and undertake the following: selecting an appropriate LMS to pilot that meets the current needs and can accommodate future growth while taking into consideration what the next generation of digital learning environments will look like (Brown, Dehoney, & Millichap, 2015). Additionally, the committee members also created a survey for current end users (i.e., people who are currently using the LMS within

the organization) on their satisfaction level and usage of the current LMS, focusing on core functionality, and a list of the criteria for selecting a new LMS (Wright et al., 2015).

While it is important to include as many people as possible when gathering feedback; at the same time, it is almost impossible to gather feedback from an entire organization. Therefore, to ensure everyone has a voice, representatives from a respective area of the organization were involved and part of the committee, including learners. These representatives were tasked with decimating information from the LMS committee to their respective areas as well as reporting back to the committee any comments and feedback received. If these representatives were opinion leaders within their areas, they could potentially influence and receive the support of others. This was another tactic that the co-chairs utilized to ensure that not only were people receiving communication about the pilot and evaluation, but that people whose opinions are respected were a part of the process (Chen & You, n.d.).

At many organizations, the purchasing department needs to be involved from the beginning as well. Usually, there are multiple LMSs available, and in order to get a comprehensive overview of the best options, a request for proposal (RFP) most likely will need to be written and sent out. The RFP is typically written by the individual(s) leading the LMS migration. The purchasing department then reviews and sends out the request. Once a list of potential LMSs has come back, the committee decides on one LMS to pilot. Throughout the pilot and the migration phase, at least two LMSs will be running concurrently, i.e., the existing and the pilot LMS. It is advisable to keep one LMS pilot at a time. This step can ensure that the pilot runs smoothly, avoiding confusion and allowing personnel enough time to learn a new system. It also helps to provide support for the pilot and existing LMS.

Facts and Figures of the Pilot

Once the LMS had been selected to pilot, the committee helped identify pilot members. When selecting the pilot group, the first thing to consider is the parameters set by the company whose product is being piloted. For example, depending on the terms of the pilot contract, there might be a limit to the amount of courses, instructors or students that can participate. In this particular case, there was a restriction on the total number of students allowed in the pilot. Although there was not a precise number imposed by the vendor, an approximate number was established. This restriction turned out to be a positive aspect in this process as it helped to keep the pilot size manageable, allowing support personnel to provide a much more hands on approach.

For this pilot, a group of faculty volunteered to teach their courses using the selected LMS for the entire semester. Included in the pilot were:

- 14 faculty and courses
- 14 disciplines across four colleges
- 367 students
- 6 fully online courses
- 6 hybrid courses
- 2 face-to-face courses

While the committee could not accommodate all of the requests received from instructors to be a part of the pilot, they were able to create courses and LMS accounts for all instructors. This step allowed for those interested in participating to at least build a course and to give them an opportunity to share their opinion about the piloted LMS. This decision was grounded on the grassroots approach taken in this process and getting as many people involved as possible. Additionally, having a limit on the number of students that could participate in the pilot, which was imposed by the vendor, gave the

committee a way to keep the pilot size manageable.

Along with the limitations aforementioned, it is also important to consider any limitations imposed by the organization. These organizational limitations can be defined as internal restrictions. For example, in a currently running LMS, there are most likely multiple third party tools integrated. These tools could be free or require a licensing fee. With an LMS pilot, it might be difficult to integrate all of the third party tools that are currently being used. Either the pilot committee or a sub-group of that committee need to make the decision on what additional resources may or may not be included with the pilot. This decision also needs to be communicated to the pilot faculty as soon as possible so there are no surprises or missed expectations throughout the pilot phase.

Another consideration is the tools, which are available in the current LMS, may not be available in the pilot LMS. These tools need to be identified quickly because there may be a need for concurrent pilots or testing additional tools that instructors have come to rely on such as plagiarism detection software. These tools can place additional time constraints not only on the evaluation committee, but also the pilot group. Any new tools introduced will require additional training and time to learn how to use them. The tools need to enhance teaching and learning while connecting seamlessly to the LMS and being relatively easy to learn (Abel, Brown, & Suess, 2013).

A third consideration identified during this pilot was to exclude specific academic programs from the pilot. For example, the organization has accelerated programs running 7-week fully online courses as well as traditional programs running 15-week courses. Switching between two different LMSs could be confusing for students and instructors. To help avoid confusion and unnecessary stress on students, the LMS evaluation committee elected not to have any of the 7-week courses participate in the pilot.

Support and Training

The next steps in this process were identifying a support/training plan. A pilot is only going to be as strong as the support and training provided. This includes both instructors and students as well as system administrators and support staff. Questions to ask include: What type of support is needed? and Who will provide it? Additionally, training needs should be addressed well ahead of the pilot to give instructors time to build their courses and ask any questions prior to the start of the pilot period.

Ideally, you want to train system administrators and support staff first. This will allow system administrators to configure the application to meet the needs of the organization and disable settings that are not needed. When getting ready to introduce a new application like an LMS, it is best to start small. In other words, if possible, the system administrators should disable anything that is not relevant to the pilot. Additional tools can always be introduced at a later time.

In the beginning, focusing on the key tools and functionality of the LMS is most important. This can and should be discussed within the LMS committee. This process is all about openness and transparency. System administrators also need time to create courses and enroll pilot instructors and students. Depending on the scope of the pilot and the system administration resources, this could be an automated process or a manual one.

In this LMS pilot example, the system administrators had a manual process. The needed course and enrollment information was pulled from the Student Information System (SIS) and formatted into a CSV file that was manually uploaded into the LMS. There were two main reasons to set up as a manual process. The first was timing. There was very little time between deciding to run the pilot and actually starting the pilot. The second was because this was a pilot, and setting up the

automation can be a time-consuming process. It was decided that the automation can be worked on once a decision was made to move forward.

Once system administration and support staff training has been completed, it is time to schedule the instructor training. It is also advisable for support personnel to attend the instructor training as well, especially if it is being conducted by an outside trainer. This will ensure that support staff will gain the same knowledge and skills that the pilot instructors were trained on, thus, giving the ability to provide better support. It is also important during these early pilot stages to reach out to the pilot group often, asking how they are doing and reminding them of the support options available. A smooth pilot really requires quality support, multiple means of support and communication.

The Course Building Process

Once a pilot group has been trained, it is time to start building courses, which brings up important questions: Does the institution import course materials from the existing LMS? In following this step, a “cleaning up” would be required since moving course content from one to another LMS is not seamless as it may seem. Or does the institution build from scratch? With this LMS pilot, there was a multi angle approach taken. The team gave the pilot members three options:

1. Have their content migrated and “cleaned up” by support staff.
2. The instructor could import their own course material and “clean up” the course themselves.
3. The instructor can build the course from scratch in the new LMS.

All three options were selected by multiple instructors. The first

option gave the support staff time to learn the migration process and get a sense of how much time a “clean up” would take. Meanwhile, the second option allowed the team to get a sense of the time that an instructor would take to go through this process. Finally, the third option provided similar information with building a course from scratch. Throughout the pilot, the co-chairs sent multiple follow up emails asking the group how it was going and asking the instructors to reply all to share their experiences with all of the pilot instructors.

Plan for LMS implementation

Once it was determined to move from the pilot to implementation, the next step was to develop a timeline. Much of the implementation plan was pulled from the pilot plan. Given that LMS migrations can be a long, multi-year project depending on the size of your organization, the co-chairs established a LMS transition team to help facilitate the migration. The team consisted of the LMS administrators, instructional designers and 3 graduate assistants.

Communication, Communication, Communication

A project of this size requires multiple meetings with multiple stakeholders and various committees across an organization. Schedules can fill up fast so the sooner a timeline can be developed and meetings scheduled the better. These meetings are all about spreading the word, as communication is key to a successful project of this scope.

One of the biggest challenges with implementing an application widespread as an LMS, which has a diverse population using it, is getting the word out. Misinformation can spread quickly and having a solid communication plan in place is very important. Keeping that

communication flowing throughout the process will help avoid any miscommunications.

In this example, a very detailed communication and roll out plan was created by the LMS evaluation committee co-chairs. The plan was then sent to the LMS evaluation committee for review and approval.

Communication Plan

The communication plan began with the co-chairs establishing a multimodal approach in communicating with the organization, starting off by identifying the various modes of communication available at the organization. In this example, that included print materials, email, web based newsletters, a new website and scheduling meetings with various stakeholders, organizational leaders and any relevant committees within the origination. The communication plan also focused on mass communication as well as very targeted communication as the migration progressed.

From the beginning, the co-chairs stressed that communication was key. Their goal was to have a high communication in flux to the point that the organization would be happy when it was over because they would not need to hear about the migration anymore. The first messaging that went out was an announcement in the organization newsletter informing everyone within the organization that the decision to move forward with implementing the piloted LMS had been made. In this case, the team began the transition during the Summer and was completed at the end of the Spring semester. To help with this timeline, the committee also recommended that the organization purchased the 24/7 live chat support provided by the vendor. This decision was made to help ensure a smooth transition and provide as much support for faculty and students as much as possible especially during off business hours.

The second part of our communication plan was a messaging

campaign with a goal of ensuring that all members within the organization were aware of the transition. This consisted of the creation of a website dedicated to the new LMS and transition. The site included training dates, a calendar for signing up for trainings, self-help guides as well as links to our internal ticketing system for instructors to easily submit requests or ask for help.

Multiple training fliers were printed and distributed across the organization throughout the transition. Weekly announcements were posted in the organization's newsletter, highlighting a different aspect of the new LMS. Monthly emails were sent to leaders across the organization and a countdown timer was set up and placed in a very visible spot in the existing LMS. This countdown timer was by far one of the most effective communication strategies employed. There was more feedback received about that timer than any other method of communication. Meetings were also scheduled specifically with program coordinators and leaders of fully online programs. Again, the goal was to ensure that the entire organization was aware of the transition and there were no surprises.

Since the pilot had been successful, much of the rollout plan was based off of what was done during the pilot. For example, limiting new tool integration and new customizations until the migration was complete. This was communicated early and often to ensure expectations were set from the beginning. This also allowed the support staff's time to focus on course migrations, trainings and learning the new LMS. The goal was to make sure support staff were comfortable with the new LMS before adding additional functionality and customizations.

The implementation plan really started with the communication plan and evolved from there. As mentioned, the implementation team met with program coordinators and leaders for fully online programs. While meeting with these groups, timelines were established for transitioning each of the respective programs. These fell into two

distinct groups, the first were fully online programs that follow a 15 week schedule. The second fell into the accelerated 7 week course schedule. With the 15 week fully online programs, each department established a plan for migration that would be implemented over the course of the Fall and Spring semesters. The goal was to get the Fall courses up and running on the new LMS while the Spring courses were being migrated during the Fall.

Communication Plan Timeline

In this particular case, the Summer was designated as a soft launch since the majority of instructors are off contract and not required to teach during that semester. It was decided that the official announcement would wait until the Fall.

The communication plan included organizational wide announcements as well as targeted communications to specific groups.

- May
 - Meetings scheduled with Program Coordinator/Leaders of fully online programs.
 - Announcement made in internal newsletter informing instructors that anyone teaching over the summer can use the new LMS.
 - A new LMS website was created to help distribute information.
- June
 - A countdown timer was added to the current LMS.
 - Emails were sent to instructors teaching over the summer with information on:
 - New LMS Help Features
 - Training dates and opportunities
- July
 - Emails were sent to department chairs focusing on accreditation and reminding them that any needed

student work will need to manually be exported from the current LMS.

- August
 - Organizational wide flyers were sent to every instructors' internal mailbox.
 - An announcement was posted in the organization's internal newsletter and a plan was established to post a new announcement every two weeks focusing on a different aspect of the new LMS.
- September
 - Emails were sent to Department Chairs, Deans and Associate Deans focusing on:
 - Accreditation and exporting materials from the old LMS
 - A moratorium on new tool integration until the migration was complete
- October
 - The official message was sent out by the organizational leader announcing the LMS migration.
- November
 - LMS administrators identified instructors still using the old LMS that had not yet logged into the new LMS to remind them of the deadline and asking if they needed any additional support migrating their content.
- December
 - Organizational wide flyers were distributed again focusing on:
 - Timeline of the migration
 - Training opportunities
 - Support resources
 - Course migration options
- January
 - An announcement was sent via the organizational newsletter reminding instructors and students that the old LMS would be shut down in May and that all needed

- content must be exported by then.
- The countdown timer added to old LMS was modified to include a blinking “IMPORTANT” at the top as well and as increased in size. The idea was to make a noticeable visual change to the time as a way to grab the attention of instructors and students still using the old LMS.
- February
 - An email was sent to Department Chairs, Deans and Associate Deans focusing on:
 - Accreditation and exporting materials from the old LMS
 - Limited access to the old LMS for the next year and what to do in the event of a grade challenge.
- March
 - Another organizational wide flyer was distributed focusing on:
 - Training and support resources
 - End of life for the old LMS
 - LMS administrators identified instructors that hadn’t yet logged into the new LMS. Emails were sent to the identified group reminding them of the deadline asking if they needed any additional support or assistance migrating their content.
- April
 - Another announcement in the organization newsletter focusing on:
 - Course migrations and the 4 options
 - Have their content migrated and “cleaned up” by support staff.
 - The instructor could import their own course material and “clean up” the course themselves.
 - The instructor can build the course from scratch in the new LMS.
 - Collect the migration requests and have the vendor migrate the courses

- May
 - A new flyer was created and posted throughout the organization informing instructors and students that the old LMS's end of life will be May 16.

Course Migration Plan

With the 7 week accelerated programs, courses were migrated in groups based on program and course availability. This was planned in coordination with the respective departments to cause the least amount of impact to the students and to ensure new cohorts of students would be able to start on the new LMS.

To confirm courses were migrated in a timely manner, the team hired 3 additional graduate assistants to facilitate trainings and course migrations. A course migration request form was created in the organization's internal ticketing system to help streamline the process and stay organized. Expectations on migration times were established up front so instructors were aware of timelines, i.e., 2 to 3 weeks, and this was communicated on the migration request form. Priorities were given to courses that would be running in the upcoming semester. This information was also communicated and part of the migration request form. As part of the communication plan, faculty were given the same options for migration as were offered during the pilot, with an additional fourth option.

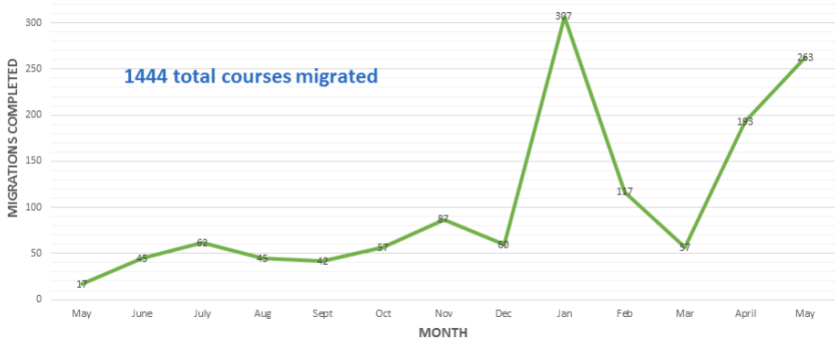
- Submit a request to have their content migrated by our internal team
- Migrate their own course material
- Build from scratch

The fourth option was having the vendor migrate the content. As part of the contract with the vendor, there was the option to send them a set number of courses from the old LMS that they would migrate into the new one. Two bulk migration times were established for the vendor to migrate the courses. The first was halfway through the migration and the second was towards the end of the migration. In all, the team received approximately 1,400 migration requests that were completed based on already established criteria. Having the established criteria helped the team easily prioritize work and identify courses that could be sent to the vendor for migration. The vendor's turnaround time was approximately 2 weeks. This gave the team time to focus on the higher priority courses.

This graph below represents the total amount of courses migrated each month during the migration.

Figure 1

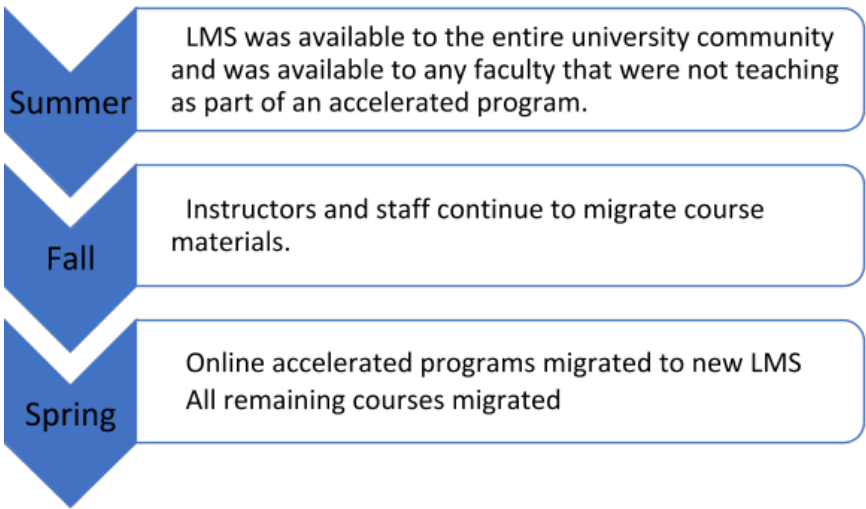
Number of course migrated per month during the migration process



The timeline for the transition broke down as follows. The transition to the new LMS began for all non-accelerated programs as soon as it was determined that the new LMS would be implemented, which was at the end of the spring pilot.

Figure 2

Timeline for the transition

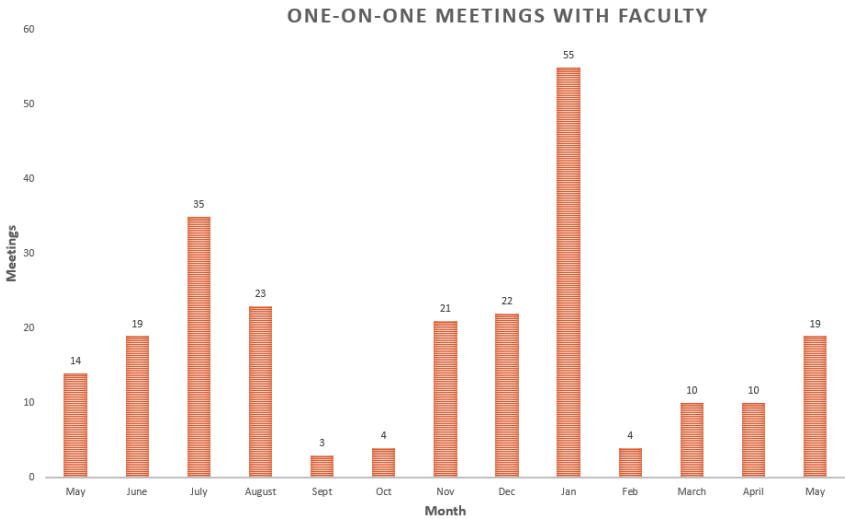


Trainings

Throughout the migration process multiple training opportunities were offered. A breakdown with the number of attendees per month can be found below.

Figure 3

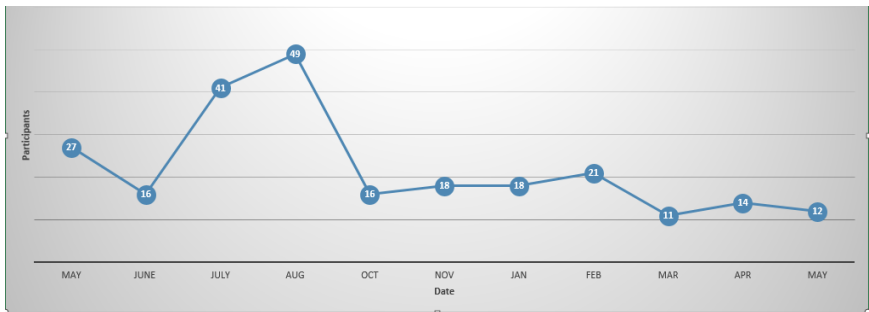
One-on-one faculty meetings during the migration process



Multiple open training sessions were scheduled in computer labs. These were set up in two-hour blocks in which faculty and staff who needed help could drop by at any time during the timeframe period.

Figure 4

Training sessions during the migration process

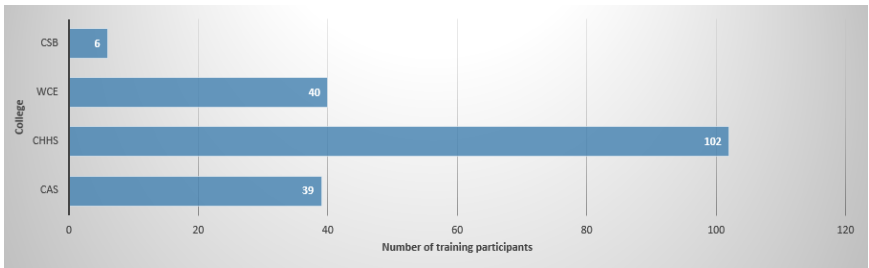


Department specific trainings were also offered and scheduled as part

of the targeted approach to the migration. Below are the training numbers for the specific trainings based on the respective colleges.

Figure 5

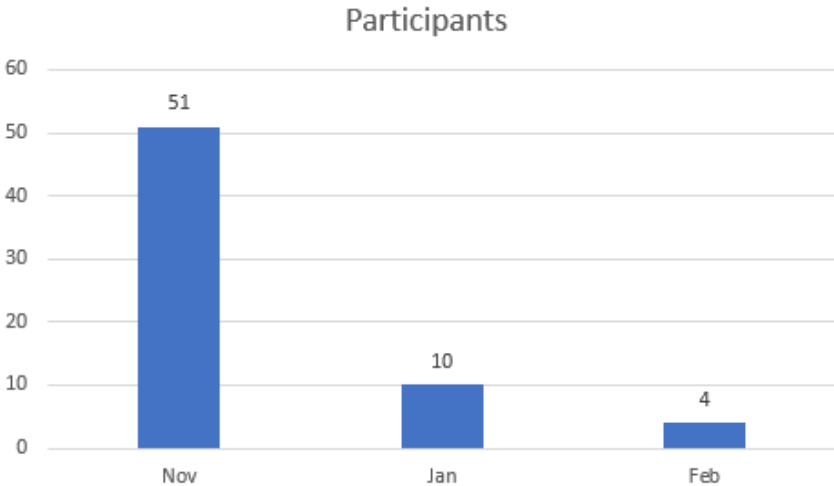
Participants in trainings based on colleges



There was also the option to enroll in online asynchronous training throughout the migration. A breakdown of the numbers of participants that signed up for the asynchronous training can be found below.

Figure 6

Participants in asynchronous trainings



Implementation Strategies/Lessons Learned

Have a soft rollout - If possible, have a soft rollout of the LMS. With the timing of the pilot and the choice to move forward with implementation happening at the end of the Spring, many of the instructors had already left for the Summer. Unfortunately, the official announcement about the LMS migration was not made until the Fall. As a co-chair, the author of this chapter wanted to get the word out as soon as possible because not announcing it sooner could be a disservice. However, letting faculty know they could use Canvas over the Summer and holding the official announcement until the Fall allowed the team some wiggle room to make changes and adjustments that were not anticipated up to the moment of a larger population joining the new LMS.

Policies and Procedures - Have policies and procedures in place prior to the launch. With a new LMS, it is a great time to establish best practices early on, especially from the administrative side. Also,

if possible have a moratorium on any new tool integration or customization until after the migration is completed. Although faculty and support staff were very eager to start working in the new LMS, there were not enough resources to run two LMSs while also integrating and learning new tools and customizations.

Stakeholders and Champions - To ensure a successful LMS implementation, it really boils down to having a strong and well respected LMS committee and pilot group. These are your champions who will help get the buy-in from their peers.

Support - Knowing the needs of the organization and communicating those needs to instructors and other personnel will lend itself to better support and training. If the end users feel like they are not getting the help they need, they will become discouraged. This discouragement can spread as they share about their experience. Additionally, training system administrators before instructors will allow the administrators time to make configuration decisions based on the current needs of the organization.

Communication - Creating a solid migration/communication plan up front will help the team once the workload and activities increase. It will also be important to have a plan to fall back on. Setting up the countdown timer in the old LMS was one of the best communication methods we employed. It was highly visible and sizable. We received the most feedback from the timer and anyone using the old LMS could not miss that information when they logged in. Being able to identify instructors still using the current LMS was also a useful strategy for providing targeted communication. Throughout the last few months of the migration, the LMS administrators identified instructors that were either still using the old LMS or had not yet logged into the new LMS. Emails and trainings were targeted at this group specifically. This allowed us to continue to provide support to those that needed.

Grade Disputes - Ensure to have a plan for the old LMS. For example, there might be a need to access the former LMS in case there is a grade dispute or other similar circumstances. Often organizations must retain grades for a specific time period. Questions to ask: How long will grades need to be kept? Will there be a need to extend the contract with the old LMS vendor?

Common problems that could have been avoided

Learning - As system administrators, it is extremely important to learn the LMS well to avoid any confusion in the future. For example, if there are tools in the new LMS, which are unavailable in the current LMS, it is beneficial to disable them until the system administrators have had a chance to learn how the new tools work. In our case, there were a few tools we would like to have disabled as they did not function as expected. This caused additional workloads on the support personnel.

Training - Plan for administration support training prior to instructor training. During the pilot in this example, there was a very short turnaround time between scheduling the trainings and instructors leaving for the winter break. The co-chairs ended up scheduling the instructor training before the administration training. If the administration training would have happened first, it would have given the LMS administrators the chance to configure the system to better meet the needs of the organization instead of making changes after instructors started using the new LMS. It is always easier to introduce new features versus removing once instructors have started using them.

Policies/Procedures - When integrating a new LMS, it is a good time

to not only check that existing policies and procedures are up to date, but also to verify whether there is a need to introduce new ones. Additionally, make sure to have any new policies and procedures worked out prior to rolling the new LMS out to the organization.

Prepare for the Unexpected - This is easier said than done. It is important to have some flexibility in the migration or make sure those that are responsible for the implementation/migration have the resources needed throughout the process to handle anything unexpected. For example, looking at the graphs presented previously on the multiple open training sessions and the department specific trainings, there is a dip during the months of September and October. This was due to the institution being shut down for nearly two months because of a natural disaster. The migration/implementation team made sure to stay in contact during this time as well as to ensure they had the resources needed to continue working remotely.

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Chapter 7

Evaluating LMS

Sheri Conklin

In this chapter, we will explore the evaluation procedures used when exploring new technologies such as a Learning Management System (LMS). Evaluation of a technology change is critical. Not only do you need stakeholder buy-in, but you also need data that the stakeholders have bought into the idea of change. When conducting an evaluation, you want to engage both faculty, staff, and students on their feelings and attitudes towards the new platform. When making a large-scale technology change, it is essential to have data to support the change. For example, in higher education organizations, faculty conduct research; therefore, the design of your survey tool and how you communicate the data is essential. In a corporate atmosphere, you need to consider the attitudes and feelings of the employees; therefore, the survey instrument should include those as well. Finally, the development of the evaluation plan needs to occur during the planning stage.

The evaluation plan consists of:

- Survey instruments
- Communication plan for faculty to students
- A timeline of when data collection will take place and type of data that will be collected
- Duration of survey availability

- Information on when and how data will be analyzed
- Details on how the data will be used and communicated.

Instructional Design Evaluation

You may have learned, are learning, or will learn about evaluation from the Instructional Design vantage. In many cases, it is a training needs analysis where formative and summative evaluation is employed. Formative evaluation provides data for revision and improvement. One-to-one or small group format is typically used to collect data to ensure the designed training meets the training objectives. Summative evaluation happens after training has been launched to determine whether the training produced the intended outcomes. The instructional design process is a systematic method of approaching an instructional problem. In this case, it is not an instructional problem; regardless, it is still essential to employ a systematic method to ensure a smooth transition from one system to another.

Evaluation of a technology product or system such as a Learning Management System (LMS) should not be an afterthought. You do not want to conduct the pilot and then think, "We should create a survey." It needs to be a well-planned, systematic procedure. The following sections will guide you through the thought processes and procedures to consider before making any significant decisions about changing technologies such as an LMS.

Timeline

When should you start thinking about your evaluation procedure? You should be planning the evaluation when you are considering a technology change. While reviewing new technology systems, begin the planning process. If your organization is considering new technologies, then change is likely to occur, and that is the time to

start planning. Therefore, at the onset of this process, begin to design the evaluation. Consider the following questions:

- What is the culture of my organization? Is the culture accepting of change?
- Does leadership support this change?
- Who are the stakeholders?
- How will the results be disseminated transparently?

The evaluation design should depend on the culture of your organization. You may want to send a pre-survey to determine the feelings of the stakeholders before implementing the pilot. Cultural awareness will help guide the design of the evaluation plan and how you approach change in the organization. Again, begin designing the evaluation plan at the onset of change. It is crucial to have the feedback of the stakeholders and evaluation committee on the evaluation plan. Once you have approval on the overall project, begin the survey instrument design. The development takes time; therefore, the sooner you start the process, the better.

Stakeholders

Often when thinking of an LMS change, end-users are typically thought of as the first and foremost stakeholders. Stakeholders are those who have a share in the organization or have an interest in the organization. There can be primary stakeholders and secondary stakeholders; all have varying influence in the organization, and with the change. In a higher education context, faculty and students would be the primary stakeholders. Although students come and go, faculty do not, however, student or end-user input is still important. There should be end-user representatives on the LMS committee who serve as stakeholders in the evaluation process. Other secondary stakeholders include university staff, such as administrative and support staff. Often the LMS is used for advising, student orientation, and professional development, where administrative staff are the ones

administering many of these entities. Also, administrative staff are the eyes and ears of faculty. Keeping the administrative staff informed of changes, allows for another communication channel for the impending technology change. Information Technology Systems (ITS) should also be involved as they are the entity that supports enterprise or system-wide technologies. ITS also typically governs and vets technologies for privacy statements, data storage, and security as well as ADA statement. All new technologies must be ADA compliant (Americans with Disabilities Act) for consideration.

ITS will also determine if the technology meets the privacy and security standards. For instance, some companies will have access to student data and sell it to other companies. Storage is another component, and some organizations will require all data to be stored in the country of residence. After product vetting, ITS will determine whether they can support this product. For example, if a faculty, student, or staff, is having technical issues, they typically call a Help desk that is associated with this group.

Finally, organizational administrators are key stakeholders since they often hold the purse to purchase the product. There may be a financial cap on the product (see Table 1). Therefore, develop a communication plan to keep the administration informed on critical decisions continually for budget planning and sustainability.

Table 1

Stakeholder Impact

Stakeholder	Role	Impact	Interest	Influence
Faculty	Uses the technology to facilitate teaching and learning	High	-usability of system -ease of use -time efficient	High

Student	Uses the technology for learning	high	-usability of system	Medium
Administrative staff	Information hub for faculty	low	-supportive role -information hub	Low
Administration	Provides funding for the technology	High	-cost	High
Information Technology Systems	Provide system wide support	High	-provide system wide support - vet product for security, privacy and accessibility	High

Design of evaluation instrument

The evaluation instrument needs to be developed before the pilot, especially if you plan on having pre- and post-surveys (Appendix A). Reach out to other organizations or to the LMS company to determine if there is a survey instrument available that can be modified for your organization. For example, we reached out to a similar organization that had recently gone through an LMS transition. This organization did a pre-and post-survey. Our organization only did a post-survey. Therefore, the survey was modified based on how our organization was conducting the pilot.

Designing with the End User in Mind

When designing the survey, you want to keep the end-users in mind. You will need a survey for the pilot faculty, students, and potentially for others who may not have participated in the pilot but were able to have some hands-on experience. For example, in our pilot, we were

limited by the number of students who could access the LMS, but all faculty could have access. Therefore, we had training sessions that allowed non-pilot faculty to have hands-on experience with the tools and features of the new LMS. They could not teach/have student interaction in the LMS. Therefore, you may have three variations of the same survey but slightly different for each audience. You also want to keep the surveys separate as the pilot participants' input will be significantly valued over the opinion of a person who may have an hour of "hands-on" experience. Once you have developed your survey, have the LMS committee, particularly the faculty, approve the survey. In our case, some of the faculty wanted more student demographic information regarding the students who were using the new LMS. The LMS committee needs to give the final approval for the survey instruments as this also creates stakeholder buy-in.

During the instrument development stage, you may want to employ various techniques such as the think-aloud protocol to ensure usability. The think-aloud protocol allows you to fine-tune your instrument and confirms the end-user will read it the way you have designed it. Once you have developed your survey, find 3-5 faculty to read through the survey. While they are reading through the survey, they should state their thoughts aloud. When employing this protocol, take thorough notes and then make adjustments to the survey instrument. It is important to remember that if the end-users are unsure of what you are asking for, you will not get the data you want and need.

Criteria to Consider Before Designing

Depending on your organization, you may be able to deploy one survey to collect data. One organization conducted pre- and post-surveys. Another organization not only conducted surveys but also employed faculty interviews. It is essential to understand the culture of your system and gather the data that will be appropriate for your organization.

One factor when designing a survey is not to compare the old system with the new system in terms of features. As Kim and Lee (2008) stated, older systems will not have the same functionality or tools since technology is continually improving. As a result, it is imperative to consider the end function of an LMS: teaching and learning. Kim and Lee (2008) proposed seven aspects of criteria: instructional management, interaction, evaluation, information guidance, screen design, technology, and organizational demand. The first four aspects are directly related to instruction. Criteria related to instructional activities are screen design, technology, and organizational demand.

Other criteria for consideration are security and compliance. The LMS must be completely accessible with regards to ADA (Americans with Disability Act) laws as well as adhere to security and privacy policies. Some states or schools may have policies regarding where and how student data is stored. For example, in Canada, student data must be housed within the country. Finally, the cost is a consideration typically for upper administration. (Appendix A - Survey questions for pilot faculty)

If the evaluation committee intends to collect qualitative data, the semi-structured questions should be designed and vetted by the LMS team before the pilot. Often, qualitative feedback is semi-structured, which means that the questions are guiding points, but the interview or focus group should be guided by the conversation, not the list of questions.

To conclude, whatever method of evaluation, whether it be a survey or a conversation, they all should be developed early and be vetted by a group of stakeholders such as the LMS committee.

Duration of evaluation

There are two points to consider for the duration of the survey. First is the actual time it will take the participants to take the survey.

Research has shown that participation declines if the survey takes longer than 20 minutes to complete. Also, completion rates drop if there are more than three open-ended questions. Consequently, the design of the survey should be carefully considered.

The second point is the duration of the survey and/or evaluation. Will the evaluation span the whole pilot, or will it be at the end of the pilot? The evaluation period may depend on how many pilots are occurring and the culture of your system. Also, if you are conducting interviews or focus group sessions, those will need to be strategically planned to optimize attendance. The timing of qualitative data collection will depend on the duration of the pilot. If the pilot is only one semester, then focus groups and interviews will be clustered near the end of the semester.

Response Rate

It is essential to have high response rates on your data. For example, you should have 90-100% of the pilot faculty. When deploying an electronic survey, the minimum/average response rate is approximately 30% to ensure validity. You want to use techniques to maximize the return rate. Many survey tools (e.g., Qualtrics, Survey Monkey) have contact lists where you can email the recipients from within the survey tool. Contact lists allow you to set up follow up emails that will only send out to those who have not completed the survey. Our LMS administrator exported class lists from the Banner system and imported them into Qualtrics. To assist with a high student response rate, you may want to set up the survey, so students have to choose the class they are enrolled in the demographics section of the survey, this way, if instructors want to offer extra credit points for a majority of the class taking the survey, you can provide them with the proper information. Typically, the surveys are anonymous; therefore, accessing student names are not possible. If you use a contact list, with some electronic surveys, there is a name attached to the data. If this is the case, be sure to indicate that you will protect

the privacy of the participant and that the survey is not anonymous, but it is confidential.

If you choose to incorporate focus groups or interviews, you will need to either have a very detailed notetaker or record the sessions. If you decide to record the sessions, a consent form will need to be developed and signed by the participants. A lower percentage rate is acceptable for focus groups and interviews due to the amount of data and detail. Still, it will be important to have an equal representation of all areas such as colleges, students, and staff. There is no acceptable response rate for focus groups and interviews but reporting on the equity of representation will be necessary.

Student data

It is imperative to collect student data, but often there is a low response rate for students. One organization had between a 14-18% response rate. Another organization had a 61% response rate for students. The size of the pilots was much different from one university piloting 50+ classes and another piloting 15 classes. The project leaders continually emailed the faculty participating in the pilot asking them to encourage their students to take the survey. Many of the faculty gave extra credit to students who took the survey or stated if 80% of the students took the survey then the class would get extra credit. This assisted with the student response rates and validated the data.

Data Analysis

You have deployed your survey and/or conducted your interviews. Now you have a lot of data. What are your next steps? First, you do not want to download the results and email them out to the faculty. You need to organize your data in an easy to read format for people who may be unfamiliar with the technology. First, organize your data

into graphs to visualize the results. Many survey tools will generate graphs for you. Next, organize any qualitative data (open-ended questions) by theme. For example, qualitative data could be organized under three themes: positive, negative, neutral. Thematic organization allows the readers to see that the positives outweigh the negatives (hopefully).

If you have incorporated qualitative methods such as interviews and focus groups, you need to analyze the notes or recordings. If you recorded the sessions, transcripts need to be created either manually or through a paid service. This should be a part of the evaluation plan and incorporated into the evaluation committee's time or budget. Once the transcripts have been completed, they need to be reviewed for themes. We will not go into qualitative analysis in this chapter, for more information, refer to Saldaña (2015). Keep it simple and again find the positive, negative, and neutral themes. You may choose to display them as a chart or a graph, but if you collect qualitative data, include quotes.

Crafting your Final Report

Communication is essential! You need to ensure that you document that you have communicated. For example, an instructor may complain that he was unaware of the impending LMS change. If your organization documents all the communication methods you employed, you can easily inform that stakeholder. Make stakeholders aware of the change and ensure you provide adequate data. You have to make your opportunities to use as many venues as possible. For example, you need to use both electronic and paper formats to ensure all stakeholders are aware of the change. Often, informative emails are overlooked; therefore, using a flyer or paper distribution can assist with delivering the message. If the faculty has a senate or group that meets regularly, try to get on the agenda. Often departments have regular department meetings. Be aware of the departments that

use the LMS regularly or that have one or more online programs and request to be on their departmental agenda. Overall, take a grassroots approach for informing the faculty/staff that change is coming and how that change occurred.

The LMS evaluation report should consist of an executive summary, members of the committee, purpose, steps taken to choose a pilot company, any limitations of the pilot, and results of the pilot along with your next steps. The executive summary serves as an overview of the report in its entirety. It is similar to an abstract in a journal article.

The dissemination of the evaluation should be highly publicized to faculty, staff, students, and administration. For instance, another organization conducted three pilots for their LMS evaluation, all of which were located on their website. Again, communication is essential. As project managers, it is vital to inform the stakeholder of each stage in the process. For example, you may provide monthly updates on the pilot detailing how it is going and then conclude with a decision. Once a decision has been determined, it is essential to get the message out. You may want to get on the Faculty Senate agenda, the IT advisory committee agenda, post in the campus news, and/or have the provost/president send out a message directly to the faculty and staff.

What do you include in your report? Begin with the background and explain the historical context. How long have you been on the current system, who was involved with the decision to look for a new LMS, and the objectives for the new LMS? Next, you need to include a purpose statement. What is the purpose of finding a new LMS? For example, there is high dissatisfaction among faculty with the current LMS, or in other cases, a cloud-based solution with minimal downtime is needed. Next, you may want to provide the context of the pilot. If you were not involved with the pilot activities, you should meet with the project manager who was involved and ask them to write that

section. If that is not feasible, you then want to move on to the design of the evaluation plan. Be sure to include the response rate for all surveys, when the survey was conducted, who was included, and the questions asked. Be as transparent as possible. Finally, based upon the data and the committee decision, write a section on conclusions and recommendations (Appendix C).

To conclude, the evaluation process is an essential process for the sustainability of the LMS. If the pilot and evaluation of the pilot are conducted in a haphazard method, the chances of faculty buy-in decrease as well as overall adoption. Technology change is hard on the end users; therefore, the more you can document and demonstrate the positives to the stakeholders, the more likely the technology will be adopted in a seamless manner.

References

Kim, S. W., & Lee, M. G. (2008). Validation of an evaluation model for learning management systems. *Journal of Computer Assisted Learning*, 24(4), 284-294.

Saldaña, J. (2015). *The coding manual for qualitative researchers*. Los Angeles, CA: Sage.

Appendices

Appendix A

Canvas Satisfaction survey

Q1 Which of these describe(s) your Canvas course? Check all that apply.

- Face-to-face course
- Fully online course
- Hybrid course
- Combined course
- Undergraduate
- Graduate
- Other

Q2 Please rate your experiences in Canvas: *Bb = Blackboard*

	Better than Bb (1)	Same as Bb (2)	Worse than Bb (3)
Setting up my course (1)	0	0	0
Overall ease of use (2)	0	0	0
System reliability (3)	0	0	0
Mobile device compatibility (4)	0	0	0
Feature set (5)	0	0	0
File organization (6)	0	0	0
Support documentation (7)	0	0	0

Q3 Which of the Help features have you used for Canvas?

	Yes (1)	No (2)
The toll-free helpline from Canvas (877-257-9780) (1)	0	0
Live, online chat with Canvas (2)	0	0
Filled out a help ticket with Canvas (3)	0	0
Called the TAC (910-962-4357) (4)	0	0
Filled out an online help ticket with TAC (5)	0	0

Q4 Would you recommend Canvas as a replacement for Blackboard

- Yes
- Unsure
- No

Q7 Please enter your reason for your recommendation. (optional)

Q6 Which one of the following statements most closely resembles your beliefs about [new LMS] versus [old LMS].

- [new LMS] is unequivocally better than [old LMS]
- It will take some time to learn [new LMS] more thoroughly, but I think it is better than [old LMS], overall
- [new LMS] is an acceptable replacement
- [new LMS] and [old LMS] are about the same, as far as I can tell.
- [new LMS] is an unacceptable replacement.
- It will take me some time to learn [new LMS] more thoroughly, but I think it's worse than [old LMS], overall.
- [new LMS] is unequivocally worse than [old LMS].

Q5 Anything else you want the LMS Evaluation Committee to know?

Appendix B

Canvas Pilot Initial and Midterm Faculty Evaluation

	Better than (insert old LMS)	About the Same	Worse than (insert old LMS)
Overall ease of use			
System reliability			
Mobile device compatibility			
Setting up my course			
Feature set			

File organization
Support documentation

Please rate your experiences:

Would you recommend [new LMS] as a replacement for [old LMS]?

- Yes
- No
- Unsure

Canvas Pilot Initial and Midterm Student Evaluation

Conducted [Date], 2016 Please rate your experiences:

	Better than (insert old LMS)	About the Same	Worse than (insert old LMS)
Overall ease of use			
System reliability			
Mobile device compatibility			
Feature set			
File organization			
Support documentation			

Would you recommend [new LMS] as a replacement for [old LMS]?

- Yes
- No
- Unsure

Which one of the following statements most closely resembles your beliefs about [old LMS] vs. [new LMS]?

- [new LMS] is unequivocally better than [old LMS]

- It will take me some time to learn [new LMS]?more thoroughly, but I think it's better than [old LMS], overall.
- [new LMS]?is an acceptable replacement.
- [new LMS]?and [old LMS] are about the same, as far as I can tell.
- [new LMS]?is an unacceptable replacement.
- It will take me some time to learn [new LMS]?more thoroughly, but I think it's worse than [old LMS], overall.
- [new LMS]?is unequivocally worse than [old LMS].

Would you recommend Canvas as a replacement for Moodle?***

- Yes
- No
- No preference

Appendix C - Example report

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Learning Management System Transition Report

This report is a summary of the work to date by the Learning Management System (LMS) Evaluation Committee. This committee was formed as a subset of the IT Advisory Council.

Executive Summary

UNC Wilmington is reviewing the current learning management system, Blackboard Learn. The university moved to this system in 2010. UNCW hosts Blackboard Learn on site.

On average, universities evaluate LMSs approximately every 8 years. This current review gives UNCW an opportunity to re-assess its learning management needs and evaluate alternatives.

This evaluation is timely given the anticipated growth of online classes at UNCW. The objectives of the review are to:

- Identify UNCW's current academic community needs for an LMS.
- Evaluate options to meet current needs and best position UNCW for a rapidly changing future.
- Recommend an LMS to pilot at UNCW.

With the growing online programs running on both traditional (15 week) and accelerated (7-week) schedules, the committee reviewed LMS's that were cloud based to minimize down time for security patches and upgrades.

The Learning Management System Evaluation Committee engaged in

a number of investigative and exploratory tasks over the course of this academic year. The committee's deliberations indicated that the Canvas LMS potentially offers significant improvements over Blackboard, as recognized by faculty, students, and staff. These advantages include increased reliability, greater ease of use, user-friendliness for mobile devices, plus the flexibility and adaptability in meeting the growing needs of faculty and students. Given these considerations, the LMS Evaluation Committee recommends that we adopt Canvas as the campus LMS beginning in Summer 2018 and that The Office of eLearning and the Learning Management System team immediately begin assisting faculty with this migration. The committee also recommends that we continue to run Blackboard for a one-year overlap period, until May 2019, to give ample time to transition to the new system.

Background and Context

The 2017-2018 academic year marks our 8th year as a Blackboard campus. Our current version, Blackboard Learn, was released in April 2010 and has been showing signs of its age, such as a lack of responsive design and an outdated user interface.

Since the advent of Blackboard, newer learning management systems have been developed with usability and sustainability in mind, to meet the modern demands of the academy. They offer cloud-based solutions that can scale up system resources during peak usage. As well as support a broad range of plugins, product extensions; and up-to-date mobile apps for faculty and students. Some of these newer systems have a more contemporary look and feel with a user centered product development and support model, implementing small fixes and improvements continuously without extended downtimes.

Therefore, given our current situation and the new offerings available, a Learning Management System Evaluation Committee convened in September 2017 to examine Blackboard and the viable alternatives to

determine whether a new system was needed.

Membership of the Committee

The Committee is co-Chaired by the director of the Office of ELearning and the IT LMS manager. The committee is composed of 17 members representing all campus units. Specifically, there are ten faculty and seven non-faculty on the committee. They are: two representatives from the Cameron School of Business, three representatives from the College of Arts and Sciences, three representatives from the College of Health and Human Services and two representatives from the Watson College of Education. Along with faculty, there are committee members representing Human Resources, Information Technology Systems, the Office of eLearning, and Randall Library. Students from SGA were solicited to be on the committee, but the committee did not receive a response.

Committee Activities

The committee meet eight times in Fall 2017 to discuss, analyze and undertake the following activities: In the initial meeting, the committee members were reminded of their charge: Choosing an LMS appropriate for UNCW now and to accommodate future growth. The co-chairs also presented background information about LMSs to educate the committee members.

Additionally, they also received input from the committee members of the criteria for choosing an LMS. Finally, the co-chairs presented the three LMSs for the committee to consider: Blackboard, Canvas, and Desire 2 Learn. These were chosen based on credibility, reliability, technology (specifically cloud-based), service, and longevity. The committee met six times throughout the Fall semester. Two meetings were conducted via WebEx with personnel from [organization] and [organization] to hear about their experience with Canvas, and one with the [organization] to hear about its experience with Desire 2 Learn. The discussion with representatives from the other institutions

covered reasons for choosing an LMS, transitioning from one LMS to another, working with the vendor and the vendor's quality of service, etc. Additionally, the committee viewed a demonstration of Canvas.

Inclusiveness and transparency were the driving principles for the committee. As such, in addition to the six in-person meetings, the co-chairs met with each committee member individually to clarify questions and encouraged them to seek input from the colleagues of their respective college. The committee also sent a survey via the Provost's Perspectives newsletter, the SWOOP and a survey link within Blackboard to ask for faculty and staff assessment of Blackboard. The data collected were presented to the LMS committee members to determine the current level of satisfaction. [co-chair] also attended some individual unit faculty meetings and with [co-chair] attended the Faculty Senate Steering Committee and the IT/Library Committee to discuss the work of the LMS committee.

After multiple meetings of examining the various LMSs the committee arrived at two options to vote upon:

1. Pilot Canvas. This does not require a Request for Proposal since UNC-GA has a contract with Canvas.
2. Not pilot Canvas and conduct a RFP to look at other LMSs.

Overall, 88% of the committee voted to pilot Canvas. The breakdown of the votes was:

- Eight faculty for piloting Canvas
- One faculty for RFP to demo other vendors
- One faculty "No to both options"
- Seven staff for piloting Canvas

Canvas Pilot

Facts and Figures of the Pilot

During the Spring 2018 semester, a group of pilot faculty signed up to teach their courses using Canvas for the entire semester. Included in the pilot were:

- 14 faculty and courses
- 14 disciplines across the four colleges
- 367 students
- 6 fully online courses
- 6 hybrid courses
- 2 face-to-face courses

There was a mix of undergraduate and graduate courses.

The Learning Management Systems staff worked with the Canvas team and others in ITS to complete technical buildout, such as Banner integration, so that the pilot experience would have high fidelity with how the system would behave in full implementation, rather than a diminished or trial version. Faculty had the opportunity to attend training with Canvas personnel at the end of the Fall 2017 semester. The pilot faculty were encouraged to utilize the Canvas Help features which included 24-hour support via toll-free telephone line, web chat, and online help forms as well as having a team of GA's to assist faculty with questions. Four open labs sessions were also scheduled throughout the semester that allowed non-pilot faculty to receive assistance with evaluating Canvas and non-pilot faculty were encouraged to log into the system for review.

Evaluation of Canvas

During the middle of March, faculty and students were surveyed about their impressions of Canvas and how it performed throughout the semester (see Appendices B and C). Results indicated that Canvas was a suitable replacement for Blackboard. Faculty support to replace

Blackboard with Canvas was 71% in favor, 28% unsure, and none against. Students replied 53% in favor, 19% against, and 30% unsure.

Conclusions and Recommendations

Adoption of Canvas for 2018-19

On April 3, 2018, members of the committee voted unanimously to recommend the adoption of Canvas as the campus LMS, due to the number of potential benefits, particularly with respect to the reliability, adaptability, ease of use, and relevance to UNCW's instructional mission. Therefore, the adoption of Canvas should be initiated immediately, in preparation for full implementation for the 2018-19 academic year.

Extension of Blackboard

In conjunction with the formal transition to Canvas, the committee also recommends that the university keep Blackboard available for use throughout the migration, until the end of the Spring 2019 semester. System updates and patches will be applied to Blackboard during this timeframe. All new tool integration requests will be applied to Canvas. This will provide ample transition time for faculty to move their course materials to Canvas. Blackboard will also need to be available for an additional year after the last course has completed in the event of a grade dispute. This availability will be limited to the Learning Management team only.

Timeline for Transition to Canvas

The transition to Canvas can begin immediately for all non-accelerated programs. The timeline would reflect the following:

- Summer 2018

Canvas is available to the entire university community and is available

to any faculty that are not teaching as part of an accelerated program.

- Fall 2018

Faculty and staff continue to migrate course materials.

Courses associated with CRN numbers will take priority over non-banner/professional development courses

- Spring 2019

Online accelerated programs migrated to Canvas

Training from ITS and OeL and online resources for faculty migration would begin with Canvas availability to all faculty. The last courses that can be taught in Blackboard will be Spring 2019 courses with an end of life on May 17th, 2019

24/7 Technical Support Available

The committee recommends that the university purchases the Tier 1 level of 24hour technical support (e.g. toll-free telephone line, web chat, and online help forms), all available 24 hours per day 7 days per week from Canvas. This should help with the transition for both faculty and students. The committee recommends an analysis at the end of the year to determine whether this service should be continued into another academic year.

Faculty Professional Development & Orientation to Canvas

Professional development will be offered through a joint effort between the Learning Management Systems team and Office of e-Learning through a variety of instructional events: group training and one-on-one support.

Caveats

There are two products currently integrated into the Blackboard environment that are not integrated with Canvas. The first is Skillport which utilized the Blackboard building block and will have to be redesigned for integration.

The second product which is a part of Blackboard is SafeAssign. SafeAssign is a Blackboard product that cannot be integrated into Canvas. The Canvas also included piloting Turnitin which is currently integrated into Canvas and will be available to faculty as an alternate solution to SafeAssign.

Appendix A: Rationale from committee to pilot Canvas

Committee members were asked to provide a rationale for their vote. The reasons for piloting Canvas were:

- Student-centered design
- Currently being used by NC public schools (K-12); 83% of our 2017 freshman class are North Carolina residents.
- Seven of the 17 UNC system campuses already using Canvas
- While I appreciate the concerns of a few committee members that we have not explored all options, I feel as if we have explored those options that are viable for a campus of our size (and growing).
- Canvas has a stable mobile application both for grading and student interaction. Grading through iPad is important to faculty.
- Stable mobile application for student use.
- The need to have a reliable, supportive, responsive, and Cloud based platform.
- Need for a flexible, adaptable, and convenience for instructors and students.
- After meeting with School using Desire to Learn, I am very wary of going in that direction due to lack of support and lack

of high performing mobile application.

- I am wary of Blackboard for similar reasons of Desire to Learn, lack of support and a poor mobile application.
- The Canvas demonstration eased the concerns I was given by my faculty with regards to ease of grading, mobile application, more creative use of apps for delivery of content, and the numerous clicks within Bb.
- Canvas seems to have a culture of support and collegiality that seems to be unmatched in this industry.
- I watched as the energetic representative demonstrated the flexibility, adaptability, and convenience of this tool for instructors and students. They also reinforced their responsiveness and ability to work with institutions to solve problems. The conversation with another university demonstrated that while no solution is perfect, Canvas provides much that can be used and adapted to fit our needs.

Suggested Citation

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Choosing the Right Path For Your Organization



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