The New Rules of LMS Content Integration
**Abstract**

The quality and quantity of publisher-provided content has increased dramatically over the past 20 years, since the introduction of academic learning management systems (LMS) in the 1990s. Today’s professors expect a wide range of digital content that can be quickly and easily loaded into the LMS.

While it has become commonplace to see content that is tightly-integrated with the LMS, professors and their institutions often find that these offerings have been limited to specific titles, publishers, or learning management systems. Today, newly-formed and strengthened partnerships between publishers and LMS vendors are changing all of that, leveraging and building upon the latest content and technology standards put forth by the IMS Global™ Learning Consortium, and essentially changing the rules of LMS content integration. The result is a dramatic improvement in the overall customer experience for LMS administrators, professors, and class participants.

**In Search of a Better Teaching and Learning Experience — On and off Campus**

On campuses around the country — both physical and virtual — more and more instructors are being asked to increase course loads and to manage their workloads with fewer administrative resources. At many institutions, administrators have been forced to reduce the number of full-time teaching positions, driven by decreases in government and donor funding and increases in tuition discount rates. At the same time, instructors are being asked to adopt new or expanded outcomes-based policies and assessments, to redesign courses, and to move more of their sections online. It is no wonder that many of them are looking for ways to streamline the course preparation process, to use their learning management systems more efficiently and effectively, to provide more opportunities for automated assessments, and to avoid unnecessary duplication of effort.

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**About MindLinks™**

MindLinks is a Cengage Learning service designed to provide the best possible user experience and facilitate the highest levels of learning retention and outcomes, enabled through a deep integration of Cengage Learning’s digital suite into an instructor’s Learning Management System (LMS). MindLinks works on any LMS that supports the IMS Basic LTI open standard. Advanced features, including gradebook exchange, are the result of active, enhanced LTI collaborations with industry-leading LMS partners to drive the evolving technology standards forward.
When we look at the challenges that instructors face today, along with the results of interviews with 70 higher education LMS administrators and IT professionals, a set of common needs and expectations begins to emerge. Instructors and administrators need teaching and learning tools that provide:

- **The ability to assemble the right set of resources** — flexibility that enables instructors to quickly and easily customize course materials, including the ability to incorporate instructor-created and 3rd-party materials and to tailor the overall flow of the course to meet the specific needs of the learners and the institution.

- **An exceptional user experience** — for both instructors and class participants. The user interface of the online resources should contribute to a higher level of engagement, which will in turn lead to better outcomes.

- **Noticeable reductions in time and energy** for LMS administrators, instructors and class participants, including the time and energy required to set up courses, to sign-in to the system, to find the right set of materials for the current unit or assignment, to correct online assignments, and to post grades for those same assignments.

**Figure 1: LMS Market Share for All Institutions**

[Image of LMS Market Share for All Institutions]

Source: Delta Initiative, Inc.: http://www.deltainitiative.com/higher-education/lms-strategy

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1 The Cengage Learning drop-in room research study, conducted at the Educause 2011 Market Research Night, consisted of in-depth, in-person interviews with 70 LMS administrators and IT professionals at institutions of higher education.
Learning Management Systems — A Market in Constant Flux

At many institutions, the status of the learning management system may also be in flux. Over the past ten years, the LMS market has seen many changes. New open-source options have emerged; some LMS vendors have changed hands; still other LMS vendors have been absorbed into larger LMS firms. As a result, instructors have had to learn new systems and to use multiple LMS environments across the institutions, departments, and divisions in which they teach.

LMS-Ready Content — It Wasn’t Always this Easy

In the early days of learning management systems, before course cartridges were widely available, supplements for textbooks arrived in one or more cardboard boxes, shipped to the instructor’s office. The package typically included various paperbound books, video cassettes, overhead films, CDs containing PowerPoint files, test banks, chapter summaries, and other resources. If an instructor wanted to make some of the publisher-provided files available to class members, she would create an entry within the resource section of the LMS, attach an individual file to the entry, and then repeat the process for each file. Many instructors still follow a similar process today, using the instructor website, DVD, or flashdrive as a source of materials.

The introduction of the course cartridge — with the entire set of course resources delivered in a ready-made kit — enabled the LMS administrator to load all of the publisher-provided resources for a particular course into the LMS, in a single operation. Once inside the course section, within the LMS environment, the instructor could move the resources around on a chapter-by-chapter basis, delete them, and add to them. Cartridges are still in use today for this reason: they provide the instructor with lots of flexibility. The caveat is that each cartridge is designed to work with a specific LMS. Institutions that are not using the most popular LMS environments often do not have the option of choosing a cartridge for the textbook that they have adopted, unless particular sections are large enough to qualify for custom cartridges.

Starting in 2001, many learning management systems began to support the SCORM standard, making it possible for publishers to provide content that can be used across all LMS environments that support the SCORM standard. The primary disadvantage — of content created to support early SCORM standards 1.1 and 1.2 — is that individual components of content delivered via the SCORM player cannot be edited, deleted, or augmented with outside content. It’s an all-or-nothing proposition. The most recent SCORM standard — SCORM 2004 — supports the ability to edit and change the flow of the content, but it is not yet supported across all LMS environments.
The New Rules of LMS Content Integration

Course cartridges and SCORM 1.2-compliant content are still components of most publisher-provided content sets today. For an instructor who has no desire or need to edit the standard content sets or to integrate online homework assignments with the LMS-based grade book, these solutions may be adequate. For those who need these features, many publishers are providing options that save time for both learners and instructors and contribute to a better overall teaching and learning experience.

A Better Way: New Standards Enable Deep Integration and Incremental Benefits

Several years ago, a new set of standards started to emerge from the IMS Global consortium, including the Common Cartridge (CC), LTI, and LIS standards. While all represent leaps forward in terms of functionality and visible benefits for instructors and systems administrators, it is LTI — in conjunction with LMS vendor application programming interfaces (APIs) — that currently makes it possible for publishers and LMS vendors to provide the level of deep integration that customers have been asking for.

Figure 2: LMS Content Integration Standards and Features

<table>
<thead>
<tr>
<th>FEATURES</th>
<th>Basic LTI</th>
<th>Enhanced LTI, Using LMS APIs</th>
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<tr>
<td>Enables single sign-on</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>Gradebook exchange</td>
<td>Upload operation</td>
<td>Automatic synchronization</td>
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<tr>
<td>Content customization process (add, subtract, or change order)</td>
<td>Manual placement of course resources, using deep links— one asset at a time— within LMS</td>
<td>Drag-and-drop interface that enables multiple selections and placement in a single drag/drop operation</td>
</tr>
<tr>
<td>Instructor/course set-up</td>
<td>Manual placement of course-level LTI link</td>
<td>Instructor simply clicks publisher’s link in the LMS</td>
</tr>
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Most publishers today have created basic LTI-based integrations with one or two LMS vendors, enabling a single sign-on experience and manual placement of deep links to publisher-provided, individual assets within the LMS. In order to take this integration to the next level, some LMS vendors and content providers have established collaborative co-development partnerships that both leverage and extend the value of the LTI standard. The full benefits of this “deep integration”, such as gradebook exchange with assets that lie both inside and outside of the LMS, a streamlined course customization interface at the course, chapter, topic, and granular activity levels, and a similar user experience across all LMS environments, can only be achieved today via a series of LMS-specific custom development projects, leveraging the APIs of each LMS vendor (see Figure 2). The investment on the part of publishers and LMS vendors is not trivial, but the pay-off — a vastly improved customer experience — is significant.
What to Look for in Publisher-Provided Content Integration

Course Cartridges and SCORM-based components will continue to serve the needs of certain segments of the instructor/institution market, at least in the short-term, but for those instructors and LMS administrators who prefer a seamless, customizable, and tightly-integrated solution, here is a list of what to look for when reviewing offerings from publishers and LMS vendors:

- **Single sign-on**: Instructors and class participants should not be required to go through two or more independent sign-on processes in order to access the LMS and publisher-provided materials. The LTI and SCORM standards have enabled single sign-on processes that make it easier for participants to set up their accounts and to access the system on a daily basis.

- **Ability to customize all publisher-provided content**: Direct access to publisher content and the flexibility to tailor the content to meet the specific needs of the course, including the ability to choose and re-order specific publisher-provided resources. Course customization interfaces that are LTI-based provide the flexibility to re-order, add, and delete resources at the specific component or asset level. Look for a solution that operates seamlessly within the interface of the LMS.

- **Integration between the LMS gradebook and assignable content**: This feature has the potential to save instructors the greatest amount of time throughout the course. Look for the ability to assign specific activities — one at a time, all at once, or by topics and chapter — and to automatically pass grades for those assignments to the LMS gradebook.

- **Support across a wide variety of LMS environments**: Look for publishers that have expressed commitment to provide the same — or a similar — user experience, across a wide variety of learning management systems.

- **A Commitment to Open Standards**: Avoid content producers that attempt to “lock” a customer into a proprietary technology — even if that technology is provided at no incremental cost to the customer. Look for publishers and LMS providers that are committed to supporting an open approach to emerging industry-wide standards.

- **Strong Partnerships between Publishers and LMS Vendors**: Check the websites of all parties to ensure that the integration solutions are formally endorsed by the vendors. Look for partnership strategies that embrace multiple LMS vendors and joint promotions of the partnerships — in press-releases and on each partner’s website.

- **Technical Support**: It’s important to ensure that the partnership does not end at the point of sale. Look for evidence of shared ownership of customer satisfaction and rapid problem resolution.

Learn more online at www.cengage.com/mindtap
MindLinks™, a new Cengage Learning service, provides instructors with a fluid, easy-to-use interface for designing and customizing course content and linking assignments to the LMS gradebook — individually or in groups — at the course, chapter, topic, and activity levels. Core features, such as single sign-on and course customization, work in conjunction with any LMS that supports the IMS Basic LTI open standard. Advanced features, such as automatic gradebook exchange and a drag-and-drop interface that makes it possible to customize courses more quickly and easily, are the result of the innovations and co-development efforts of Cengage Learning and its LMS partners to both leverage and extend the LTI standard. The seamless drag-and-drop environment of a MindLinks-to-LMS integration makes it possible for instructors to make rapid course design changes — to improve learning retention and outcomes.

Cengage Learning worked closely with Blackboard and Desire2Learn3 to deliver its first two enhanced, “deep link” integrations and is committed to doing the same across a wide variety of popular LMS environments. MindLinks for Blackboard Learn™ leverages Cengage Learning’s standards-based, Web-services architecture — MindLinks — in combination with the Blackboard Building Blocks® program; MindLinks for Desire2Learn utilizes the MindLinks architecture in conjunction with a Desire2Learn extension that provides integration with the Course Builder. In both cases, a new content selector provides a “tree” structure, allowing instructors to efficiently select content instead of manually placing multiple links within a course. The partnerships extend beyond mere integration delivery — and include a comprehensive, ongoing commitment to customer satisfaction.

**Conclusion**

Instructors should not have to choose textbooks and related content based upon their compatibility with the LMS that the institution or department is currently using. A better model is one in which textbook publishers commit to partnering with a wide range of LMS vendors for deep content-to-LMS integration. Thanks to the wide adoption — by LMS vendors and publishers — of modern standards and APIs for LMS extension, system administrators, IT managers/Directors, instructional designers, and instructors no longer need to be tied to a single LMS provider in order to enjoy benefits related to saving time — for system sign-in, course set-up, customization, and automatic grade exchange.

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2 Note that automatic grade exchange is available for Cengage Learning MindTap products, within LMS environments that currently share Enhanced LTI integrations with Cengage Learning. For other LMS environments, Basic LTI features are supported.

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