



Article

***Integration Innovation:
Launching the Library into a Course Management System***

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Abstract

In higher education, courses are commonly delivered through or supported by an online course management system (CMS). Unfortunately, there is typically little integration between the CMS and online library resources, making discovery and use of library tools for coursework a difficult task for both instructors and students.

This paper reports how one group at the University of Minnesota, Twin Cities examined the educational technology used in courses and then identified a method to efficiently integrate library resources with existing course technologies. The group developed a plan for a library course page system that automatically generates a page populated with relevant library resources for each class. The page is included by default in the CMS and is able to be integrated into other technologies. The creation and early stages of implementation of the library course page system are discussed, as well as future directions.

Introduction

In the higher education environment, librarians face the challenge of helping students discover relevant resources across many types of library tools, such as the course reserves catalog, electronic reserves (e-reserves), subject guides, article databases, and the library catalog, in order to complete course assignments. Instructors face a parallel challenge in bringing together disparate systems and resources, such as the syllabus, class readings, and assignments, to teach a course.

Course management systems (CMSs) such as Blackboard and Moodle are widely used to gather course-related resources and activities in an online environment. CMSs have become one of the major tools for organizing and locating course information for both faculty and students. To promote the discovery and use of library resources, it would seem logical for library resources and tools to be more closely integrated with each other and with CMSs—yet this is not often the case.

To address this issue at the University of Minnesota, Twin Cities, a course integration exploratory committee was asked to "examine the educational technology used in courses, explore possibilities for library integration, and make recommendations on the integration of library tools, resources, learning objects and e-learning modules into these course technologies" (Carrillo et al., 2009, p. 2).

The importance of exploring library integration became apparent with the growth in popularity of online course technology. According to an EDUCAUSE Core Data Survey, "93% of ALL responding campuses reported currently supporting at least one CMS" (Hawkins & Rudy, 2007, p. 33). In 2007, the University of Minnesota's Office of Information Technology (OIT) surveyed both faculty and students concerning their use and comfort with technology. The report found that "88.3% of students reported taking at least one course supplemented by online educational technology in the past two years" (Walker & Jorn, 2007b, p. 5).

The OIT student survey found that students "had strongly positive attitudes toward educational technology" with a preference towards technology that "related to nuts-and-bolts of academic life (preparing assignments, completing assignments on time, delivering content, being more efficient)" (Walker & Jorn, 2007b, p. 12). The faculty survey similarly reported favorably on educational technology, speaking of a motivation to "increase students' access to course materials...to facilitate communication between students and instructors...and...to make teaching more efficient" (Walker & Jorn, 2007a, p. 12). The tools and services the library could integrate matched the types of features already favored by students and instructors in educational technologies.

Many academic libraries have investigated and implemented a variety of course integration solutions: electronic toolkits (Gladstone & Kenausis, 2006), libraries with their own free-standing Blackboard sites (Karplus, 2006), and a virtual carrel (Sabharwal, 2005). These tools have been used with mixed success. The focus of many libraries has been on the integration of the library into existing CMSs such as Blackboard, Desire2Learn,

ANGEL, Sakai, and Moodle (e.g., Solis & Hampton, 2009; Pyatt & Snavely, 2004; McLean & Lynch, 2004).

The importance of connecting library resources to online course technology is explicitly championed in Lawrence (2006) and Gibbons (2005). Gibbons writes: “If the library can push relevant resources into the course sites, those resources gain importance [to the students] because of their presence within the course sites” (p. 22). Lawrence views integration as not only beneficial to student learning, he also believes that successful integration will be vital for the future of libraries: “Libraries must also insert themselves into the CMS to preserve and/or reinvent their symbolic place in the institution” (p. 248). Since 2001, the University of Minnesota, Twin Cities Libraries’ method of course integration was to build separate, stand-alone static web pages listing course-related resources, created by a subject liaison, usually in connection with a library instruction session—a system known as CourseLib. The University of Minnesota, Twin Cities is the largest university in the state. With an enrollment of over 50,000, it has the fourth-largest student body of any university in the country (National Center for Education Statistics, 2006). The two most widely used CMSs on campus are Blackboard (called WebVista) and Moodle. At the time of our research, CourseLib pages were created unevenly across campus and usually were built only when specifically requested by an instructor. In our exploratory work, we were interested in examples where libraries had taken a system-wide approach to integration versus the individual approach we employed.

Experts advocate for a top-down approach to the integration of library resources into online course technology. Lawrence (2006) noted that “[r]ather than establishing a desired level of deep course integration with only one or two courses, it can be argued that a generic, global link to the library will better serve *all* students by increasing the ease of access to library resources” (p. 246). Lawrence adds that “macro-level approaches make the provision of library services a scalable endeavor while working to increase the ease of access for students and faculty” (p. 257). An important feature to this top-down approach is making the Libraries’ resources an expected portion of a course’s online presence.

The idea that libraries must be the instigators in course integration, instead of passive responders to instructors’ requests, is also emphasized in the literature (Machovec, 2001). Instead of waiting for instructors to come to the library, the course integration team felt we needed to bring the library and its services to instructors. The approach of implementing pages for all classes also has pedagogical benefits through its use of a consistent and standardized design (Gulbahar & Yildirim, 2006) for all courses. Students and instructors would have easy access to course-related material to use in teaching and learning.

An additional part of the committee’s charge was to focus on ways in which our physical course and e-reserves systems could be integrated into CMSs. Our original course page system rarely included readings or a connection to the libraries’ reserves systems (the Aleph library catalog and Docutek, our e-reserves management tool). This lack of

a connection left many instructors either unaware of the reserves service or uncertain about how to link to readings in their courses. There are many different models for integrating electronic reserves into CMSs. Bell and Shank (2004) describe training faculty to create “a paperless reserve room within their courseware site” by using links to full text articles in the libraries’ databases. An increasing number of university libraries are also using CMSs to manage the entire electronic reserves process. Bales, Taylor, Havert, and Lehman (2001) discuss the University of Notre Dame’s decision to use WebCT for their electronic reserves system, citing benefits such as convenience and familiarity (i.e., use of a system that faculty and students are already comfortable with). They refer to this application as “one-stop shopping,” as it allows students to access their course readings along with their other course services in the CMS (Bales et. al, 2001, p. 50). It also minimizes the need for additional passwords, links, and instances where students and faculty have to re-authenticate. An additional benefit to this type of integration is that e-reserves become more apparent and easier to use. This type of integration also increases the visibility and user-friendliness of e-reserves, which may help faculty avoid possible copyright violations by using the e-reserves system rather than posting unauthorized copies of PDFs on open sites (Solis & Hampton, 2009).

Our group combined the course integration methodologies created at other institutions with research data that we accumulated at the University of Minnesota to develop recommendations for the most efficient and effective means of integrating the University of Minnesota Libraries with course technologies. After briefly outlining our methods for assessing University-specific needs, we will discuss our research findings and proposals. We will conclude with a discussion of the Libraries’ implementation of our recommendations to date.

Methodology: Needs Assessment at the University of Minnesota

We used a variety of qualitative and quantitative methods to develop and support our recommendations. We hoped to find answers to the following questions:

- How were the Libraries already being utilized (if they were included at all) in course technologies?
- What library resources and services would instructors, students, and staff find useful if integrated into their courses?
- How might the Libraries’ existing course support systems be integrated more effectively into courses and course-related workflow?
- What additional development of resources and services would be needed to successfully implement integration?

Our methods included in-depth interviews with instructors and other stakeholders, an instructor survey, and a student survey. Since we had only three months to conduct our research, these investigations were conducted simultaneously, with each member of

our group working independently to obtain a portion of the data and reporting back to the larger group via email and periodic meetings. We also used Basecamp, a project management software tool, to share our findings and notes.

Stakeholder and Instructor Interviews

We targeted a diverse sample of 21 University of Minnesota faculty members, instructional designers, staff instructors and library staff to sit down for one-on-one interviews to discuss the specific needs and desires of those who work directly with CMSs and other educational technologies. We made sure that our interviewee pool covered a wide variety of subject areas and professional duties, as we wanted to obtain the perspectives of both instructors in the classroom and staff who support educational technologies. We kept the format of these interviews broad and informal to allow for flexibility in the discussion. We were also careful to cover specific points, such as how the interviewees used technology in their courses and how they currently connected students to library resources.

Instructor and Student Surveys

To obtain additional data on instructors' use of course technology, we gathered a list of instructors who had used library e-reserves or Moodle in the past. Unfortunately, we were unable to obtain a list of instructors using WebVista, the major CMS on campus. We generated a random sample of 289 individuals by going through the list of instructors that had used Moodle since its inception at the university and picking names using a standard numeric interval to arrive at around 50 Moodle users. We then combined their email addresses with those of instructors that had requested e-reserves for that current semester and emailed a link to an online survey. We received 84 responses, for a response rate of 29%. The survey questions we asked are available in our full report (Carrillo et al., 2009).

For the student survey, we elected to focus on a group to which we had fairly easy access: student employees of the Libraries. Although the range was clearly not as broad as it would have been with a more general sample from the student body, it did allow us to quickly gain an insider perspective into our students' habits and experiences. Many of these students worked with library users and were familiar with common problem areas that students face in accessing information. At the same time, we were aware that the composition of our sample population could skew our results, as it is probable that there is greater use of the catalog and other online library resources among students who already work in a library. However, we believed that the benefits of consulting a group of knowledgeable students outweighed these drawbacks. We obtained a list of 129 work study students who worked in libraries across campus and emailed them a link to a survey. We received 51 responses, for a response rate of nearly 40%.

Findings

We analyzed the findings of our research, identifying themes and opportunities for new and improved library integration. Each research methodology yielded useful information that provided us with a more complete picture of the existing relationship between the Libraries' resources and services and the online course technology.

We found that instructors wanted a course-specific library resource that covered general information literacy instruction on how to search, access, and evaluate materials. They wanted a central resource that incorporated various library tools, something that would be simple for students to access and simple for instructors and staff to administer. In addition, instructors wanted resources to be customized to the individual course level, but they stated that they do not have the time to do it themselves. Instructors often felt as though there were many useful library tools or services they did not know about. They expressed a desire for an easy mechanism, integrated into their workflow, to heighten awareness of potentially helpful resources. For many instructors, the numerous discrete systems containing library resources and issues with persistent URLs and authentication made integration problematic.

At the time of our research, the most commonly used instructional technologies among instructors we surveyed were e-reserves (74%), followed by WebVista (68%), Moodle (51%), and stand-alone course websites (33%). Of the library resources that were currently being utilized within course technologies, e-reserves (71%) and online articles and journals (62%) were the most popular. These results demonstrated that instructors use a wide variety of platforms, as well as a disparate set of library resources—indicating to us that any solution we proposed would need to be flexible and include a wide assortment of library tools.

Supporting this proposition were the results from our student survey, which reiterated the fact that nearly every student had used some form of educational course technology (90% of our sample) and that they used a variety of library tools to support their research. The most frequently chosen answers regarding library tools were the online catalog (80%), followed by articles/e-journals (55%), indexes/databases (48%), and Google Scholar (27%). Additionally, the survey results verified our suspicion that students generally feel the Libraries are overwhelming and confusing; a finding that told us our recommendation would need to result in a simple system that was easy to locate.

Recommendations

Based on the data we collected, it was clear that our current models of integration were not adequate—students and instructors could not or did not navigate to the rich library content designed for their needs, and did not make full use of the existing course-related resources and services that the Libraries provide. We therefore recommended the creation of a system that would create a customized library resource page for every course offered at the university. We recommended taking the existing CourseLib struc-

ture and mashing it up with other existing structures (reserves catalog, e-reserves) into a new, more holistic, system.

Our original CourseLib pages were developed, upon request, by subject liaisons one at a time for individual courses. The group recommended a new system that generates the Library Course Pages (LCPs) automatically for each class and links to existing class WebVista and Moodle sites by default. We concluded that the LCPs would be a way to gather all of our current course-related offerings together—essentially, an integration of all course-related library resources at the individual course level. Each LCP would bring together databases, instructional materials (e.g., tutorials), a library catalog search box, reference help, e-reserves, and course reserves—all on one page with a minimum number of mouse clicks and additional log-ins. We already had several systems in place to support the LCP. We had a robust database-driven system of resources called LibData¹ that had been used to support CourseLib, our previous creation system for course-related web pages, and a system known as Research Quick Start (RQS) where subject specialists created lists of resources for subject-specific pages. The LCP system would act as an aggregator, collecting information from these existing silos within the library (e.g. e-reserves, reserves catalog, RQS, CourseLib) and make them available in one interface: the LCP.

We also recommended incorporating expertise from an earlier project to extend the Libraries' content on the University's portal. This technology pushes out recommended resources based on affinity strings—a series of codes assigned by the University to each individual based on their area of study or work (Hanson, Nackerud, & Jensen, 2008). Each LCP would automatically display resources at the department or subject level using the affinity strings to connect to the RQS resources. Then, in partnership with instructors, the subject liaison could further customize the page to the individual course level. Since the LCPs would also be available as stand-alone web pages linked from the Libraries website, an LCP would be created for every course regardless of CMS usage, creating a customized online resource standard that students and faculty could rely on regardless of which, if any, CMS is used. We further recommended that the Libraries work with the Office of Information Technology to include links to the LCPs within WebVista and Moodle in all courses by default. The default inclusion of the LCP in the CMSs would bring library resources into the students' and instructors' workflow in a widespread, proactive manner.

Implementation

After the exploratory group presented their findings and recommendations, work on the project was passed along to an implementation group. Library programmers created a prototype of the LCP, adapting the open source code provided by the course page developers at North Carolina State University (Casden, Duckett, Sierra, & Ryan, 2009). The LCP, using a combination of programming languages, pulled information from

¹ See <http://libdata.sourceforge.net/>

many of our existing systems, including Aleph (our integrated library system), the RQS and CourseLib systems, a chat widget from QuestionPoint, and more.²

This new, enhanced system generates a LCP for every class being offered at the University. Using a course's departmental designator to pull the information from the appropriate RQS page, the LCP automatically produces a tab with subject-specific resources for each course (see Figure 1). In the center portion of the page we placed a large "search and find" section. For undergraduate level courses (1000-3000 level), the user would see two search boxes: one for Academic Search Premier and one for our online library catalog. Upper-level classes (4000 level and above) would only see a library catalog search box, since we expect upper-level students will have less use for a general subject database. The pages list recommended databases for that department pulled from the RQS system using the affinity string technology. A left-hand column includes the option to navigate to a different course's page and a reference chat box. The right-hand column contains a picture and email link for the subject liaison for that particular area and a rotating advertisement for different library resources, tools and events.

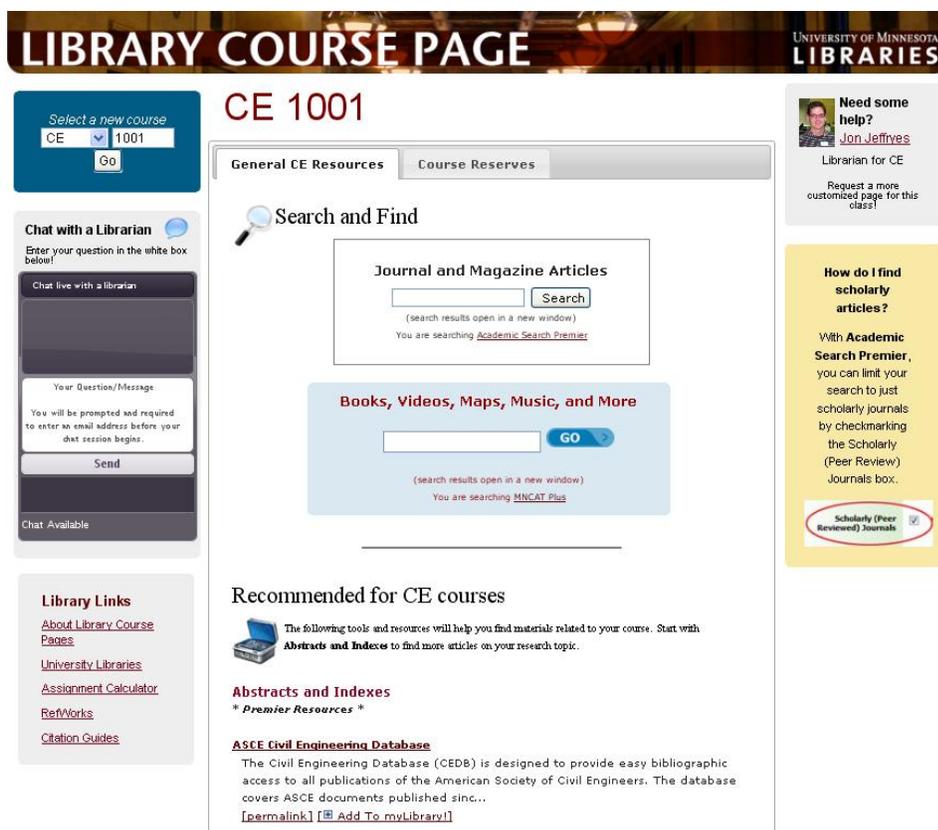


Figure 1. A non-customized Library Course Page

² For an example see <http://www.lib.umn.edu/course/WRIT/1301>

If a librarian has created a customized CourseLib page, the system will create an additional tab for this CourseLib information along with the more generic tab of subject-based resources. This course-specific tab becomes the entrance screen for that course's LCP. Figure 2 gives an example of an LCP with a list of resources specifically created by a subject liaison for a particular class.

LIBRARY COURSE PAGE UNIVERSITY OF MINNESOTA LIBRARIES

Select a new course
WRIT 1301

WRIT 1301

Resources for Your Course | General WRIT Resources | Course Reserves

WRIT 1301: University Writing
Last updated October 18, 2010

Maintained by
Kate Peterson katep@umn.edu

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- [Get Started: Planning](#)
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Scholarly (Peer Reviewed) Journals

Figure 2. LCP customized to the course level

Finally, the LCP displays content from our e-reserves system and course reserve catalog of physical holdings. The LCP lists them at the individual item level on a third tab,

combining the course's print and electronic reserves into one interface for the first time. This tab pulls the information on the readings using an Application Programming Interface (API) called AlephX. Figure 3 shows an example of the combined list of electronic and print reserves.

WRIT 1301

Resources for Your Course General WRIT Resources **Course Reserves**

This course has more than one section. Please select your instructor's section from the list below.

Course title: University Writing
Instructor: Kim, Seonna

Course title: University Writing
Instructor: Bonine, Lelaine Lesley

On-Site Resource(s)

- [Citizen Kane \[videorecording\]](#)
- [Citizen Kane \[videorecording\]](#)
- [Morocco \[VHS\] \(Library Reserve\)](#)
- [Vertigo \[videorecording\]](#)

Figure 3. The Course Reserves Tab

By developing a new, simplified user interface built on our existing data infrastructure, we provided our instructors and students with an improved user experience which required minimal staff education and little change to our present workflow. Ultimately, we maximized our already existing course integration efforts. Another important feature of the new system was a predictable URL structure. For example, the LCP page for Math 3001 is <http://www.lib.umn.edu/course/MATH/3001>.

We gathered feedback from instructors, staff, and students as the design phase continued. We also began sharing the LCP with librarians to garner support for the new system. The development of the LCP was an iterative process of drafting, gathering feedback, revising, and then gathering more feedback for further revisions.

Our lead programmer took the demo page to the WebVista and Moodle administrators and developers to begin on the process of the CMS integration. Because the LCPs were mapped to particular course numbers and were created for every class offered at the University, a Moodle "block" of library content would automatically be generated for every course using Moodle. As the university planned to move away from WebVista, further development was not pursued.

The implementation group also developed a communication plan. The plan was double-pronged, focusing on the internal audience within the Libraries and externally to instructors, staff, and students. The roll out date was fall 2010.

Future Directions

Along with the LCP, our exploratory group came up with several long-term innovations that would make the LCP system more flexible and extensible. It was vital that the system be designed with these recommendations in mind to ensure that the future uses and development of this system were not impeded.

We recommended that individual portions of the LCP (i.e., recommended databases, e-reserves, reference chat service, etc.) be converted into widgets. The widgets would be compatible with a wide variety of technologies and would provide the instructor with the ability to embed widgets within their courses at the point of need, as opposed to linking to a webpage to access the resources. The goal is to allow content to be re-purposed and re-used in a variety of course-related settings, while giving instructors the flexibility to reorganize the layout of the LCP and their courses to better meet their pedagogical needs. Giving instructors this option provides for the inclusion of library resources and services into a variety of educational applications, such as wikis, blogs, stand-alone course pages, etc.

We recommended that further research be conducted on how the system might best respond to faculty needs for time savings, ease of use for themselves and students, and seamless integration into their CMSs and course technologies. Based on information gathered from our instructor interviews and survey, we recommended that the idea of LCP administrative rights for faculty be explored. For example, faculty could add, edit, delete, and otherwise customize the content within their courses. Many faculty members have additional resources such as websites that they include in their CMSs, and it may be useful to have these resources incorporated with library resources in a single location.

As the system is further developed, additional research will be needed to determine the best practices for the LCP based on categories such as discipline (e.g., Social Science, Science, Humanities, etc.), grade level (e.g., undergraduate, graduate, etc.), level of writing intensity, liberal education requirements, enrollment, etc. We recommended subject liaisons prioritize gateway, keystone, and capstone courses to create customized LCP pages. For example, a senior research course should include more extensive library resources, such as embedded librarians, instructional modules, and other specialized tools. Research addressing how the LCP system should function with course-integrated instruction and assessment efforts is recommended. The ability to include quizzes and surveys using the features of the CMS is important for the long term accountability of our course-integrated instructional efforts.

Finally, we recommended that the LCP include a robust statistical mechanism. To maximize this system, it will be important to know what aspects of the LCP students and

instructors are using and to be able to tie usage to specific user groups (e.g. first year students, graduate students, engineering students, etc.).

Conclusion

The LCP is an exciting attempt to integrate the University Libraries' presence into the course environment of instructors and students. We combined the expertise of our librarians and our strong existing collections with Web 2.0 technologies to create a valuable new tool. This tool provides the framework for delivering course-related content and services that support the mission of teaching and learning at the University of Minnesota, Twin Cities.

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