

Engaging Users: The Future of Academic Library Web Sites

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This article examines current academic library Web site practices and recommends a conceptual model for future academic library Web site design. The author investigated 111 ARL member library Web sites and has summarized current site content, design patterns, and innovative features. The author discusses the Web 2.0 principles as defined by Tim O'Reilly and reviews the current literature on Web 2.0 implications for library Web services. The author proposes making the academic library Web site a virtual place and recommends a conceptual model to inform future academic library Web site design based on the investigation and the discussion. Future academic library Web sites might feature any of the following: 1) user focus, 2) personalization, 3) user engagement, 4) online communities, and 5) remixability.



Academic library Web sites are libraries' virtual presentation to the world. Beyond providing information about libraries and library services, academic library Web sites provide access to online catalogs, electronic databases, subject resources, library instruction/tutorials, and digital collections. In alignment with each institution's mission, academic library Web sites are gateways to information that supports faculty and student research and educational needs. Currently, most academic library Web sites are inventories and access points for such information. As the massive growth of Internet resources and new searching and sharing tools such as Google, Amazon, eBay, uTube, Flickr, del.icio.us, and MySpace give users more power, ease, and fun in information seeking, academic library Web sites face stiff competition in

the area of user preferences, despite the fact that academic library Web sites provide considerably higher quality and better scholarly information. As Brian Detlor and Vivian Lewis point out, "Academic libraries are at a turning point."¹ Chuck Thomas and Robert H. McDonald state, "Libraries are facing a new generation of online users who are technologically savvy and integrate information access and use in all spheres of their lives to an unprecedented degree. They approach the traditional library with certain expectation that may conflict with the existing services, policies, and values of the library as information broker."² Thomas Frey, a senior futurist at the DaVinci Institute, argues, "... the library of the future will need to be designed to accommodate the changing needs of its constituency."³

"Web 2.0" was introduced to the library world a couple of years ago. The concept

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of Web 2.0 began with a conference brainstorming session between O'Reilly Media and MediaLive International in 2004. According to Tim O'Reilly, Web 2.0 is a set of key principles demonstrating successful features of a new era of Internet companies/applications. These key principles include:⁴

- the Web as platform
- harnessing collective intelligence
- data is the next Intel inside ("Intel" is used here as a metaphor to emphasize the importance of data)
- end of the software release cycle
- lightweight programming models
- software above the level of a single device

O'Reilly himself later provided a compact definition of Web 2.0, stating: "Web 2.0 is the business revolution in the computer industry caused by the move to the internet as platform, and an attempt to understand the rules for success on that new platform. Chief among those rules is this: Build applications that harness network effects to get better the more people use them."⁵

In this article, I make recommendations for future academic library Web site design, inspired by the Web 2.0 key principles, particularly, the Web as platform, harnessing collective intelligence, lightweight programming models, and rich user experiences. These recommendations include the following:

- provide an efficient, flexible, and user-oriented interface
- build a virtual space that facilitates rich user experiences
- engage users and encourage collective intelligence
- support content sharing and nurture online communities

By implementing these recommendations, academic library Web sites will streamline and enrich users' experiences in interacting with and utilizing information throughout their learning and research activities and will keep up with rapid changes in user behaviors. I used

the following methodology to arrive at these recommendations. I chose to investigate the Web sites of the Association of Research Libraries (ARL) members⁶ to discover the current state of academic library Web sites. ARL members are a well-defined set of academic libraries and include my own institution, Colorado State University Libraries. My discoveries have been documented in an appendix and I will summarize current content, design patterns, and innovative features of those Web sites in this paper. I will then discuss the key principles as defined by Tim O'Reilly and review the current literature on Web 2.0 implications for library Web services. Based on my investigation and discussion, I will provide a conceptual model echoing the above-listed recommendations to inform future Web site design for academic libraries.

Current State of Academic Library Web Sites

This investigation was limited to those ARL member Web sites specifically affiliated with a college or university and provided in the English language; the sample consisted of a total number of 111 ARL members. This investigation focused on content and design patterns and was, in most cases, limited to library homepages. My discoveries are detailed in Appendix 1. Use of specific examples is not intended to be pejorative or critical of specific library Web pages in part or in whole; rather, the examples are used to provide comparison among the various pages, and a certain amount of subjectivity is therefore unavoidable.

Detlor and Lewis previously evaluated 107 ARL member Web sites to assess and measure library Web site functionality in a quantitative manner. They used a codebook derived from the published literature that was dedicated to the design and usability of library Web sites and other related electronic interfaces. They made recommendations surrounding a central argument, "academic libraries build robust library Web

sites to combat increasing competition from commercial services."⁷ Although I acknowledge Detlor and Lewis' findings and insights, the investigation for this paper differs from theirs in approach and comprehensiveness. I used a snapshot of current academic library homepages' content and design as a basis for my recommendations. A summary of the investigation appears below in the categories of content, design patterns, and innovative features.

Content

The following major content elements were identified on the library homepages:

- search/find resources by format
- resources by subject/subject guides
- research assistance/how do I.../help
- about (library)/library information

- library services
- search site, and/or site A-Z
- ask a librarian/ask us
- news/announcements/events
- contact us/suggestions

The following content elements were less common but frequently appeared:

- library account(s)
- digital collections/Web exhibits
- portals by user types such as students, faculty, staff, alumni, friends, and visitors

In general, the homepage content is focused on and arranged according to library functions, resources, and services. Online library information and resources are vast and comprehensive, requiring multiple searching and browsing pathways. Content typically follows a "one-design-for-all" approach and there are few customization features and few opportunities for users to create, publish, and exchange content.

Design Patterns

The following design patterns appeared on the library homepages:

- columns by category
- horizontal sections by category
- mixed columns and horizontal sections
- four equally divided sections with sidebar(s)
- mouse-over links with sidebar(s)

Most library homepages have an overwhelming amount of text and links. A few academic libraries are less text and link focused by employing a more graphical design.⁸

Innovative Features

About thirty libraries employed RSS (Really Simple Syndication)⁹ for library news and events (see Appendix 2).

Four library Web sites provide personalized library spaces, named "My Library," "My Personal Library," or "My Search Space," aggregating into one spot access to library user accounts, course reserve materials, library alerts, databases, citation tools, and/or search preferences/results.¹⁰ On nine library homepages, links are provided to a university-level Web portal or centralized Web service.¹¹

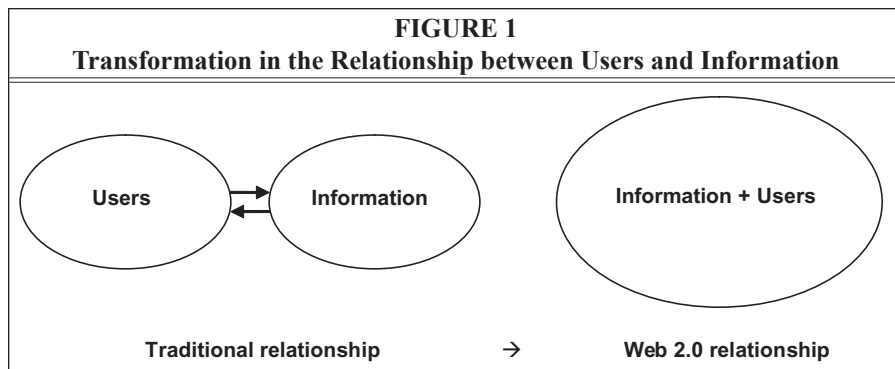
Ten library homepages provide a "Google Scholar" search box or a direct link to search Google Scholar.¹² Two library homepages also provide a link to search "Windows Live Academic."¹³

Live Chat, as a reference communication method, appears on almost all library homepages. The table below illustrates other unique and user-friendly innovative features.

Web 2.0 Principles and Implications

Some Web 2.0 transformations, according to O'Reilly, include the evolutions from Britannica Online to Wikipedia, from personal Web sites to blogging, from publishing to participation, from content management systems to wikis, from directories (taxonomy) to tagging ("folksonomy" — general users' classifications of Internet resources), and from stickiness (static Web pages, manual update) to syndication (dynamic Web pages, auto update).¹⁴

TABLE 1	
Innovative Features Discovered from 111 Academic Library Web Sites	
A. Use of “Web 2.0” Tools	
RSS for new library resources	MIT, U. of Oklahoma, U. of Saskatchewan, U. of Toronto, York U.
Blogs	Brigham Young U., U. of Minnesota, North Carolina State, Temple, Texas A&M, Washington U. in St. Louis
Wikis	Colorado State (not linked from homepage), North Carolina State
Podcasts	Arizona State (“The Library Channel”), MIT (coming later), Ohio State
Personal Bookmarks/Tagging	U. of Pennsylvania, U. of Saskatchewan
B. User Engagement	
“Rate this page”	U. of Toronto
“The Library Video (created by students, for students!)”	U. of Virginia
“What Students are Saying about LIBR1100 ...”	Texas Tech
“Question of the Week”	Boston College
C. Homepage Customization	
“Customize this site for ...”	U. of Connecticut
D. Aggregated Resources	
“Knowledge Bank” (IR model: DSpace)	Ohio State
“The Teaching Library” (for faculty and librarians to teach information literacy)	U. of Tennessee
“InfoTree” (subject resources)	Ohio U.
“Knowledge Base” (library information)	U. of Oklahoma
“Library Survival Guide” (instructions)	York U.
E. Single Sign-on	
“Passport York”	York U.
F. Recommending Information	
“Popular Links” side bar	U. of Toronto
“Top 10 Databases”	U. of Wisconsin-Madison
“Featured item”	Vanderbilt U.
“Resource Spotlight”	Brown U.
“Featured Resources”	U. at Buffalo (SUNY), U. of California at Davis
G. Multimedia	
Library Virtual Tour	Texas Tech, U. of Oklahoma
Audio Tours, Library Tutorial Videos	Arizona State
H. Use of Familiar Format	
Library hours in a calendar	Texas Tech



As the “read/write Web,” the “collaborative Web,” or the “expressive Web,” Web 2.0 is an “organic” information environment where user engagement adds value. Web 2.0 tools “set inclusive defaults for aggregating user data and building value as a side effect of ordinary use of the application.”¹⁵ The more users participate, the more value a service provides: users connect with, inspire, help, and improve one another through the service’s participation mechanisms; the service’s user-generated content is then available over the network for reuse. In the Web 2.0 era, the relationship between users and information is transformed from stand-alone, separate silos to mutually inclusive, mutually reliant, and reciprocal action-and-reaction entities. The diagram below illustrates this point.

The Web 2.0 culture also includes syndication of dynamic content and lightweight program/service models to create usable and exciting innovations called “mashups.” Mashups challenge the imaginations of information designers and providers to create and deliver more usable tools and better services over the Internet. As O’Reilly states: “think syndication, not coordination”; “innovation [is] in assembly.”¹⁶ Relating to recognition of the idea (or already a fact?) that, in the Web 2.0 era, users and information are integrated, I consider it legitimate to say “Web 2.0 = users + mashups.” O’Reilly’s Web 2.0 application examples include Google, eBay, Amazon, Wikipedia, blog-

ging, RSS, del.icio.us¹⁷ (a social bookmarking Web site), Flickr¹⁸ (a photo sharing Web site), iTunes¹⁹ (a digital media player by Apple), TiVo²⁰ (a popular brand of digital video recorder in the United States), and AJAX²¹ (a programming technique for creating interactive Web applications).

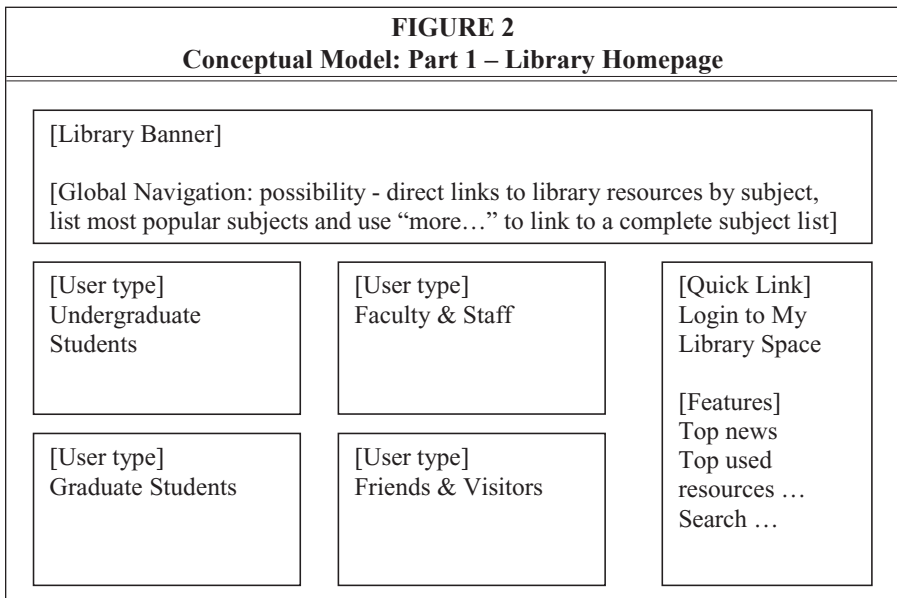
Several librarians and information researchers have recognized the implications of Web 2.0 principles on library Web services. Karen Coombs, Head of Web Services at the University of Houston Libraries, proposed four principles to construct a concept of “Library Virtual Presence in 2010”: “1. A library’s virtual presence will be more than the library’s web site. 2. A library’s web site will be responsive to the needs of users. 3. Through a comprehensive effort in digital collection building, the library’s virtual presence will exploit unique materials in its collections. 4. Users will be able to come to the site not only to search for information but also to collaborate and share ideas.”²² Doug Achterman, the library media teacher at San Benito High School in Hollister, California, discussed the use of blogs and wikis (the most popular applications of Web 2.0) in a school setting to promote school library programs, advance instructional practice in collaboration with classroom teachers, and connect with students.²³ Elizabeth Yakel, Associate Professor at the School of Information, University of Michigan, investigated ways in which Web 2.0 features are being used in archival access

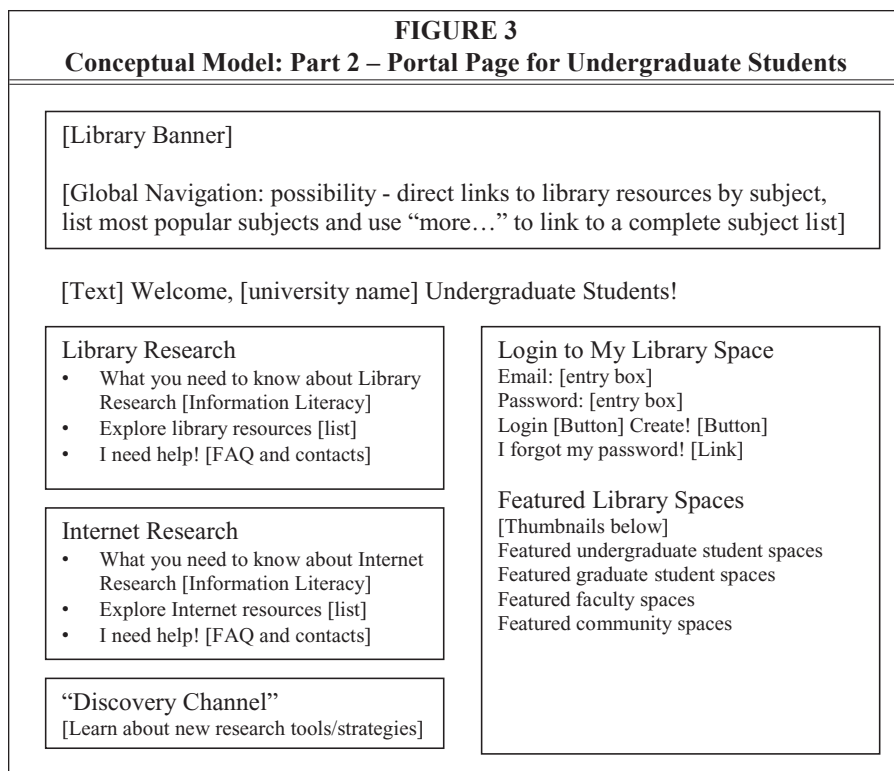
systems (such as live chat reference, tagging/commenting, bookbags/shopping carts, and recommender systems/ratings) and how more might be incorporated in the future.²⁴ Jack M. Maness, Librarian/Computer Science Bibliographer at the University of Colorado Boulder Libraries, addressed how Web 2.0 technologies (such as synchronous messaging, streaming media, blogs, wikis, social networks, tagging, RSS feeds, and mashups) might intimate changes in how libraries provide access to their collections and user support.²⁵ Edward J. Maloney, Director of Research and Learning Technologies at Georgetown University, discussed the challenges that Web 2.0 poses to e-learning technologies in higher education and proposed a Digital Notebook project as one model to “incorporate the paradigm-altering technologies of Web 2.0 into teaching and learning.”²⁶ In addition, University of Houston Libraries Strategic Directions (2006–2010) declared “expand our virtual presence” as their first strategic principle and “include content on the Libraries’ web site that is interactive, engaging, and participatory” in their course of action.²⁷

Recommendations

The core value of libraries is the service they provide to their users. The ultimate goal of academic library Web sites is to make preselected and preserved information readily available to users for their educational and research needs. The investigation described at the beginning of this article reveals that current academic library Web sites have made significant efforts and are successful in putting available information online and providing users with complete access to online library resources and services. Several academic library Web sites have employed innovative features that bring users closer to what libraries have to offer and encourage some level of user engagement (see table 1). However, the universe of information presented on academic library homepages still focuses on library functions, requires numerous pathways for access, has overwhelming options, and takes a “one-design-for-all” approach that fails to recognize users as individuals. In addition, few current academic library Web sites offer opportunities for users to create and share user-generated content.

FIGURE 2
Conceptual Model: Part 1 – Library Homepage





To capitalize on the insights of a variety of information professionals on the Web 2.0 culture, and to take action on these observations, I propose making the academic library Web site a virtual place and recommend a three-part conceptual model described in details below. Before beginning, I would like to note that the suggested model only demonstrates what users might want. Technological details, usability testing, and privacy/liability issues need to be further explored beyond this paper.

Library Homepage

Reduce the intimidating appearance of library homepages' by using as little text and linking as possible to convey only the most necessary access points and by employing an appealing graphical design that accommodates usability and accessibility requirements. I suggest using a portal approach where users first identify themselves as belonging to one of several

general groups (for example, graduate students or undergraduate students). Each group-specific portal would then lead a user to a specific set of resources customized for the group. Label each portal with a graphic or a color. Figure 2 illustrates the first part of the conceptual model and provides an example of a library homepage (graphics and colors are not applied in this illustration).

Library Portal Page

Once a group-specific portal page is selected, a user may navigate among a customized set of resources or may choose to create or log in to a personal library space. Figure 3 illustrates the second part of the conceptual model and provides an example of a library portal page for the user group of undergraduate students.

Content in the left main body is adjusted accordingly. For example, on a portal page for the user group of faculty and staff, that portion of the page could be a list of

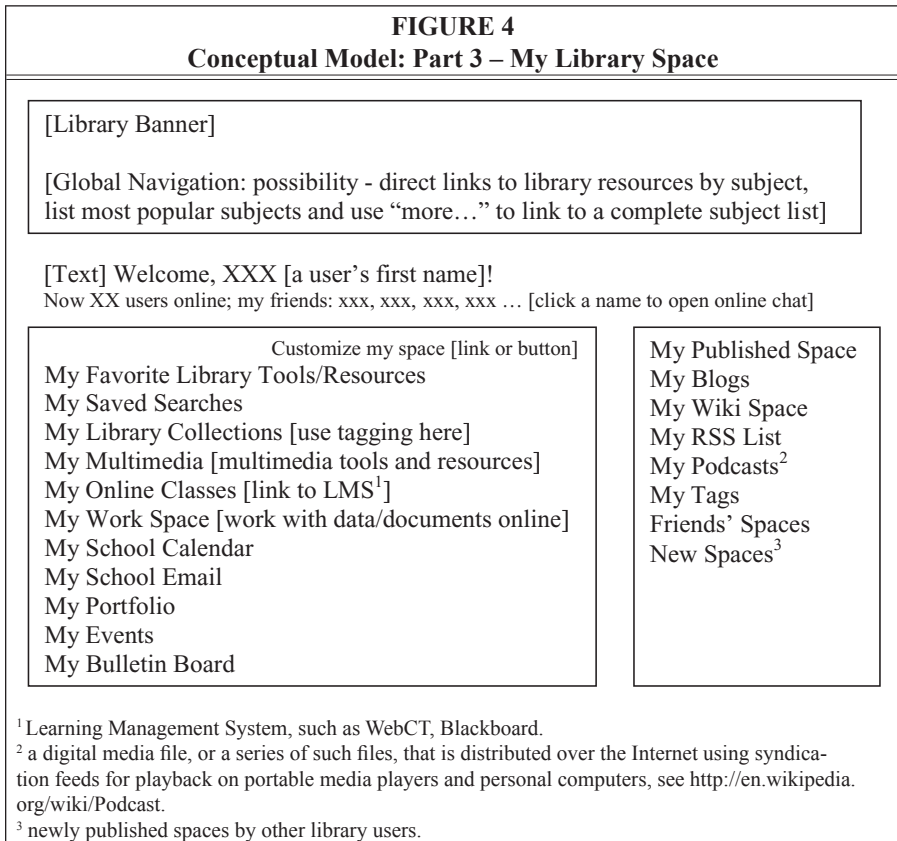
links to the library's catalog or the library's federated searching system (ideally, federated searching is an aggregated search of all library resources such as catalogs, research databases, digital collections, and so on), an e-journals list, a databases list, a scholarly Internet resources list, a scholarly publishers list, a subject librarians list, and the "Discovery Channel" (that is, a themed section for users to learn about new research tools/strategies).

To create a personal library space, a user would need to enter basic, required information such as name, e-mail, and user type. Once a user account is created and authentication is completed, a user may then create a profile to list optional information such as college, department, major, year in school, specialization, research interests, personal interests, and "What I most use the library for..."

"My Library Space"

My Library Space is a one-stop information environment for an individual user and provides a combined set of information technology tools for use. A user may customize the interface and select what tools/links to use/display in the space, according to personal need. Within My Library Space, a user can save and access preferred library resources, interact with others using preferred tools (such as instant messaging, e-mail, and bulletin board), work with data/documentation online, create and share content (using blog, wiki, or podcast), and integrate school/work activities. A user may wish to create a personal library space for either or both of the rich user experiences and the "one-stop-shopping" capabilities it provides. Figure 4 illustrates the last part of the conceptual model and provides an

FIGURE 4
Conceptual Model: Part 3 – My Library Space



example of a My Library Space, regardless of user type.

This conceptual model demonstrates ways in which Web 2.0 principles might be incorporated into future academic library Web site design. The recommended design will provide an efficient, flexible, and user-oriented interface and thus minimize the distance between users and library resources/services. This effort will require collaborative experimentation among librarians and information technology professionals. The back-end work will be extensive, demanding continuous creativity and exploration. Meanwhile, the convenience and rich experiences we offer users will be very rewarding.

Based on this conceptual model, future academic library web sites might feature:

1. User focus: focus on library users by presenting library resources in a targeted and customized manner.
2. Personalization: recognize library users as individuals by giving them opportunities to configure their own library interfaces and to select tools and content based on personal needs.
3. User engagement: provide sufficient tools to allow and encourage library users in content creation and exchange.
4. Online communities: nurture the development of online communities by connecting individuals through online publishing and sharing tools such as blogs, wikis, podcasting, and tagging.
5. Remixability: employ a mashup ap-

proach to aggregate current and emerging information technologies to provide library users with opportunities to explore new possibilities to discover and work with information resources.

Conclusion

Rachel Singer Gordon states, "L2 (Library 2.0) recognizes that each library implements technology and services in ways appropriate to its community. We all start from different points and have different needs. Embrace this one-size-doesn't-fit-all approach."²⁸ In conclusion, future academic library Web sites should:

- switch the focus from presenting information arranged according to library functions and resources to providing targeted and customizable tools and services to library users;
- design a seamless, one-stop information environment that minimizes users' way-finding effort and nurtures the formation and dissemination of knowledge, ideas, and experiences; and
- respond to users' changing needs and give users opportunities to express, share, and learn.

The OCLC College Students' Perceptions of Libraries and Information Resources: A Report to the OCLC Membership (2005) pointed out that "It is time to rejuvenate the 'Library' brand."²⁹ The opportunity to be responsive to the changing information environment and rejuvenate academic library Web sites is now in our hands.

Notes

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3. Thomas Frey, "The Future of Libraries: Beginning the Great Transformation." Available online at <http://www.davinciinstitute.com/page.php?ID=120>. [Accessed 23 July 2007].

4. Tim O'Reilly, "What Is Web 2.0: Design Patterns and Business Models for the Next Generation of Software" (2005). Available online at www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html. [Accessed 23 July 2007].

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APPENDIX 1			
ARL Homepages: Investigated December 4-8, 2006; last updated March 7, 2007			
No.	Institution	Major Contents	Page Layout
1	U. of Alabama	Find (resources by format), Search, Services, About, News, Ask a Librarian, View Account, Search Site, Portals by user type	Columns by category
2	U. at Albany SUNY	Info & Services, Research Tools, Help, News & Events	3 columns
3	U. of Alberta	Browse by Subject, Featured Services, Catalog Search and other tabs, News & other tabs (Digitized Collections)	2 columns; then horizontal sections by category
4	U. of Arizona	Search & Find, Services, About, Help, News & Events, Affiliated Sites (Web Exhibits), Central Search, My Account	4-box on the main body with side and bottom bars
5	Arizona State U.	Find (resources by format), Services, Research Assistance, About, Help, Other ASU Links, Catalog Quick Search, My Account, Search Site, News, Exhibits, The Library Channel	3 columns; then horizontal sections by category
6	Auburn U.	Find (resources by format), Services, About, What's New, Ask a Librarian, Quick links, Search Catalog	4-box on the main body with side bar
7	Boston College	News & Features, Quick Searches, Research Help, Services, Resources, About, Ask a Librarian	2 columns divided evenly; 4-box within the right column
8	Boston U.	Catalog Search, Find articles, eJournal Locator, Find books, Research by Subject, Reference Shelf, News, Quick links, about, how to . . . , services, libraries, Search (Catalog, Library Web, BU Web)	2 horizontal sections; then columns
9	Brigham Young U.	Find Articles, Find Books, Find Other Materials, Services, About, Reservations, More . . . , Beta, Quick Start, News, Unique BYU Collections	2 columns; tabs on the left; horizontal sections on the right
			Features
			Google Scholar
			RSS News
			RSS News
			RSS News
			The Library Channel - Podcasts, Audio Tours, Streaming Videos, RSS News; MyASU—university Web portal; Other ASU Links (Blackboard, EMMA, etc.)
			Question of the week
			Blog: "Beta" (library new projects); RSS for Beta library projects; Google Scholar; Blackboard

10	U. of British Columbia	Find, How to..., Resources by Subject, My Library Account, News/Features, Portals by user type, top navigation	4-box on the main body with side bar	Graphical design; "my UBC"—university Web portal
11	Brown U.	Resource Spotlight, Digital Library, Announcements, Quick links, Research, Library Services, For you (portals by user type), Did You Know ..., Quick Search box	2 horizontal sections with bottom bar, then columns	"MyJostia!" = My library account
12	U. at Buffalo, SUNY	Quick Links, Library Info, Catalog Search, Featured Resources, Library News & Announcements, How do I... (Quick links), top navigation	2 horizontal sections; then columns	RSS News
13	U. of California, Berkeley	Find (resources by format), Catalogs, Services (portals by user type), About, Help, News & Events	Columns by category	
14	U. of California, Davis	Catalogs & Databases, Libraries & Collections, Services, About, Find (resources by format), Quick Links, News, Current Exhibits, Featured Resources, Quick Search, top navigation	3 columns; then horizontal sections by category	My Search Space
15	U. of California, Irvine	Online Resources (Catalogs, E-Resources, Subject Guides, Free Resources), Services, Libraries (info), How to, What's New, Spotlight	3 columns; then horizontal sections by category	Library Publications
16	U. of California, Los Angeles	Search & Find, Services, Libraries & Collections, About, News, Events, Exhibits, Quick search catalog	Mouse-over columns by category; featured image on main body	Graphical design
17	U. of California, Riverside	Books & Journals, Finding Articles, Course Reserves, Internet Sites, Quick Search, Featured Services, News & Events, Featured Resources, Library Hours	3 columns; then horizontal sections by category	RSS News
18	U. of California, San Diego	Catalogs, About, Get Started (research guide), Search Site, Quick Links, News & Events	2 columns; then horizontal sections by category	
19	U. of California, Santa Barbara	Services, Catalogs, Research, FAQ: How do I...?, Ask a Librarian, About, Search (Site), Popular pages (quick links), Library News, Comments	3 columns	

20	Case Western Reserve U.	Library Catalog, Libraries, Research Databases, Electronic Books and Journals, Course Reserves, View Library Record, Quick Reference Resources, OhioLINK, Quick Search	2 horizontal sections	
21	U. of Chicago	Catalogs, Course Materials, Electronic Resources, Subject Guides, Campus Libraries, Collections & Research Centers, Library Access & Policies, Services & Facilities, About, What's New, Ask a Librarian/Suggestions & Comments, How do I find...?, My Accounts, Help	3 columns	
22	U. of Cincinnati	Find Books, Find Articles & Journals, Find Media, Special Collections, Information, Services, Instruction, Help, Quick Links, Research Assistance, Quick Search, News	3 columns	Instruction by user type
23	U. of Colorado at Boulder	Research Resources, About, Services, News & Events, Quick Search, Ask Us, Search Site, About Libraries A to Z, How do I...	Columns by category	
24	Colorado State U.	Collections, Find (resources by format), Services, About Us, News, Quick Search, Help, Top navigation, Portals by user type, A to Z, Site Map, Search, My Accounts, Contact Us	4-box on the main body with side and bottom bars	
25	Columbia U.	Quick Search, Libraries & Collections, Catalogs, E-Resources, Request, Ask Us, Using the Libraries, News, Spotlight, Information for... (portals by user type), Featured Resource	Mouse-over columns by category; featured image on main body	Graphical design
26	U. of Connecticut	Search, Online Resources, Collections, Using the Library, About the Library, News, Quick Links, Special Libraries, Customize this site for ...	3 columns	Customize this site by subject or by campus; Save customization
27	Cornell U.	Find it! (resources by format), Services, Instruction, Technical Support, Inside Library, Quick Links, How do I find..., Announcements, Exhibitions (digital collections)	Boxes by category in the main body with side bars	

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28	Dartmouth College	Search/Browse, Library Services, About the Library, How do I...?, Ask a Librarian, Quick Links, Featured Sites, Library News	2 horizontal sections with left side bar	"Search 360" (search articles within selected resources)
29	U. Delaware	Information, Services, Resources, Subject Guides A to Z, (Quick links), Portals by user type, top navigation	Horizontal sections by category with left side bar	
30	Duke U.	Library News, Research, Library Services, About Us, Digital Collections, Quick Search, Top navigation	Mixed columns and sections	
31	Emory U.	Quick Search, Branch library links, Archives, Digital Library Programs, Preservation Office, Portals by user type, Resources	2 columns	
32	U. of Florida	Find, Services, About, News, Quick catalog search, Research Gateway	Columns by category	
33	Florida State U.	About, Services, Other Libraries, Academic Web Search, Libraries Catalog, Resources & Services for..., E-Resources by Subject, Most Used Databases, General E-Resources, Tutorials, News	3 columns; then mixed sections	Google Scholar; Windows Live Beta (Windows Live Academic? User authentication required)
34	George Washington U.	Catalog Quick Search, Research Portal, Article Quick Search, E-Journals, Services, Research Help, Ask A Librarian, News, Specialized Collections, other Links	Mixed columns and sections	
35	Georgetown U.	Catalogs, Databases, Journal Finder, Research Help, Services, More information for..., News, other links	3 columns	
36	U. of Georgia	Catalog, Databases, E-Journals, Special Collections, Digital Library, Research Guide, Google Scholar, Find (resources by format), Services, About, News & Events	Mixed columns and sections	Google Scholar
37	Georgia Tech	About, Search & Locate, Borrow & Order, Course Reserves, Research Help, Research by Subject, Quick Links, Quick Catalog Search, News	Mouse-over columns by category; then vertical local navigation and horizontal sections by category	

38	U. of Guelph	About, Resources, Help & How-to, Search, Services for... Borrowing & Interlibrary Requests, Facilities, News & Events	2 columns; then horizontal sections by category	RSS News
39	Harvard U.	Featured Resources & Welcome, Catalog, Other catalogs, E-Research, Research Guides, Libraries (info)	2 horizontal sections; then columns by category	
40	U. of Hawaii	Resources, Campus Libraries, About, News, Spotlight	3 columns	
41	U. of Houston	Research a Topic, Libraries & Collections, Services, About, Support the Library, Catalog, Quick links	One graphic; mouse-over vertical navigation	Strategic Directions
42	Howard U.	Search/Browse, Research Assistance, Services, About, Special Programs, Library Calendar, Orientation, Prime & Pertinent (News)	3 columns; then horizontal sections by category	Virtual Library Tour; Google Scholar
43	U. of Illinois at Chicago	About, Catalog, Services, Resources, Site Search, Ask a Librarian, News, Libraries (Branches), Quick Links, Quick Search	Mouse-over columns by category; then 3 columns	
44	U. of Illinois at Urbana-Champaign	Research Tools, Services, About, News, Quick catalog search, Quick Site Search	2 columns; then columns by category	
45	Indiana U. Bloomington	Find information, Libraries & Collections, Services, About, News & Events	Horizontal sections; columns by category on the main body	
46	U. of Iowa	Search, Services, My Personal Library, About, Help, Location & Hours, Contact Us, Library Smart Search, News & Events	Horizontal sections; then columns by category	My Personal Library; Library Blog
47	Iowa State U.	Collections, Services Areas, Classes & Tours, Arts, Catalog, Find Articles, Library Information, How do I..., Ask a Librarian, News	Primary image detailing horizontal sections on the main body	RSS News; Graphical design
48	Johns Hopkins U.	Branch library links, Quick Search	3 columns	
49	U. of Kansas	Research, Services, Help, About, News	3 columns; then horizontal sections by category	
50	Kent State U.	Find (resources by format), Get help & info, Renew Books & Materials, Multimedia, Off-campus Access, What's new	3 columns; then boxes by category on the main body	Multimedia

51	U. of Kentucky	Find, Borrow, Services for ..., About, Help, My Library Account, Library Catalog, Databases, E-Journals	2 columns; image buttons on the main body	RSS news
52	Louisiana State U.	Research Tools, Key Links, General Information (About), Services, Quick Search	2 columns; then 4-box on the main body	“PAWS” (Personal Access Web Services)—university Web portal
53	U. of Louisville	Services, About, Libraries (Branches), Search, News	3 columns	
54	McGill U.	Finding Information, Seeking Assistance, About, Support for ..., News	Columns by category	RSS news; “myMcGill”
55	McMaster U.	Search, Quick Links, News & Events	2 columns; then horizontal sections by category	RSS news
56	U. of Manitoba	Welcome (About & Spotlight on Services), Catalog Search, Related Info, News & Events, Quick Links		
57	U. of Maryland	Research Collections (Catalog & Research Port), My Account, Reference Shelf, Ask Us, Digital Collections, Digital Repository, Get Oriented, More information for ..., News & Events	3 columns; boxes by category on the main body	Tip of the Week
58	U. of Massachusetts Amherst	Find, How Do I, Services, Collections, About, Quick Search, News, Especially for ..., New Hot Topics Guides	3 columns; click-to-change tabs on the main body	New Hot Topics Guides
59	MIT	Search Collection, Ask Us, Help Yourself, Borrowing & Ordering, About, Quick Catalog Search, Quick Links, How Do I ..., Library BETAs, News	3 columns; then horizontal sections by category	Library BETAs (Blog); RSS news; RSS new resources; Podcasts (coming later)
60	U. of Miami	Search & Find, Research Tools, Services, About, Ask A Librarian, Quick Links, News & Events	3 columns; then boxes by category on the main body	
61	U. of Michigan	Research Tools, About, Services, Help, I Need to Find ..., Find Articles, General Search (by resource format), News	3 columns; then boxes by category on the main body	RSS news
62	Michigan State U.	General Info, Resources, Research Help, How to ..., Computers, Contact, Quick links, Unique @, Features, Your Library Account, Quick Search (Catalog, Articles, Site), What's New, Today's Event, Ask a Librarian [modified 12/18/06]	2 columns; then mixed sections	RSS news

63	U. of Minnesota	Books & More (Catalog Search), Articles & More, Indexes & Databases A-Z, I Need to Find..., Services by User, Services by Type, Ask Us, News, Quick Links, Course Support, Libraries A-Z, Portals by user type	2 columns; then boxes by category on the main body	RSS news; Uthink Blog
64	U. of Missouri-Columbia	About, Books Articles & More, Libraries Archives & Collections, Services to..., Portals by user type	Click-to-change tabs on the main body	
65	U. of Nebraska Lincoln	Quick Catalog Search, Resources, Services, Navigation, Related Links, What's New, Portals by user type	3 columns; sections by category on the main body	
66	U. of New Mexico	Quick Finds, Main Campus, Specialty Libraries, Branch Libraries; Main Page: Quick Links, Resources, Announcements, Search (by resource format)	Columns by category	
67	New York U.	Collections—Find (resources by format) & Search (catalogs), Research Assistance, Services, About, Help, Quick Search (catalog), How do I... (FAQ), News	Sections by category	
68	U. of North Carolina Chapel Hill	Quick Catalog Search, Article Databases, E-Journal Finder, Research Help, Services, About, Featured Resources, Featured Services, News & Events	2 columns; then sections by category	RSS news; Google Scholar; My Library (= My library account)
69	North Carolina State U.	Search Collection, Browse Subjects, Services, Library Information, Community, News & Events	Sections by category	RSS news; My Library (Library Account, My Course Reserves, My Alerts); Blog; Wiki
70	Northwestern U.	Find (resources by format), Services, Research Assistance, About, Help, Quick Search (Books & Journals, Articles, Databases), What's New	Sections by category	RSS news
71	U. of Notre Dame	Research Tools, Getting Help, Services, Inside Libraries, News	Sections by category	
72	Ohio State U.	Quick Search Books Articles & More, More Catalogs, Quick Links, News, Lectures/Programs, Services, Exhibitions	3 columns	Podcast (Library News Audio), Knowledge Bank (library info)

73	Ohio U.	Find (resources by format), Services, Collections, Info, Quick Search (Books, Videos, Articles), News	2 columns; click-to-change tabs on the main body	InfoTree (aggregated hierarchical resource list)
74	U. of Oklahoma	Announcements, Getting Started..., Where Can I Find..., Call Number Locations, News, Portals by user type	2 columns; then sections by category	RSS news; RSS new books & new electronic resources; Knowledge Base; Virtual Tour
75	Oklahoma State U.	Find... (resources by format), Services, Give, About, News, Article Quick Search	Mouse-over links by category	
76	U. of Oregon	Search (different formats by changing tab), Find Resources, Research Assistance, Services, About, News	2 horizontal sections; then columns by category	
77	U. of Pennsylvania	Search Engine, Ask Us/Get Help, Subjects, Libraries/Collections, Site Guide, Quick Links, Library Account, Article Finder, Highlights	2 columns; mouse-over changing tabs on the main body with side bar	PennTags (user authentication required)
78	Pennsylvania State U.	Catalog, Books & More, Articles & More, E-Resource List, Research Tools, Services, About, Locations & Hours, Get Help, Quick Links, News etc.	2 columns; mouse-over links by category	
79	U. of Pittsburgh	Find Books Articles & More, Libraries, Services, University Library System, Quick Search, Quick Links	Horizontal sections by category	
80	Princeton U.	Books Articles & More, Research Help, Services, About, Spotlight & News	2 horizontal sections; columns by category on main body	RSS news
81	Purdue U.	Catalog, Key Resources, News, Quick Links	Boxes by category on the main body; mouse-over navigation	
82	Queen's U.	Research Tools, Services, Libraries at Queen's, Help, News, Quick Search	2 columns; then boxes by category on the main body	RSS news
83	Rice U.	Catalog, Collections, Services, General Info, Departments, News	Mouse-over links by category	
84	U. of Rochester	Find (resources by format), Catalog Search, Borrowing, Library Information, News & Events	2 columns; then horizontal sections by category	

85	Rutgers U.	Quick Links with mouse-over to further links, Ask A Librarian, Hours & Directions, Search Web site, Site Index, News & Events	3 columns	
86	U. of Saskatchewan	Find Resources, Your Account, Help, Library Information, Especially for..., News & Events, University Learning Center, Portals by user type	Mixed columns and sections	Your Bookmarks; RSS for New Books; Blogs (e-Resources News)
87	U. of South Carolina	Research Tools, Library Assistance, Services, Information for..., Spotlight on..., Quick Links to Libraries & Collections, Portals by user type	2 columns; then boxes by category on the main body	
88	U. of Southern California	New at USC Libraries, Libraries, Subject Areas, Collections, About the Libraries, Spotlight, Quick Links, Quick Search in Subjects	3 columns; featuring New at the USC Libraries on the main body	Feature "New at USC Libraries" on the main body; Graphical design
89	Southern Illinois U. Carbondale	Welcome, Quick Links, News, Quick Search, Renovation, Giving, Hours, Help, Contact, Sitemap	3 columns	System powered by Plone (an open source CMS); RSS news
90	Stony Brook U.	Online Resources, Services, About, Branches & Collections, Help, How do I..., Google Search, Quick Links	2 columns; then boxes by category on the main body	Google Search
91	Syracuse U.	Find Books, Find Article, Find Journals, Digital Library, Find A Librarian, Find Facts, Find Reserves, Other Libraries, Citation Support, About Us, Services, Help, Quick Search (resources by format), News	2 columns; then mixed columns and sections	
92	Temple U.	Find Articles, Books Movies & More, Services, About, Archives & Collections, Get Help, News & Events	2 columns; boxes by category on the main body	News & Events powered by a blog
93	U. of Tennessee	Find Information, Use Our Services, Get Help, Technology Support, Inside the Libraries, What's New, Quick Search, Portals by user type (in "Services")	3 columns; boxes by category on the main body	RSS news; The Teaching Library
94	U. of Texas at Austin	Quick Links, About, Research Tools, Services, Resources for You, For Students, For Faculty/Staff, Google Scholar, Featured Resource, UTOPIA, Portals by user type	2 horizontal sections; then columns	RSS news; Google Scholar

95	Texas A&M U.	Quick Links, Search Now for... (Articles/Books, E-Journals, Indexes/Databases), News, Service, Research Support, Collections, About, Giving, Help, My Portal	3 columns	Windows Live Academic; Google Scholar; Undergraduate Info Blog; My Portal—university Web portal
96	Texas Tech U.	Find Books & More, Find Articles, Library Info, Reference Tools, Ask A Librarian, Research A Topic, Quick Links to and List of Databases, On the side—Research, Services, About, Give, Computing, Sitemap, News, E-Resource Status	2 columns; then sections by category	Library hours of the day; Library hours in a calendar; Virtual Tour; “What Students are saying about LIBR1100...” (student quote on library training)
97	U. of Toronto	Catalog Quick Search, Quick Search Articles (e-Journals, All e-resources), Tools, News, New Titles..., Research Tip, Tabs—Resources & Research, Services (portals by user type), General Info, Help	mixed columns and sections; mouse-over links at the top	RSS new titles; Popular links; My Tools; Rate this page; *most innovative design
98	Tulane U.	Research, Help & Guidance, About, Help, News	Columns by category	
99	Utah U.	Research Tools, Services, Library Information, Collections, Ask Us, Other Libraries	Columns by category	Library Hours Today; “Unrequired Reading”; “My Utah.edu”—university Web portal
100	Vanderbilt U.	Find Books & Other Items, Find Articles & Databases, Use Library Services, Get Help with Research, News, Quick Catalog Search, Quick Links	2 columns; boxes by category on the main body	Featured item under each main category; color code for each main category
101	U. of Virginia	General Info, Collections, Services, Subject Guides, News, Quick Search Catalog, Search Site, etc.	Mixed, mouse-over links under major categories on the left	The Library Video—Created by students, for students!
102	Virginia Tech	Find (resources by format), Services, Help, Announcements, Off-campus Sign-in, Spotlight on...	Columns by category	Library hours of the week; “My VT”—university Web portal
103	U. of Washington	Resources, Services, About, Quick Search Catalog, How do I..., News, Event & Exhibits, Ask Us, Search Site, Off-campus access	3 columns	
104	Washington State U.	Catalog, Article Indexes/E-Journals, Your Record/Renewals, Interlibrary Loans, Other Library Catalogs, Reference Services, Digital Collections, Quick Links, What’s New	3 columns; Graphical design	RSS news; Graphical design; “My WSU”—university Web portal

105	Washington U. St. Louis	Find it! (Articles, Databases, Full-text), Find Books & More, Log in to My Library Accounts, Reference Sources, Jump Start Research, How do I...., Services (portals by user type), Libraries & Collections, Hours & Maps, About, What's New, Quick Catalog Search	2 columns; mouse-over links by category on the main body	What's new blog
106	U. of Waterloo	Quick Catalog Search, News, Left Navigation—Catalog, Resources for Research, Services, About, Help & Instruction, Connect from Home, Site Index, Right Navigation—Hours, How do I...., Subject Guides, etc.	3 columns	
107	Wayne State U.	Quick Catalog Search, Find Articles & Databases, Find Online Journals, Ask A Librarian, News, Library Info, Services, Portals by user type	2 horizontal sections; then columns	Google Scholar; "WSU Pipeline"—university Web portal; "WSU Blackboard"
108	U. of Western Ontario	Research Resources, How Do I...., My Library Account, What's New, Quick Links, Portals by user type	2 columns; sections by category on the main body	RSS news
109	U. Wisconsin-Madison	Search Shortcuts, Books/Articles/Databases, Library Services, About, Help & Guidance, News	2 columns; boxes by category on the main body	Top 10 Databases; Info on top category links by clicking one of the links or the (i) icon
110	Yale U.	Research Tools, Libraries & Collections, About, Services, Ask A Librarian, News, In Focus	Mixed columns and sections	RSS news
111	York U.	Catalog, e-Resources, Services, Help with Research, Title Quick Search (Catalog, e-Resources), Library News, Portals by user type	3 columns; 4-box on the main body	Library Survival Guide; "Passport York" (single sign-on); RSS for e-Resources

Appendix 2: Academic Library Web Sites That Employed RSS for Library News

1. University at Albany, SUNY
2. University of Alberta
3. University of Arizona
4. Arizona State University
5. University at Buffalo, SUNY
6. Brigham Young University
7. University of California, Riverside
8. University of Guelph
9. Iowa State University
10. University of Kentucky
11. Massachusetts Institute of Technology
12. McGill University
13. McMaster University
14. University of Michigan
15. Michigan State University
16. University of Minnesota
17. University of North Carolina at Chapel Hill
18. North Carolina State University
19. Northwestern University
20. University of Oklahoma
21. Princeton University
22. Queen's University
23. Southern Illinois University Carbondale
24. Temple University
25. University of Tennessee
26. University of Texas at Austin
27. University of Toronto
28. Washington State University
29. Western Ontario University
30. Yale University