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Work of the Web Weavers: Web Development in Academic Libraries

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Keywords: academic libraries; Web site management; Web design; Web sites; Web committees; Web teams; content management systems; surveys

Abstract: Although the library's Web site has become a standard tool for seeking information and conducting research in academic institutions, there are a variety of ways libraries approach the often challenging — and sometimes daunting — process of Web site development and maintenance. Three librarians at Western Michigan University explored issues related to this topic by conducting a Web-based survey, which was sent to two librarians — Web services and reference / public services — at 149 academic institutions. Survey findings are discussed, including references to Web departments and committees, priority setting, Web authoring, soliciting input, outsourcing, content management systems, redesigns, and user involvement. The participants' insights regarding greatest challenges and what seems to be working or not working well are also outlined, in addition to the authors' suggestions for future research in this area.

After a year of planning, the library's new Web site has gone live! The students and faculty love it, so those who wove the intricate new Web site can now relax, right? As today's librarians know, the academic library's Web site is a work in progress, and there is no rest for the weary weavers. The Web site has become the library's calling card and primary window to its collections and services as well as the main interface between the library and its clientele. Developing and managing this multi-layered, sometimes slippery entity can be a great challenge given the overwhelming amount of information it contains. How do college and university libraries approach and manage this process? That was our question and consequently the aim of a survey we conducted in late spring 2008.

Literature Review

A literature search on Web development in academic libraries yielded a variety of useful titles. However, for the purposes of this discussion, we concentrated on literature that alluded to the primary development and management of the Web site and the role of

the developers. We did not include many works that addressed usability, for example, since this is such a distinct area of study.

There were a number of questions posed and answered in the literature related to our research. These fell into several categories: (1) who are the Web developers, and what do they do?; (2) how are Web groups selected, and what is their role in the Web process?; and (3) how do libraries engage users in Web development?

A key article by Ruth Sara Connell (2008) incorporated all these elements and most closely pertained to the content of this article. She reported on a survey of Web developers in academic libraries that explored the demographics and duties of people responsible for Web development; outsourcing; the characteristics, size, abilities, and selection of Web teams; resources and technology used for development; accessibility; and usability testing. Connell said nearly half the institutions surveyed indicated they had one Web designer, and the majority of them held other duties in conjunction with the Web.

Two surveys by Mary K. Taylor (2000) and Jason Kneip (2007) further examined particulars about library Webmasters. They both investigated educational background, Web training, job titles and duties, and workload. Although these studies were close to a decade apart, both researchers found about three-quarters of Webmasters held MLIS degrees; more than 80 percent considered themselves self-taught (in addition to other formal training); and roughly 60 percent in both studies reported having responsibilities in addition to the Web site, supporting Connell's findings. One area of difference that emerged was the Webmasters' perceptions of their library school training in Web development — in 2000, 71 percent of the Webmasters considered their library school preparation "inadequate," while in 2007, only about 55 percent shared this opinion. Taylor also found more than 80 percent of Webmasters were either "satisfied" or "very satisfied" with their positions (120).

The majority of the pertinent articles related to the selection, function, and dynamics of the Web team. Jennifer Church and Kyle Felker (2005), Jessica Burdman (1999), and Jerilyn R. Veldof and Shane Nackerud (2001) outlined recommended roles and skills for members of Web teams. Burdman emphasized several elements necessary for collaborative Web development, including planning, assembling the Web team, communicating effectively, managing change, and administering a large-scale content site. Additional considerations for group work suggested by Church and Felker were a clear-cut definition of the Web team's authority, accountability, and adequate technical training — as the authors said, "A Web team without sufficient knowledge is a huge white elephant" (549). Veldof and Nackerud referred to several academic library projects to illustrate the variety of knowledge and skills and the level of diversity needed to create a successful Web site, including project management, graphic design, information architecture, and accessibility for users with disabilities.

Debra Engel and Sarah Robbins (2003) focused on the benefits of collaboration that improved the University of Oklahoma Libraries' Web site. Of interest is that both library faculty and staff members representing major areas of the library worked together on a large Web committee. The following elements led to the group's success: establishing objectives with deadlines and ground rules for group interaction (e.g., zero tolerance for attacks on individuals) and using small work groups to accomplish a variety of tasks. In a timely new book published by the Association of College and Research

Libraries, Brenda Reeb (2008) delved into the unique roles, skills, and responsibilities of those involved in library Web site design, the interaction among the participants, and the steps involved in the design process. One of her most salient points was the need for librarians to be more accepting of colleagues without an MLIS degree when collaborating on Web site development.

The third main area in the literature focused on how libraries engage their users in Web development. Gary Roberts (2005) enumerated the benefits of involving patrons, most especially students, throughout the Web design process. Not only were they involved in usability testing, but there were also students on the redesign committee, and students drew up an initial design and created and edited page prototypes. Speaking from a corporate standpoint, Jamie Manning (2002) was zealous about shifting the Web team members' focus to becoming ambassadors for the customers they served. This involved forging new relationships to ascertain user needs through individual consultations. Subsequent analysis of the interactions yielded usage patterns that could be used to interconnect pieces of the Web site to improve its functionality.

Relating to Web design with an eye toward user engagement in a Web 2.0 environment, Shu Liu (2008) surveyed Association of Research Libraries members about their Web sites' content, design patterns, and innovations. Some noteworthy features libraries reported using to involve their patrons were Really Simple Syndication (RSS) feeds for library news and events, customizable library spaces, live chat, podcasts, wikis, tagging, a "rate this page" function, a question of the week, and virtual tours. Karen A. Coombs (2007) reported on how one university library allowed its staff members to take greater ownership of the Web site and make it more appealing to users. She created numerous Web 2.0 pillars that were used to rebuild the library's Web site. These included radical decentralization of Web content; using a combination of different technologies to allow content reuse and to create a uniform appearance across the Web site; "perpetual beta" to foster continual improvements; the ability to remix or repurpose different types of content both onto and from the library's Web site; and last but not least, establishing a rich experience for the user as a contributor.

Purpose of Survey

The survey intended to identify key issues, determine best practices, and gain valuable insights regarding the development and ongoing management of academic libraries' Web sites. Of particular interest were library Web redesigns, Web committees, usability testing, content management tools, and the methods libraries used to solicit input from both staff and users. While other surveys in the literature, such as those conducted by Connell (2008), Taylor (2000), and Kneip (2007), looked at some of these areas, no other studies specifically sought to find academic libraries' procedures for the day-to-day maintenance of their Web sites, what worked and what did not, particular content management systems used, and perceived challenges associated with Web work. Librarians' responses to the numerous open-ended survey questions yielded some of the article's most enlightening qualitative findings.

In order to canvass a broad array of perspectives, we decided to target librarians who worked with their Web sites in a technical capacity and librarians who administered reference services; this is another facet that did not seem to be in the literature. Web and

public-services librarians work together and share the goal of providing the best possible access to their collections and services through the Web site. However, since Web librarians bring technical expertise and public-services librarians are more conversant with user behavior, this confluence sometimes results in disagreement.

Methodology

We selected the following types of libraries to be included in the survey: (1) academic libraries that are members of the Association of Research Libraries; (2) Mid-American Conference institution libraries, which include our university; (3) libraries that were awarded Peer-Reviewed Instructional Materials Online (PRIMO) recognition because they were cited for outstanding Web-based initiatives; and (4) a few academic libraries that emerged in the investigators' literature review of Web development and management practices. The group of libraries selected was not intended to be a scientific sample but was designed to include an adequate variety of institutions to highlight issues and best practices.

The librarians contacted in the study fell into two categories: those responsible for coordinating the libraries' Web work and those who most closely fit the description of head of reference services. We derived the list of names primarily from the selected libraries' Web sites.

In late May 2008, we sent the survey to two people at each of the 149 libraries. However, two institutions had the same individual doing both jobs, while two other institutions had at least one of those positions unfilled, resulting in a pool of 294 individuals. We created an anonymous Web-based survey using SurveyMonkey (<http://www.surveymonkey.com>) consisting of 31 multiple-choice and open-ended questions (see Appendix A). We e-mailed an invitation, suggesting a two-week return date, then sent a reminder a fortnight later.

We received 118 responses, for a 40 percent response rate. These actually represented more than half of the institutions since there was a greater rate of response from Web personnel than reference librarians. It appears the respectable response rate reflected interest in our research topic. Over the summer, we began evaluating the collected data for patterns and best practices.

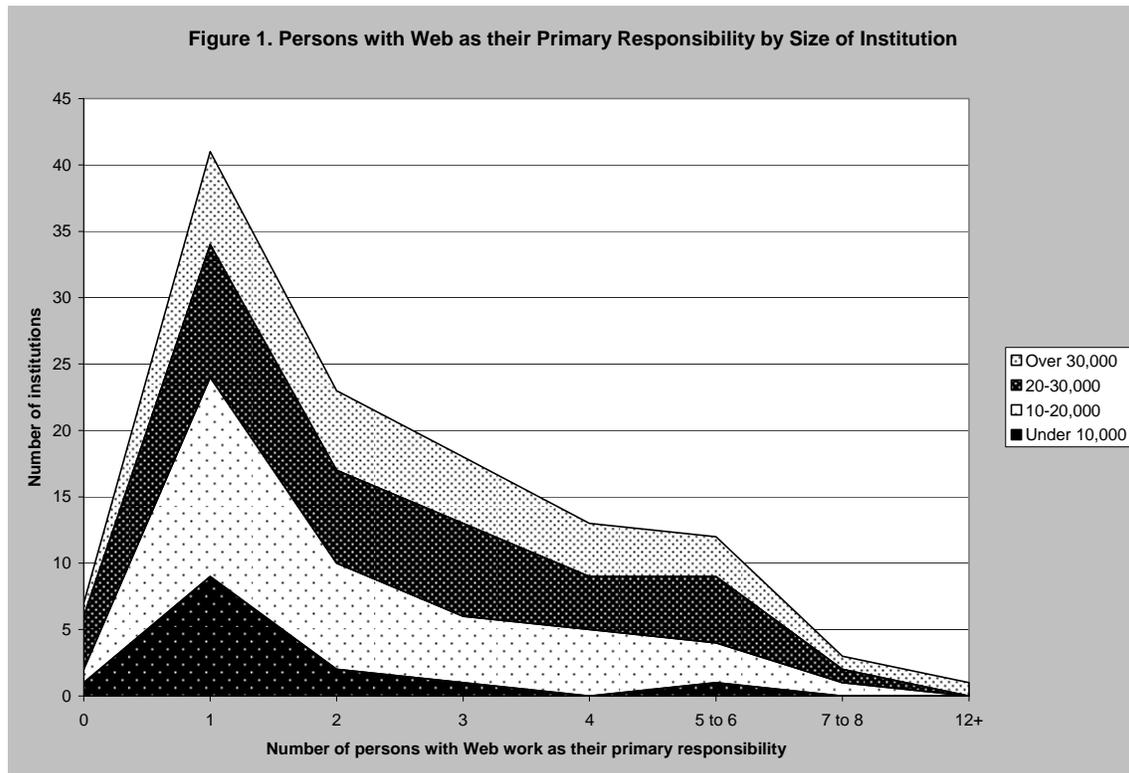
Survey Results

Institution Size

Institutions of varying sizes responded to the survey. Twelve percent were from institutions with fewer than 10,000 students, while mid-sized institutions (10,000-20,000 and 20,000-30,000 students) were each represented by 32 percent of the responses. The largest institutions, those having more than 30,000 students, provided 24 percent of the replies.

Web Workers

There was a wide range of responses to the question of the number of librarians, staff, and student employees with Web work as their primary responsibility. The answers ranged from zero, where not one employee was considered to have that primary responsibility, to twelve. Forty-one libraries reported having just one person (see Figure 1).



Some comments indicated this was not a clear-cut question since the libraries' Web sites appeared to be a shared responsibility. One person commented, "The decentralized nature of our library system allows individual units a great deal of flexibility on how many people and what percent of their jobs are tasked to Web site development and maintenance." It is interesting to note that nine respondents with institutions in the 10,000-20,000 range reported having four or more people working on the Web site. As one person stated, "[We have] four Web coordinators — two Web Librarians, a Webmaster, and a Systems librarian." It became clear in our review of the responses that some of the large institutions had numerous branches and multiple library Web sites that functioned independently, although we had not anticipated or addressed this in our survey. One librarian explained, "Just to clarify, I manage Web pages for one of the eleven libraries on our campus." It is worth noting that 27 comments made on the survey's open-ended question regarding satisfaction with the Web site development process pertained to the understaffing of library Web services. For example, responses included:

- "Need more than ½ librarian working on it!"
- "It would help to have more staff dedicated to the work. ... We could accomplish more."
- "Too few skilled people to maintain the site effectively using Web standards."
- "Our Web presence has grown, and what worked five years ago is no longer working. ... Too much for a three-person team."

The Respondents' Roles in Web Work

In response to the open-ended question, “What role do you have in the Web work done in your library?” four respondents listed supervisory roles where Web departments or teams reported to them. Many other responsibilities that were mentioned fell under what seemed to be the work of a coordinator, with 40 of the 116 respondents listing coordinating, overseeing, leading, chairing, or serving as head of Web services or project manager. Thirty-seven respondents said they were in roles that directly involved developing Web applications, mentioning they created, provided, edited, suggested, or updated content. Thirty-one respondents in this category called themselves Web developers or designers, with only nine actually referring to themselves as Webmasters. Twenty-one individuals also spoke of programming or coding functions, Web support duties, or information technology functions such as Web server administration.

Some participants described their responsibilities in a somewhat different way, using terms like “advising,” “consulting,” or “usability testing,” with one respondent offering the distinctive title “user experience architect.” A few librarians trained colleagues, and several mentioned being liaisons either between libraries in their systems or between the libraries and their institutions. Only one person mentioned assessment. Wearing all the hats at once, five individuals frankly stated they did everything or almost everything. Several pointed out a lack of clarity in these roles. One person said, “Getting less clear every year, we moved to a CMS so Web page work is out. [We are] mainly customizing and integrating different Web services these days.” Another befuddled respondent simply said, “Good question.” These remarks are in keeping with Kneip’s (2007) survey results, in which 62 percent of Webmasters queried specified having additional duties besides the Web site (11).

Web Departments and Committees

The survey contained two questions that seemed similar and may have confused respondents. The first was about having a Web department, office, or team, which could mean a group that does the daily work. The other question regarded the use of a standing Web committee that would be more of a planning and decision-making body. As expected, most respondents reported having a designated Web department, office, or team in the library. A scan of the provided descriptive titles indicated some of these appear to stand on their own, such as Web Services, while others may be part of another service area, such as Communications Office or Digital Library Services. Forty-three percent of libraries with a designated entity mentioned these terms: “team,” “group,” “committee,” or in one case “board,” suggesting the Web work was likely accomplished through a collaborative, decision-making process that often involved more than one area. It is interesting that about one-quarter of respondents indicated there were no official Web entities in their libraries.

In response to the question “Do you have a standing Web committee?” about three-quarters of respondents answered, “Yes.” Forty-seven variations on committee titles were submitted, with Web Committee, Web Advisory Group, Web Steering Committee, and Web Team appearing most often. More unusual titles included DUWOP (Design and Usability of Web Orientation for the Public), Electronic Gateway Functional Team, E-Library Governance Group, Library Web Delegates, Web Presence Improvement Team, Virtual Presence Committee, and WebPoint.

Figure 2. Size of Web Committee

N=84	Percent	Number
3 to 5	28%	24
7 to 9	42%	35
10 to 12	24%	20
13 or more	6%	5

As shown in Figure 2, the most common size range of Web committees was from seven to nine individuals. The comments demonstrated a variety of opinions. One respondent said it was advantageous for a library to use a small group of enthusiastic librarians and staff so changes could be initiated more quickly. Conversely, another individual mentioned the disadvantage of using a smaller group was “a lack of expertise in some areas that could make advancements faster and easier.” Most committees reported meeting regularly, while a few met sporadically, handling some business by e-mail. One librarian said the library committee had been dormant for some time and another lamented that a meeting had been called “exactly once in the last two years!”

Representation of different areas of the library also varied, ranging from all-inclusive to, in the words of one person, “whoever shows up.” About 60 percent of responses suggested most library departments were represented on the committees, while a quarter included *all* library departments. Sixty-five percent mentioned representation came from reference or public-services areas, sometimes in conjunction with systems or IT. This focus on public services dovetails with a participant’s comment extolling the merits of a committee with members from their library’s “front lines” to obtain valuable input for customizing Web site content for users. Only one respondent reported “student liaisons” were included on the Web committee. This is in contrast to the emphasis that Roberts (2005, 30) placed on the inclusion of students on the design or redesign team in order to tap students’ expertise and better understand their needs.

Teamwork Challenges

Although the composition of most Web groups appeared to be broadly based, one librarian remarked on the disadvantage of being “highly collaborative / consensual / collegial,” meaning it was “slower than we would like.” This may be the reasoning behind another respondent who reported his / her library was reorganizing its Web Board to include “individuals who have interface design / development / maintenance and user needs” knowledge. One person expressed the opinion that one committee was not enough and that a Web editorial committee was needed in addition to a Web usability team, while yet another library reported moving to three groups: Web site management, Web site advisory, and Web editors.

In a timely book about Web site development, Reeb (2008) made the following excellent point about the composition of Web entities:

In fact, what works best for leadership in a library’s Web presence is a cross-functional team of people with different areas of expertise who are viewed as equal contributors to the process. Librarians are not accustomed to sharing leadership with people who have an equal share of the leadership yet are not themselves librarians. (xii)

Other respondents cited problems with the operation of the Web group and the need for a truly “functional Web team.” These included difficulties when people failed to demonstrate proper protocol at meetings and respect or understanding regarding the various aspects of Web development. Other issues were a lack of clarity over mandates and specific roles of authority within the group. This supports Taylor’s (2000, 121) findings about Webmasters’ dissatisfaction with ill-defined roles and “responsibility without authority.”

Reconciling the perceived differences and perspectives between IT-oriented librarians and librarians with fewer skills in this area surfaced in a number of comments. For example, one frustrated person complained that some view Web development “without thought to consistency, design sense and Web standards ... resulting in mediocrity.” Similarly, another complained that because there was no decision-making authority for the Web site, the technical team had gained a reputation for being “difficult” because they did not implement all new suggestions without question.

Problems have led some libraries to discard a committee structure and simply put one or several people in charge of most decisions. Conversely, others are moving away from a highly centralized authority to a committee configuration for the first time, and in the words of one librarian, “We are hoping for the best.” Clearly, a number of libraries are still finding their way when it comes to the delicate balance between centralized vs. more collaborative decision making in Web development.

Regarding the composition of the Web team, Church and Felker (2005, 546) reiterated the importance of selecting the right people for the group. This requires that availability or “political considerations” need to take a back seat to choosing the right individuals who can bring the different skills necessary for the project. Burdman (1999, 32-33) outlined the core skills needed for Web development; these included project management, information design / architecture, graphic design, graphic production, content development, programming, and technology / network infrastructure. In addition, Veldof and Nackerud (2001) suggested other desirable proficiencies for Web team members were knowledge of usability and accessibility for people with disabilities (15).

In a survey of academic library Web developers, Connell (2008) indicated the most frequently reported attribute for the selection of Web team members was an interest in Web design (124-125). By the same token, Church and Felker (2005) pointed out it was easier to “train people without skills than to motivate people without interest” (548, 550). To foster success, they also recommended that accepted decision makers in the library officially establish the authority of a Web team as well as some form of accountability to encourage members to make the work a priority. The question, “Why are we here?” should be posed early on, and members should be able to have a clear vision of the reason for the team’s existence to help alleviate conflicts.

Setting Priorities

In keeping with the diverse responses in regard to responsibility for the Web site and use of committees, librarians reported a wide array of processes for setting Web development priorities. Fourteen respondents said they were unaware of any process or it was done on an ad-hoc basis. One person indicated his / her library had a procedure, but it lay dormant. Another mentioned his / her unit was struggling to put one in place. One librarian said communication between the Web department and librarians at his / her

institution was strained because each side was developing priorities independent of the other. Out of the 84 people who reported having Web committees, at least thirteen mentioned using their Web committees as a primary means of setting priorities, and another nineteen specified using the committee in conjunction with other entities such as administration, systems, department heads, Web staff, and other individuals, committees or departments. A few also acknowledged that, out of necessity, changes or new initiatives in technology often dictated priorities in their libraries.

Only two respondents mentioned users or patron feedback in priority setting. One referred to users' needs being a factor, while another talked about usability testing as "a primary driver" in the process. Manning (2002) described the importance of building "customer obsession" into the Web development process vs. the traditional Web team working "in a bubble" (37). Considering ways of incorporating this principle might provide assistance to libraries that seem to be struggling with the priority-setting process.

Authoring Content

Figure 3. Web Content Authoring

N= 112, could give more than one answer		
	Percent	Number
Subject librarians	95%	106
Library departments	78%	87
Web master/librarian	79%	89
Other	28%	31

It appears that just about everyone has a say in authoring Web site content, but it is handled mostly by subject librarians, Web librarians, and individual library departments (see Figure 3). Nearly two-thirds of those surveyed indicated all three groups were involved. Respondents who chose "other" for this question described various scenarios, including library administration, library paraprofessionals, and IT staff. Somewhat surprisingly, several schools reported student assistants penned Web content.

When asked about the process of suggesting changes to the libraries' Web sites, there was a wide variety of answers, but several patterns emerged. Of the 110 responses to this question, about a third specifically mentioned communication through a Web committee / group / team. Contacting the Webmaster was mentioned in about a quarter of the answers. In some instances, suggestions for small modifications were given to the Webmaster, and more complicated changes were sent to committees for discussion. A small number reported submitting ideas directly to the individual Web page authors or to departmental Web editors. However, one person reported suggestions were simply given to "whoever is vocal and willing to actually do the work."

The methods of communication described by the respondents ranged from casual to fairly official. About one-quarter of responses used the word "informal" or reported that one could simply send an e-mail to the Webmaster or Web committee with suggestions. Several in this group referred to casual scenarios such as "chatting in the hall," with one Webmaster indicating, "Somebody asks me, and if there's no compelling

reason not to, I do it.” At least two respondents mentioned changes resulting from patron input received at public-service desks or collected during usability testing.

Other people mentioned forms as a mechanism for librarians, staff, and patrons to submit requests in more structured settings, resulting in the creation of tickets that officially put the suggestions in a queue for further review. It was interesting that some libraries used departmental delegates who communicated with the Web decision-making authority. Before being passed on for consideration, proposals for changes were first given to the librarians. Several libraries reported an interesting variation in which suggestions were submitted to the library director for approval before they would be considered.

Comments throughout the survey suggested that authoring content can be particularly challenging and was not always handled consistently. For example, one person remarked, “Our Web is a product of the working group. Actual authoring? I would say that a quarter of it gets combed to death by the committee, and the rest slips in on the sidelines.” Another librarian observed, “We need better control over what we have; [there are] many orphan pages or those that need updating,” while one overwhelmed respondent commented, “Have a hard time keeping ... content current. We have research guides that haven’t been updated since 2000.”

Coombs (2007) partially addressed this issue by recognizing that a system where content must be passed through a Web services department could result in a lengthy updating process with substantial portions of the libraries’ Web sites becoming outdated. She suggested a decentralized process where ownership of content was distributed — any staff member could make changes to a page if they saw a problem. Changes then would need to be approved by the page owner before they could go live, reflecting a wiki-like approach to Web development (17). This model might well serve library users who would benefit from quick changes and enhancements to the site.

Soliciting Input

Libraries reported a diverse range of methods for actively soliciting suggestions for their Web sites, including e-mail queries and all-staff, faculty, and town hall meetings. One respondent reported in detail, “I send out minutes of meetings to all staff and encourage feedback. We have monthly meetings of departmental Web editors. Occasional library-wide meetings. Monthly meetings of the Web advisory group, which represents many departments and interests.” Another librarian mentioned having “just conducted a ‘Redesign the Library Homepage’ workshop for staff and faculty in the library.”

Quite a few libraries also employed online surveys, blogs, library newsletters, brown-bag lunches, listservs, library intranets, focus groups, and usability testing to help make decisions on ways to improve their sites. And then, of course, there were instances of more informal methods such as water-cooler discussions and our favorite: the “squeaky-wheel method” of providing input. A handful of librarians responded that input for the Web site was not solicited at their institutions.

Outsourcing

When asked if Web site assistance was sought outside the library, the responses were virtually split down the middle. The Web librarians were probably more aware of

outsourcing and replied with more affirmative responses. Most received assistance within their institutions, for example, from campus IT, Web, graphic design, communications, and marketing departments. About one-third of the “outside help” group indicated they used consultants or Web companies. One librarian stated his / her library had tried external companies, but they were unable to meet the library’s needs. Another cited the good fortune of being able to employ a professional Web designer as well as communications and IT staff, so the work could be kept in-house.

Figure 4. External Assistance with Web Site

N=51, could give more than one answer		
	Percent	Number
Graphic design	65%	33
Technical support, programming	33%	17
Server, networking support	31%	16
Other	24%	12
Information design	20%	10
Redesigned whole site	10%	5
Content	4%	2

Figure 4 shows graphic design was the primary outsourced service used by the libraries. Others received technical, programming, server, or networking support; help with information design; assistance with usability testing; aid with the entire site redesign; and help with content. Some libraries had templates designed; others had support with specific issues like proxy servers and accessibility guidelines. Not all were satisfied with outsourced services, citing issues such as delays and misunderstandings about library needs.

Content Management Systems (CMS)

It is intriguing that only a little more than half of those surveyed reported using a CMS. Differences showed up between Web and reference librarians responding to the survey, where eight of the latter did not know if a CMS was used. When reviewing the diverse systems mentioned, it is obvious that people defined CMS very broadly. Participants mentioned digital collection tools like CONTENTdm, DigiTool, and DSpace; tools for creating guides and sharing library content like LibData and LibGuides; course management tools such as Moodle; and tools for specific social-networking applications like blogs (WordPress) and wikis (MediaWiki). Others mentioned Web analytics, programming tools, or other software that in some way helped them manage content, although these are not technically considered CMSs. Drupal was the most popular program with fifteen mentions. Eleven librarians reported using homegrown systems; five used Contribute; four used Cascade Server; three used LibGuides, Vignette, and WordPress; two employed CONTENTdm and Plone; and a few mentioned using the university-wide CMS. The following programs were mentioned once: Cold Fusion, CommonSpot, Day Communiqué, DigiTool, DSpace, Ektron, Ingeniux, LibData, MediaWiki, MetaLib, Moodle, Omniture Publish, OmniUpdate, Open

CMS, Oracle, Percussion, Red Hat, Rhythmyx, Sitellite, Stellent, Teamsite, WebGUI, and WebSideStory (see Appendix B). This lengthy list demonstrates the wide array of CMS products that are available and being used by libraries.

Of those who used a CMS, more than three-quarters used it to manage Web pages, about one-half employed it for managing databases and guides, more than one-third implemented it for the staff directory, and more than one-quarter used it for all three purposes. Some librarians reported using their CMS for internal staff intranets, blogs, news applications, statistics, digital repositories, and electronic journal and image collections. At least six institutions were looking at CMSs, and many comments in other areas of the survey mentioned that a good CMS would make their lives easier.

Web Site Redesign

In response to the question, “How often has your library Web site been redesigned in the last ten years?” 38 percent indicated it had been done twice, and about 20 percent each reported one and three redesigns. More than one-quarter of respondents considered themselves to be constantly upgrading in addition to doing periodic redesigns. One person observed, “We are clearly heading for a process of continual assessment, tweaking, redesign, and flat-out playing with open source and new applications.” Another remarked, “We are now in a perpetual state of beta.” Several librarians referred to their redesigns as “face lifts.” This is perhaps a more accurate term for what many libraries are doing, as much of the original work in creating and testing pages has already occurred, and new enhancements may be less all-encompassing.

Librarians mentioned Web committees, Web departments, and special task forces were responsible for their libraries’ latest Web site redesigns. Some relied heavily on university-dictated formats, and one library simply used its director and the university Webmaster for the redesign.

Two respondents mentioned incorporating users into the redesign process, with one stating, “Our Web content and design are informed by our primary audience, which is undergraduate and graduate students. We hold focus groups at each phase — concept, design, [and] implementation to make sure we are meeting our users’ needs. We learned that what librarians THINK students want in a Web site and what students actually want are very different.” Similarly, the second individual remarked, “The last redesign was done in conjunction with a usability project. ... We should do it more often.” This practice upholds Liu’s (2008, 14) recommendation for academic library Web site design that advocates user focus, user engagement, and being responsive to users’ changing needs, and Coombs’ (2007, 18-19) principles of library Web site development that include the user as “contributor” to the site through Web 2.0 features.

Engaging the User

There has been considerable research conducted on library Web site usability testing in the library literature. We felt the need to include a few questions about testing to see what the targeted libraries were doing. Seventy-five percent of respondents reported they conducted usability testing, while 25 percent did not. Usability testing was most frequently carried out by the Webmaster, Web team, and / or Web committee, so it was not surprising that Web librarians were the most likely to say usability testing was

being done. In some cases, people mentioned a special usability task force or individuals with titles such as “usability and assessment librarian” and “user experience librarian.”

When asked what usability testing methods were favored, 89 percent replied with set tasks, followed by focus groups, surveys, card sorting, paper prototypes, and other techniques. At least six institutions tried to record combinations of keyboard, mouse, and eye movements, audio responses, and screen images of searching. Several librarians said they used Morae and Camtasia software, while others listed tools such as blogs, workshops, WebTrends, statistical analyses, natural behavior observation, and Google Analytics. A few librarians commented there was a need to do usability testing or were concerned that current testing efforts were inadequate.

Figure 5. Frequency of Web Usability Testing

N=87		
	Percent	Number
Continually	15%	13
Few times a year	23%	20
Annually	13%	11
Rarely	24%	21
Never	25%	22

Figure 5 reveals the frequency of usability testing ranged from continually to not at all. Some respondents indicated testing was done for a specific project, new tool, or major enhancement. Other comments reflected the opinion that usability testing should be conducted more often. For example, one individual stated, “We plan to start to do so on a more regular basis now that we have a dedicated ‘Web team.’”

After incorporating user feedback into the development process, libraries need to communicate Web site changes to the entire campus. Nearly three-quarters of respondents employed an announcement on the library Web site to get the initial word out. Just less than one-half reported using campus e-mail announcements, and campus news and newsletters were used by about one-fourth each. Several libraries asked library liaisons to convey news to academic departments or employed communication tools such as RSS feeds. Engel and Robbins (2003) described an additional strategy in which library administrators made presentations to key academic groups such as library committees, student government leaders, and the libraries’ student advisory committees (168).

Web 2.0

We wondered how many library Web sites incorporated Web 2.0 features to connect with library users. Eighty-four percent of participants stated they used instant messaging, 78 percent had an online suggestion box, and 61 percent used blogs. Some libraries allowed site customization, as in My Library, and others used wikis where users could participate. Four librarians said they used LibGuides, which offers various interactive features. Other opportunities for user interaction included online room reservations; Primo, for My Bookshelf functions; Skype, which enables video telephone calls over the Internet; surveys; tagging; a virtual tour; and widgets for Facebook and

Google. Many comments were about recognizing the *need* for these types of features, and a number of librarians mentioned they planned to incorporate Web 2.0 functionality — for example, one was testing software for a campus-wide digital memory scrapbook. Not surprisingly, several people mentioned librarians and / or members of the Web team were resistant to Web 2.0.

Is It Working?

Survey questions regarding how well the structure for Web site maintenance works and the libraries' biggest challenges in managing the Web sites were found to be interrelated, and responses dovetailed with comments made in other parts of the survey. When asked how well the structure worked, about 60 percent of participants said the response "works OK," 23 percent selected "very well," and 17 percent reported "not very well."

Figure 6. How Well Does the Process Work?

N=113	Web librarians		Reference librarians	
	Percent	Number	Percent	Number
Very well	28%	20	15%	6
Works OK	61%	44	59%	24
Not very well	11%	8	27%	11

A significant difference between Web and reference librarians was most evident in the feedback from the "how well is it working" question. As shown in Figure 6, 28 percent of Web librarians thought the structure worked "very well," while only 15 percent of the reference librarians thought so. Of the reference librarians, 27 percent thought the structure was *not* working very well, while only 11 percent of Web librarians agreed. The "works OK" group was roughly the same for both sets of librarians.

Most of the observations in the "not very well" category dealt with managing content issues and the need for a new or improved CMS. For example, one participant glumly wrote, "We're trapped in a god-awful campus-wide CMS design [that was] meant for static, hardly ever touched pages. Until we get out of the CMS, I don't want to do a redesign [or] usability testing." In the "biggest challenge" responses, eleven comments related to being confined to using campus Web templates — or in the words of one participant, "figuring out how to develop content effectively while adhering to University templates." Other statements referred to authority and decision-making issues, such as the need for "an active group with defined oversight," and problems when the "reporting line is unclear." A few remarks spoke of differing opinions, turf struggles, or a lack of communication.

One in four librarians mentioned human-resources concerns. Most alluded to a lack of necessary staffing, but a few specifically mentioned difficulties with the high turnover of programmers, the staff-at-large not having the technical skills needed to work with Web pages, a need for staff development, and the librarians' inabilities to keep up with new technology because of time constraints.

A shortage of time and motivation, general inertia, and resistance to change on the part of content authors were challenges that emerged in a distributed work environment.

In fact, one person indicated that participation in this regard would soon be tied to performance reviews in an attempt to improve the quality of Web content. A contrary problem in a distributed environment was that Web pages might lack cohesion and be less user-oriented. One individual said when Web pages were designed to please many individuals, the end result was “a tool that is very cumbersome and hard to use” and tended to heavily repeat content across the site. Another participant bemoaned the tendency toward text-intense pages because they were not attractive to users who were “much more visual and more playful.”

Remarks in the “works OK” group indicated improvements had been made in the development process and work was more or less getting done, even though there was definite room for improvement. Again, a CMS that functioned reasonably well seemed to be a basic requirement for things working smoothly. Even when a distributed model of Web editing seemed to be serving its purpose, respondents reported imperfect results. Librarians mentioned concerns such as uneven quality across library Web pages and a lack of user focus, which resulted in pages being text heavy and slanted toward staff needs. Comments made by this group again reinforced the need for adequate staffing levels and development. For example, one library wished it could employ an in-house graphic designer. The need for continuous training was reiterated, and as one person commented, “People forget how to do things when they only update their department pages every six months!”

Of great interest were the comments made by those who indicated things were working “very well.” Highlights included a statement made by a particularly satisfied participant who reported success using style sheets, resulting in “uniformly well-organized” and easy-to-update Web pages. Others expressed satisfaction with their libraries’ CMS. Addressing the practice of project management, a respondent expressed contentment with a system that “works well because people can always see timelines and milestones for projects by viewing the design plan.” On the topic of communication and top-down support, one librarian remarked, “The Systems Web Team gets good input from the faculty and staff. We have a talented, dedicated team of developers, and the management provides excellent support for our work.” Another person responded, “We get many compliments on the site and few complaints. The marketing and IT departments appreciate how we’ve structured ourselves because it makes their work easier as well.” One participant observed that when a system for Web development in the library reached the point of consistent functionality, plans could be made to move to the next step — initiating more Web 2.0 features.

Conclusion

The purpose of this survey was to ascertain key issues and challenges involved with the development and maintenance of library Web sites as perceived by Web developers and public-services librarians in academic libraries. A number of themes emerged in the results of the survey, beginning with library management. Administrative support at the upper levels is fundamental to success as indicated by those participants expressing a high degree of satisfaction with their Web site processes. Not surprisingly, inadequate staffing is another significant issue that surfaced.

A content management system, which allows for the editing of pages across the library to distribute the ever-increasing amount of work, raises additional issues. Many

respondents alluded to the presence of a CMS as a quality-of-life issue in their work and as a basic requirement for Web site success, reasonable workflow, and the implementation or expansion of Web 2.0 features. Along these lines, however, quite a few librarians commented on the inadequacies and constraints of their institutions' CMS.

Another issue that arose pertained to working within the constraints of a distributed work environment. Respondents commonly reported the use of collaborative groups to steer Web site policy and development. However, creating the right blend of knowledge, skills, motivation, and representation across the libraries in a Web-group membership of can be quite tricky. Librarians mentioned obstacles such as overcoming participants' adherence to "legacy practices"; inconsistent staff-oriented, rather than user-centered, pages; and a lack of authoring participation altogether. Different perspectives between public-services librarians vs. librarians and staff whose primary responsibilities involved Web and technology work emerged as another challenge. This is a sensitive issue that librarians tend to shy away from, but it would make for an edifying future study.

Librarians noted the time it takes to involve others in decision making as a downside to collaboration, however valuable diverse opinions may be. Although some libraries reported gravitating toward a group model, others indicated moving away from unsuccessful attempts at committee decision making in favor of a more centralized management process. The overall findings of this survey indicate the use of committees or teams, in itself, is not a guarantee for smooth Web operation. A group development model, as well as individual authoring, needs to be carefully considered in conjunction with a central decision-making authority. It may be beneficial for libraries to have a division of responsibilities to manage small and large changes to their Web sites.

The perpetually evolving nature of the Web and Web-related work is another theme that emerged. Periodically engaging in major redesigns may be counterproductive as a means of improvement, as opposed to continually making enhancements. More than one respondent indicated that in the near future their responses to the survey would probably be different given the ever-changing nature of the work involved. Some expressed the opinion that this survey was timely and were eager to see its results because there are no concrete standards for this area.

The authors did not feel any major questions were left unasked but would like to see how these libraries are doing five years from now, as more institutions begin to implement CMSs, expand their interactive Web 2.0 features, and move toward either centralized or distributed decision making. It would be especially interesting to explore in depth the practices of libraries who believe their Web process is successful. Academic libraries today are still experimenting to find the right balance to manage their Web sites by deftly weaving together the sometimes tangled threads of user and librarian needs.

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Appendix A: Library Web Site Development and Management Survey

Introduction

This survey is designed to identify current practices regarding the development and management of academic library Web sites.

1. How many students are enrolled in your institution?
2. How many professional librarians in your library?
3. Do you have a designated Web department, office or team in the library?
4. How many people have the library Web site as their primary responsibility?
5. Which of the following most closely matches your primary responsibilities?
6. What role do you have in the Web work done in your library?

Library Web site redesign

7. Has your library created a mission statement for your Web site?
8. In what years have you done a major redesign of your library Web site?
9. Who was responsible for the most recent redesign?

Library Web site maintenance

10. Do you have a standing Web committee?
11. How many people are on it?
12. What areas of the library are represented?
13. How often do they meet?
14. Who authors the content of your web pages?
15. How are priorities set for Web development in your library?
16. What is the process for suggesting a change in the library Web site?
17. How is editing and quality of the content from page to page addressed?

Usability

18. Does your library conduct usability testing of the Web site?
19. If yes, who is responsible for usability testing?
20. What types of usability testing do you use?
21. How often do you do usability testing?

Tools and outside help

22. Do you use a content management system (CMS)?
23. If yes, what do you use it for?
24. Have you obtained any help with the Web site from outside the library?
25. If yes, what have they done for you?

Other issues

26. How is library wide input solicited for the Web site?
27. How do you communicate Web site changes to the academic community?
28. How actively are you involving users in your site (Web 2.0)?
29. How well does your process or structure for Web site development and maintenance work for your library?
30. What is your library's biggest challenge in managing your Web site?
31. Any other insights you would like to share with us?

Appendix B: Software List

Includes parent companies and URLs for all software tools mentioned in this article.

- Camtasia — Softwarecasa, <http://www.softwarecasa.com/camtasia-studio.html>
Creates tutorials, demos, courses, and online videos
- Cascade Server — Hannon Hill, <http://www.hannonhill.com/products/cascade-server/index.html> - Web content management
- Cold Fusion — Adobe, <http://www.adobe.com/products/coldfusion/>
Application server and software language used for Internet applications
- CommonSpot — Paperthin, <http://www.paperthin.com/>
Web content management
- CONTENTdm — OCLC, <http://www.contentdm.com/>
Digital content management
- Contribute — Adobe, <http://www.adobe.com/products/contribute/>
Web content management
- Day Communiqué - Day Software, <http://www.day.com>
Now CQ WCM - Web content management
- DigiTool — ExLibris, <http://www.exlibrisgroup.com/category/DigiToolOverview>
Digital content management
- Drupal — open source, <http://drupal.org/>
Content management system and social networking
- DSpace — open source (DSpace Foundation begun at MIT), <http://www.dspace.org>
Digital content management
- Ektron — Ektron, <http://www.ektron.com/>
Web content management, portals, social networking
- Google Analytics — Google, <http://www.google.com/analytics/>
Web analytics
- Ingeniux — Ingeniux Corp., <http://www.ingeniux.com/>
Web content management
- LibData — open source on SourceForge, <http://libdata.sourceforge.net/>
Authoring environment for research guides and other pages for libraries
- LibGuides — Springshare, <http://www.springshare.com/libguides/>
Library knowledge sharing system for guides and social networking
- MediaWiki — open source, <http://www.mediawiki.org/wiki/MediaWiki>
Wiki software
- MetaLib — ExLibris, <http://www.exlibrisgroup.com/category/MetaLibOverview>
Federated searching tool
- Moodle — open source, <http://moodle.org/>
Course management system
- Morae — Softwarecasa, <http://www.softwarecasa.com/>
Usability software
- My Library — open source, variations used in various libraries, the one at Notre Dame is at <http://mylibrary.library.nd.edu/>

Omniture Publish — Omniture,
<http://www.omniture.com/en/products/conversion/publish>
Web content management

OmniUpdate — OmniUpdate, Inc., <http://omniupdate.com/>
Content management system, social networking

Open CMS - Alkacon Software, <http://www.opencms.org/en/>
Web content management

Oracle — Oracle, <http://www.oracle.com/>
Integrated collection of tools specializing in database management, but includes many other applications

Percussion — Percussion Software, <http://www.percussion.com/>
Content management system, interactivity

Plone — open source (Plone Foundation) <http://plone.org/>
Content management system

Primo — ExLibris, <http://www.exlibrisgroup.com/category/PrimoOverview>
Federated searching tool

Red Hat - Red Hat, Inc., <http://www.redhat.com/about/>
Provides Linux open source technology

Rhythmyx — renamed Percussion CM System by Percussion Software,
<http://www.percussion.com/> - see above

Sitellite CMS — Simian Systems, <http://www.sitellite.org/>
Content management system

Skype — Skype Ltd., <http://www.skype.com/>
Free calls, video calls and instant messaging over the Internet.

Stellent — Oracle, <http://www.oracle.com/stellent/index.html>
Content management system; part of the Oracle system

SurveyMonkey — SurveyMonkey, <http://www.surveymonkey.com/>
Online survey tool

Teamsite — Interwoven
<http://www.interwoven.com/components/page.jsp?topic=PRODUCT::TEAMSITE>
E — Content management system

Vignette — Vignette Corp., www.vignette.com
Content and document management system

WebGUI - Plain Black Corporation, <http://www.webgui.org/>
Content management system

WebTrends — WebTrends Inc., <http://www.webtrends.com/>
Web analytics software

WebSideStory — acquired by Omniture in 2007, <http://search.omniture.com/>
Web analytics

WordPress - Open source (WordPress) <http://wordpress.org/>
Blog publishing