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What a User Wants: Redesigning a Library's Web Site Based on a Card-Sort Analysis

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Published on: 01 Dec 2007 - [Journal of Web Librarianship](#) (Taylor & Francis Group)

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10-12-2008

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Laura Pope Robbins, Lisa Esposito, Chris Kretz & Michael Aloï (2007) What a User Wants: Redesigning a Library's Web Site Based on a Card-Sort Analysis, *Journal of Web Librarianship*, 1:4, 3-27, DOI: 10.1080/19322900802111346

This is an Accepted Manuscript of an article published by Taylor & Francis Group in *Journal of Web Librarianship* on 12/10/2008, available online: <https://www.tandfonline.com/doi/abs/10.1080/19322900802111346>.

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What a User Wants: Redesigning a Library's Web Site Based on a Card-Sort Analysis

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Keywords:

Usability studies

Card sorting

Task-based testing

Web site redesign

Library users

User feedback

Abstract:

Web site usability concerns anyone with a web site to maintain. Libraries, however, are often the biggest offenders in terms of usability. In our efforts to provide users with everything they need to do research, we often overwhelm them with sites that are confusing in structure, difficult to navigate, and weighed down with jargon. Dowling College Library recently completed a redesign of its web site based upon the concept of usability. For smaller libraries in particular, this can be a challenge. The web site is often maintained by one or two people and finding the time and resources to conduct a usability study is difficult in that situation. Additional demands of a site redesign, from restructuring page layouts to adding visual appeal, only add to the burden. However, our team of four librarians was able to do it. We focused on vocabulary and organizational structure using a card-sort analysis. This analysis taught us how our users approach the information on our site. Task-based testing confirmed what the card-sort analysis had taught us and smoothed out design problems. Incorporating user feedback at nearly every stage of the process allowed us to create a site that more closely mirrors how our users look for information on our site. This study details how using testing and analyzing results throughout the redesign process created a better, more user-friendly web site.

The redesign of an academic library's web site is not to be undertaken lightly. As the web has become an essential and integral component of a library's operation, as well as its sole presence in the lives of many of its users, the steps taken towards any changes should be carefully considered. To that end, usability testing has become a common practice in library web site redesigns. Soliciting user feedback in the form of surveys, focus groups, and task-based analysis has proven a valuable method of ensuring that any redesign will reflect the needs and thought processes of the end user.

However, the task is even more daunting when the redesign includes every aspect of the existing site: from layout to navigational structure to written content. When considering a project on this scale, the inclusion of a card sort analysis has been shown to provide a valuable basis for rearranging materials across an entire site to bring it more in line with the user's expectations.

In this case study, we will document how a team of four librarians at a small private college undertook a complete redesign of its web site, including a comprehensive look at the role the card sort analysis played in the process. By documenting the steps taken, the lessons learned, and the design changes that resulted, we hope to show how this type of usability testing can be incorporated into a redesign by a small committee using only internal resources and skills.

Battleson, Booth, and Weintrop trace the development of usability testing back to the field of software design and the need to design computer interfaces that allow users to do what they need to do.¹ Applied to academic library web sites, usability testing is conducted to evaluate how well a site supports the information and research needs of its main users. Studies have focused on assessing the usability of library sites to support specific tasks such as finding articles,² specific elements of a library home page³ and overall student awareness of library resources.⁴ One of the most frequently used

testing methods is task-based analysis in which users are observed as they perform a variety of common library-related tasks online while verbalizing their thought processes through "think aloud protocols." Watching and recording users' reactions to a redesigned site can provide valuable feedback on what has worked and what has not.⁵

At the beginning of a redesign process, initial data on a site's weaknesses and on user perceptions of a site is often gathered through the use of online surveys.⁶ Faiks and Hyland showed the usefulness of using a card sort analysis to gain user perspective on how an existing page's content should be organized.⁷ Librarians at the University of Nevada, Las Vegas used a card sort, along with surveys and usability testing, to discover problems with terminology and determine the basic structure of their site.⁸ Similarly, the University of Washington Libraries incorporated card sort analysis in their web site redesign undertaken in 2003.⁹

In contrast to some of these large institutional libraries, Dowling College Library serves a population of about 7,000 students in a small liberal arts college on the south shore of Long Island in New York. Dowling College specializes in aviation, business, and education and offers degrees at both the undergraduate and graduate levels.

The library web site was established in 1997/1998 and was initially redesigned in 2002/2003. At that time, the Library's Web Coordinator worked with a team of co-workers on the redesign and then conducted usability testing, which consisted of task-based analysis, before launching the new site. Content on the site was spread across six color-coded sections: About Us, Catalog, Databases, Services, Web Sites, and What's New. The layout of the home page was a unique design of linked boxes most like a circuit diagram or a subway map. (INSERT FIGURE 1) The usability testing showed that users needed a little time to get used to the new design before successfully navigating the site. However, they

were able to complete the tasks given to them in the allotted time. Therefore, it was felt that the design was usable, and we went forward with it.

Common web design practice dictates that a home page should be redesigned about every three years; it helps to keep users interested and encourages them to return often. Dowling College completed a redesign of its site in 2006, and the current library web committee believed that it was time for the library's site to be updated as well. The years had revealed several problems with the site that needed to be addressed.

The majority of the problems were related to usability. The library's home page was an 800x600 image map designed by an outside consultant that was hosted on a different server from the rest of the site. Because of the complexity of the image and knowing that there were several visually-impaired students on campus, we also opted to have a text-only version of the home page. This meant that changes to the home page had to be made in two different files that were kept on two different servers. Also, because the home page was an image, the image had to be edited any time we wanted to add or remove an area, which acted as a deterrent to making any changes.

Student comments and complaints revealed that many users had difficulty navigating the site. Navigation was not transparent, resources were not always where researchers expected them to be, and we did not have a site map or a way to search our site. For example, the Special Collections page was located via the Catalog section of the web site. While a user could use the catalog to find items in Special Collections, it was not logical to expect the Collection's hours of availability to be found in the Catalog section. In addition, the site used many in-page links. The majority of users expect to go to another page when they click a link. When it simply jumps them down the page, they get frustrated.

Terminology was also a problem. As librarians, we have a specialized vocabulary that describes

our profession and what we do, and we tend to use that vocabulary extensively on our web sites. We found this library jargon impeded our users in the use of the site. For example, there was a Databases section on the site, but students were unable to identify it as a place to go to find articles. Similarly, they did not recognize the catalog as a place to find books, videos, or DVDs.

Finally, we determined that our pages were simply too long. Academics tend to be verbose, and this can be a problem. Nielsen has stated that only 46% of highly experienced users will scroll. And then, only 1.3 screenfuls are scrolled.¹⁰ This means that people prefer to see what they need immediately, and if they do not, they leave. Similar to newspapers, important items must be "above the fold."

Therefore, we decided it was time to redesign, and this time we wanted to involve our users throughout the redesign process. After all, "testing one user early in the project is better than testing 50 near the end."¹¹ Krug notes that early and frequent testing will reveal problems before they have become too far embedded in the site to change, provide a fresh perspective, and guide the developer's judgment so that change can be implemented wisely.

Methodology

We used a four-step process to redesign the library's web site. The first step was to post a brief online survey on the existing web site. Users were asked questions that were related to relevant redesign issues such as content, navigation, and appearance. The second step was to invite users to perform a card sort analysis using individual terms from both the existing site and the planned future site. This process helped to structure the new site by letting users group and relate topics themselves. The third step used the results of the card sort experiments to devise a pattern for prototyping the new web site. The final step had users participate in a task-based analysis of the new web site using

preplanned questions. Except for the actual prototyping of the new site, all of the steps in the process directly involved our users.

Step 1 - The Web Site Survey

The web site survey provided immediate feedback from our most vocal users on important issues. The survey was brief and easy to complete; it only had eleven questions, and eight of the eleven were closed-ended, requiring only an effort to "check the box." The remaining three questions were open-ended and extremely broad; those who wanted to type narrative responses could do so and were not restricted in the topics about which they could opine. (Appendix 1)

While many comments received from the survey were anticipated, some were also enlightening and provided a focus to help design future testing criteria. In response to the open-ended question "What can we do to improve the site?" the following two statements were of note:

"There is too much clicking to do to get to where you want to go, and the colored boxes structure is not really welcoming or easy to figure out." From the library's perspective, the colored boxes were created to help compartmentalize resources into related groups. However, the comment indicated that if one did not understand how the resources within the compartments were related, the color-coding was a useless enhancement.

"Perhaps a less scattered layout on the homepage." While the starburst pattern was eye-catching, this user indicated that the location of links on the home page should be more obvious and more in line with what pages on the rest of the World Wide Web look like.

In response to "General Comments," one user said:

"If the librarian hadn't shown me how to navigate, I'm not sure I would have figured it out. Whenever I

go to the library page, I don't really feel I'm at a college library. The colored boxes don't really look right..." This user expected something more professional from a college library. The home page needed to be more in line with what users expected from our type of institution.

Recruiting Participants

After obtaining approval from the Institutional Review Board (IRB), a multi-pronged advertising campaign was started to recruit students, faculty, staff, and administrators to participate in the redesign project.

First, a request for volunteers was included in the web site survey. We figured those interested enough to provide feedback on the library's web site would be interested in further participating in redesigning the site.

Next, fliers were placed in the library and around campus. Related bookmarks were created, which were placed in books at the circulation desk. (INSERT FIGURE 2) The library's monthly column in the student newspaper was also used to describe the redesign process and solicit help from the campus community.

These efforts yielded fifteen participants for the card sort (three staff members, five faculty, and seven students) and five participants (one staff member and four students) for the task-based testing. Each participant was given a gift card for a free lunch in the cafeteria as a "thank you."

Card Sort Analysis

Card sorts explore vocabulary and usage of terms. They identify participants' mental model or thought process so that the structure of the new site will match how users search for information. Ultimately, this increases findability: the ability to easily, quickly, comfortably, and successfully locate

what is needed on the web site. It is important to remember that not all library users are librarians. It is necessary to determine what vocabulary and organizational structure works for the users of the site.

The goal of a card sort analysis is multifaceted. It begins with the basic redefinition of the web site vocabulary by locating the terms with which the user is most familiar. Using the users' own terminology gives the site "scent,"¹² a characteristic that automatically draws the user to the correct place for what is needed. A sort can be either open-ended, where the user has complete discretion to create the categories, or closed, where the user is given category headings and must use those headings to group the terms. Our card sorts were open-ended, as it was deemed important to be flexible with the categories themselves, not just with the terminology. Either way, the results can be surprising, as what the user is thinking will not necessarily be obvious to the librarian. The categories place terms in the layout of the new site, leading to the ultimate goal of persistent navigation, enabling users to easily move between pages on the site.

The card sort exercise was chosen for several important reasons. It was inexpensive (requiring very few materials), it was fairly quick (thus participants were not turned off by a lengthy time investment), and it directly involved the end users of the library's web site. We performed fifteen card sorts. Fifteen sorts will, according to Nielsen, result in a 90% correlation.¹³ More than fifteen gives diminishing results, while less will only give about a 75% correlation. The combination of results from all of the card sorts ultimately suggested a new site structure.

Defining the Vocabulary

Terms for the card sort were based upon a content analysis of the original and planned future web sites. In selecting terms, it is necessary to determine a level of granularity (how specific the terminology should be). We chose to use a narrow or very specific grain, creating cards with individual

terms from all over the site, such as "ID Cards" or "Catalog." A broader grain, such as by type of library service, would not be very meaningful to our users. Once the granularity was determined, terms were included from the original web site, which were to be carried over to the new site, as well as new terms describing future services, to encompass both what was currently on the site and allow the site to grow.

When creating terms for the cards, the following factors were kept in mind:

- Consistency. Length of the terms and how detailed they were.
- Representation. Content and topics from all areas of the site (It can be surprising what users might choose to group together).
- Ability to group terms. Enough cards that users do not struggle to create groups. Terms should not be so "few and far between" that they could all be considered unrelated.
- Uniqueness. A card should represent one thing or concept. For example, a "Find Information" card would be too broad, encompassing too many possible things to be of much use in a card sort. A card labeled just "Catalog" would be better.

Creating the Cards

Once the vocabulary was defined and the group of terms selected, each term was typed on a label and affixed to the front side of an index card. The front side of the index card showed only the term. A brief explanation of the term was included on the back of each card. During the sort, participants were permitted to ask for a definition of a term and having the explanation readily available provided a consistent definition. The cards were also numbered sequentially in alphabetical order on the backs. The numbers helped with documenting the results of the card sort quickly, and keeping them in alphabetical order streamlined the data entry.

Performing a Card Sort

The total time of a sort can vary depending on the participant and the number of total cards to be sorted. Our card sorts involved sixty-eight cards and took approximately 30-45 minutes to complete.

Each card sort took place in an isolated, quiet place where the participant could work undisturbed, with sufficient table space to spread the cards out. Participants were asked to think out loud while sorting the cards into groups of related terms and an observer took notes during the sort. Any questions participants asked were documented because they identified problem vocabulary. In these cases, participants were asked to suggest new names for terms with which they had difficulty. Post-it notes were then used to attach the "new" terms to the cards. In addition, participants were allowed to include a term in two separate groups by providing blank index cards to make duplicates.

When all of the cards were sorted, participants were asked to provide a category name for each group; they had the flexibility to make the name as descriptive as necessary. Participants were then asked to decide which groups were related and which groups were the most important.

Creating a Standardized Vocabulary

Once the results of each card sort were recorded, the standardized vocabulary could be created. This new vocabulary would dictate overall categories of materials on our site as well as change areas that had given users problems. While compiling the results showed many similarities between participants' responses, indicating that the experiment had been successful, it was still difficult to create the standardized vocabulary.

Since participants were allowed to name their own categories, we began our analysis by compiling an alphabetical list. The next step was to look for similar categories and combine them. In some cases, categories were obvious, such as "Course Resources/Guides/Information," which had been suggested by seven of our participants. Next, synonymous categories were sought, such as "Citation

Center," "Someone Doing a Paper Would Need," and "Mandatory Writing Policies." An additional way to create categories is to comb through the list of suggestions to see if the same term occurred in different categories. For example, participants suggested "Circulation Policies," "Basic Policies," and "General Library Policies." Therefore, "policies" was also a possibility for a category, as it was a term that obviously had meaning for our participants. After the synonymous categories were combined, it was time to look at the leftovers, which included interesting categories such as "High Volume Activity" and "More Than College." These were very personal definitions, and it was necessary to consult the participants' responses and look at the terms they had placed under a particular category to see what that category represented.

It was important to be discriminating in determining the number of categories used for our final analysis. If too many categories were created, the correlations would not be great enough to suggest a new site structure. For example, three people suggested "Articles" as a possible category, while "Databases" had been suggested by eight. Since articles are found using databases, it made more sense to use "Databases" as the final category and doing so gave us a stronger correlation.

This new list of standardized categories was then used as the basis for the statistical analysis. For this we used an Excel spreadsheet located on the BoxesandArrows web site.¹⁴

Spreadsheet Analysis

The spreadsheet analysis gave a clear view of how often a term appeared under a particular category and used color coding to distinguish between high and low correlations. The low correlations (1% to 33%) were terms that did not have a strong representation under a category. A high correlation (66% to 100%) indicated that many participations placed a term in that category.

Medium correlations indicated terms that participants were divided on and which had been

placed fairly equally under more than one category. On examination of the results, many of the medium correlations showed a marked preference for one category over another. For example, the term "Borrowing From Another Library" was represented under four different categories: Catalog (14%), General Information (21%), How To (57%), and Web Links (7%). For us, this indicated that "Borrowing From Another Library" should be linked primarily under "How To" with cross references to the information from "General Information" and the "Catalog."

Therefore, the spreadsheet helped to determine the primary placement of resources on our web site, as well as cross references. Based on the results, one of the strongest benefits of this redesign was the ability to use cross references on the site to make it easy for patrons to find useful information.

Reviewing Vocabulary

Once it was determined which terms went under a category, we examined the kind of information that was in that category. In some cases, it was obvious that a certain term, such as "books," triggered a grouping. For example, the category "Catalog" contained the terms: "Award-winning Books," "Big Books," "Catalog," "Government Documents," and "New Books." While all of these terms contain or suggest books and the catalog is used to locate them within the library, the committee did not believe that people actually used the catalog to find a list of new books specifically. Rather, it was the participants' recognition that books are found using the catalog that caused them to group these items together. This prompted a re-examination of the results.

In some cases, there was so much information beneath a category that it was necessary to subdivide it. For example, "General Information," a category that was used in the spreadsheet, contained terms related to policy information. "Policies" had been a category suggested by several participants; however, it was not used in the analysis because too few of the participants had

suggested it. Knowing that "policies" was a term that made sense to our participants, a new category was created that would contain that kind of information. We were positive that as long as we made it apparent on the web site, users would be able to find it.

Determining Sections of the Home Page

The final step in this process was to determine the sections under which the various categories would be organized on the home page. This had to be based upon the groupings of categories suggested by the participants. We wanted to organize information based on how our participants would expect to find it. The groupings would then provide the major sections of the site as well as determine the navigation structure.

The groupings of categories were based upon participants' responses to the question "Which groups are related to each other?" Some suggested groupings included:

- articles, catalog, databases
- catalog, databases, how-to
- databases, catalog, web
- web databases, articles, help, catalog
- how-to, databases

Most participants tended to group catalog and databases together. This seemed to indicate that users did not differentiate by type of information to be found but rather preferred to have their research tools together. They did not want to have to go to different areas of the web site to find them, which is what the current web site forced them to do.

It was then time to determine a name for that grouping by focusing on the following questions: how are resources in that group used, what is their purpose, and why would someone want them

together? Catalogs and databases are tools to find books and articles. Broadly speaking, they are tools to find information. Their purpose is the same even if their formats are different. Therefore, the general section for this category became "Find Information."

Throughout this process we had to consider that there were groupings our participants may have missed. So, we let ourselves be guided by them as much as possible, but we were not blind to other possibilities. We used our judgment and skills as librarians to determine the final product. For example, though participants felt that any term with the word "books" in it belonged in the catalog, as librarians we recognized that we had presented the participants with collections that just happened to be books. Therefore, rather than placing them within the "Books & More" section of the new web site, we created a "Collections & Other Materials" section that would also enable the library to feature digital and art collections in the same place.

Fixing Library Jargon

Finally, the results of the card sort analysis were used to fix any remaining library jargon. However, we had to balance our desire to make the site easy for our students to use with the purpose of an academic institution, which is to teach. Students should be able to go to any library and be able to use it.

One of the terms that consistently came up as a problem was "Catalog." Several participants interpreted that term to mean the college catalog of courses. Therefore, its function needed to be made more apparent. So, "Catalog" became "Books & More (Catalog)." This was done so that those who do not know what a catalog is would be able to identify it. By including the word "catalog" in parentheses, users are being educated that this is a common term that might be found on a library's web site.

"Circulation" was another problematic term. While its meaning is apparent to librarians, it did

not seem to make sense to the average user. After examining the purpose of circulation, it was broken down for our users by what they could do, i.e., "Borrow, Renew, or Request." In fact, the results of this experiment have further permeated the library. The sign over the library's circulation desk now reads "Check-outs and Returns."

Additionally, "Databases" was a problem. Many participants needed to have the term defined for them. Once it was defined, it often became the name for a group of cards. With the need to define "Databases" in mind, we also thought about how students approach us at the reference desk. They usually request help finding *articles*; that is the term they know. Therefore, "Databases" became "Articles & More (Databases)."

The term "Database Locator" also caused confusion. One survey participant requested that - databases be grouped by subject. The "Database Locator," which already existed, did exactly that; however, the card sort results emphasized that people did not recognize its purpose. Thus, it was time to make the name more explicit and change it to "Databases by Subject." This may seem contradictory to what we had done with "Databases." However, "Articles & More" was actually an intermediary page that contained "Databases A-Z" and "Databases by Subject." This emphasized that articles are found using databases.

Other terms that were changed were related to new technology, such as RSS feeds. Very often, librarians are at the forefront of introducing new technology to the public. But in doing so, we tend to use technical language, which can put off our users. We learned that it's better to state what the technology is; therefore, "RSS Feeds" became "News Feeds" on the library's web site.

Building the Site

The new vocabulary terms and new category groupings that emerged from the card sort

provided the conceptual framework around which the new web page infrastructure was built. However, while user feedback had aided in the determination of how to rearrange the content from the existing site, we still had to create a new visual design as well as determine the new site's technical dimensions. On these matters we integrated ideas and inspiration from sources beyond our users. Primarily, we relied heavily on web design principles and usability guidelines. In addition, web sites from other academic libraries were studied for examples of how to present content, particularly as it would be laid out on the home page. Exploring how other institutions with similar collections, services, and concerns designed their sites helped guide and finalize our decisions.

The concept of our site's usability was of utmost concern, and the rich field of usability studies provided a groundwork of best practices that helped define many of the basic elements of the site. As applied by Nielsen to web site design, usability is a measure of how well a site performs in five key areas: learnability, efficiency, memorability, errors, and satisfaction.¹⁵ At the most basic level, usability guidelines led to a number of conceptual decisions: a fluid as opposed to fixed layout, short pages that required no or a minimal amount of scrolling, and no links within pages.

A fluid layout creates a design that shifts to accommodate the various screen resolutions that a patron may use. By contrast, fixed layouts keep page elements locked-in to specific dimensions; as the screen resolution increases, there is an increasing amount of white space beyond the page's content. The elements in a fluid layout - columns, text, images – "flow" to make use of whatever percent of screen space is desired. The fluid layout is particularly useful when considering the changes that occur in user behavior and equipment. Whereas at one point the majority of users' monitors were set to a resolution of 800x600, the majority now utilize a resolution of 1024x780.¹⁶

With regard to the length of individual web pages, usability studies have shown that most

people do not scroll through long pages on the web. As a result, it was decided that rather than risk losing users over the need to scroll down two or three screens to find the information they wanted, content on each page would be kept short and manageable. The goal was to keep each section to one page in length where possible.

In terms of navigational elements, usability guidelines also led us to make several decisions quickly. To ensure that the web site modeled a design that had become commonplace across most web sites, a direct link to the home page was placed in the upper left hand corner of every interior page. We also elected to use breadcrumb navigation, listing the navigation path followed at the top of every page. This provided a useful cue to users as to where they were on the site, how they had arrived there, and where they could return to redirect their search. It also anticipated the users who arrive at a given page as an outcome of a search engine result list. Such users come to a page without a sense of context. The breadcrumb places them in the context of the overall site and gives them an impression of its depth and scope.

Having made these decisions, the existing site was dismantled and re-organized under the new categories defined by the card sort experiment. In keeping with the dictate for short pages, previously lengthy areas were broken into "chunks" of content. For example, the former Circulation page contained information on everything from fines to borrowing headphones on a single page. Each section became its own web page.

In addition to rearranging all of the content on the site, we also took the opportunity to rewrite much of the text. On inspection, it was apparent that many of the existing pages included lengthy paragraphs of description along with many links embedded within the course of a sentence. While these pages were dense with information and contained copious detail, it is doubtful that few, if any, users

actually read them or were able to pick out the pertinent links from the surrounding text. In fact, online reading is markedly different from printed text; users tend to scan pages for information rather than read in great depth; content is more easily recognized when presented as bulleted lists or short sentences.¹⁷ We rewrote accordingly, with an eye towards clarity and brevity. Long paragraphs of description were converted to bulleted lists wherever possible and links were set apart from surrounding text.

When it came to other questions of the new design, such as visual elements and layout, other academic library sites were examined. It was particularly interesting to see how the various elements were arranged on the page: navigational components such as sidebars and related links, as well as graphics and blocks of text. It was important to see what looked good and how similar institutions presented their resources: how graphic-heavy were they, how colorful, how visually appealing. Among the sites we consulted were Georgia State University, Sarah Lawrence College, and the College of DuPage.

After much discussion, a number of common elements were identified that would work for our site, particularly on the home page:

- A consistent color scheme;
- Photographs;
- A quick links section for the most used areas of the web site;
- A space to display current news from the library; and
- Links to commonly used resources that were not necessarily library-related.

Other decisions about persistent elements across all pages helped to define the layout. Beyond the breadcrumb navigation, it was obvious that each page should have a header. The elements

identified as most valuable were links to the home page, a site map, a help page, and a log-in for patron accounts. A footer on every page included links to lesser-used but helpful resources such as Blackboard, Turnitin.com, and Dowling College's e-mail system.

The layout and style of the home page absorbed a great deal of time. The home page's appearance was in many ways the most important part of the redesign. It would be the starting point for most of our users' research experience, and it needed to be both easily navigable, visually appealing, and intuitive. To that end, a number of what were, for our site, new elements were included. A "Quick Links" section was added in order to support what we knew to be the most commonly performed tasks. Photographs and news items drawn from the library's "What's New" blog were integrated to add visual appeal and dynamic content to the site. We wanted to give returning visitors a sense of the library as a place where things were constantly happening and changing.

One of the drawbacks of the existing home page was its overabundance of categories and choices. We were very aware of the fine line between being comprehensive and overwhelming. Using the results of the card sort, three distinct sections of the web site were designated under which to group all the content available. These main sections were labeled: "Find Information," "Library Services," and "About the Library." We felt that these titles were descriptive enough to suggest the types of material found within and simply stated without using library jargon.

The problem then became how many links could be displayed under each section on the home page. Listing too many options would again overwhelm the user with choices and also increase the length of the home page beyond one screen. We settled on listing seven choices under each section, followed by a "More" link. This would lead to what amounted to a site directory for that section listing every available topic it contained. For example, under "About the Library" on the home page, links

were included to what were believed to be the most useful information for users: hours of operation, floor plans, the library directory, etc. Following the "More" link provided additional options ranging from the library's mission statement to information about library displays.

Having three main sections also dictated a color scheme using three colors, a marked improvement over the previous six. A mock web page was created using the various chosen elements: a header and footer; areas for quick links, photos, and news; and three columns to cover the three main sections of content. It was then a matter of rearranging these elements to decide on the most appealing, coherent, and accessible design. Prototypes A-E were posted online and we discussed the pros and cons via email. This resulted in a new home page built around usability principles, influenced by design elements of existing library pages, and organized along a conceptual framework suggested by the needs and conceptions of our users. (INSERT FIGURE 3)

An interior page was also mocked up, which utilized a much simpler design and was easily agreed upon. The standard interior page consisted of the header and footer, with a block of content in the middle. This new template was populated with rewritten text from existing pages. The next step was to test how well the new design performed under normal conditions using task-based testing.

Task-Based Testing

Task-based testing is just what it sounds like. A user is presented with a number of tasks to complete using a web site. Task-based testing provides a real-life glimpse of how a user interacts with a site as well as valuable insight into how a user really looks for information on the Web.

The research team (consisting of one proctor and one recorder) presented each participant with a list of ten standardized tasks to complete using the new site. (Appendix 2) The questions were based on common information needs frequently encountered by reference librarians. The participant was given

three minutes to answer each question. If a participant could not answer a question in that time, there was definitely a problem with the part of the web site being tested. The participant was asked to talk out loud as he or she performed each task; this provided additional insight into our users' thought processes as well as some unexpected feedback. We were able to incorporate much of this feedback into the fine-tuning of the site.

It was hoped that task-based testing would help determine how well our users would respond to the new vocabulary discovered during the card sort analysis; relate to the groupings of information as determined by the card sort analysis; and make use of new navigation elements, such as a page header, footer, and breadcrumb trail.

Fine-tuning

Most participants were able to answer the questions in a reasonable amount of time. However, as mentioned earlier, their processes provided some valuable information.

Two questions in particular provided the most trouble for our participants.

Question #6: You need to find articles for a paper on schizophrenia. Name a database that you could use for research.

Many users have particular information needs like this, and many of them are required to consult journal articles for their research. Most participants correctly navigated to the "Find Information" category on the home page and selected "Articles & More (Databases)." However, the way the database page was structured proved problematic. The first option on the page was labeled "Databases A-Z." Participants did not take the time to notice this referred to an alphabetical listing of the library's databases and instead approached this list as though it were a list of researchable topics (like schizophrenia) that would direct them to articles on that topic. When one participant clicked on

"S" for schizophrenia, she became confused when presented with a list of databases that start with the letter "S." She back-tracked and clicked on "M" for medical information and encountered the same situation. Eventually, she started over, taking more time with the page, selecting "Databases by Subject" then choosing "Health/Medicine" to find an appropriate research tool.

This interaction identified several things. The "A-Z" label was misleading. Thus, it was changed to read "Databases by Name," thinking it would eliminate some confusion. In addition, participants kept trying to click on the major headings on this page; they did not notice links embedded in the descriptions on the page. As a result, the headings "Databases by Name" and "Databases by Subject" were made active links that bring researchers directly to their research tools.

Question #7 also proved to be somewhat problematic: *You're doing research at home, but you're having trouble accessing the databases and the library is closed. Where would you look to solve the problem?*

This question was asked to determine how easy (or difficult) it would be for a user to access the library's online help. Unfortunately, locating the help pages, which were labeled "Off Campus Access FAQ," was not as simple as expected.

Two participants looked at the library's home page, did not find an obvious answer and gave up. Another went to the technology section of the "Library Services" page, but did not find a link to the help pages there. Another went directly to the databases page, but did not notice the "Help" links in the "Related Links" boxes on the right. The fifth participant answered the question using the "Help" link in the home page header.

From these observations, we found it was important to provide our users with multiple access points to the help page. It also became obvious that the title of this particular help page needed to

change, as "Off Campus Access FAQ" was not a meaningful term to users, who think of themselves as doing research "from home" rather than from "off campus." Thus, the help page was renamed "Using Databases from Home." In addition, the term "Help" was added to "How Do I..." in the Quick Links list, because many users look for the exact word "Help" when searching for assistance online.

Our observations also brought other problems to our attention. We learned that our users did not notice links embedded within sentences, which usability studies have shown to be a common problem. Therefore, it was important to make all headings clickable, as in the databases section. Most headers on other web sites are clickable and these users came to the library's site with the same expectation.

Minor changes to navigation were also made. Most significantly, the "More" option in each of our categories was separated from the other items in the list. By moving the term to the right, it became more noticeable and the information more accessible.

One participant provided excellent feedback about the "Reserves" page. While she appreciated the quick link to reserves under the "Find Information" section, she did not like the original page placed there, which explained what reserves were and asked the user to click again to search for them. This introductory page was removed; now the link takes the user directly to a page where reserves can be located by either professor's name or course number. The arrangement of the search boxes was also changed so both search options appear "above the fold."

In addition, this participant suggested that linking reserves to existing course guides (web sites created for specific courses that feature important reference works, databases, and other resources) would be extremely helpful. Thus, a link was added to reserve material for a course from the appropriate course guide.

Finally, we found we could not assume that we know where our users will look for information.

We had already determined from the card sort analysis that they do not recognize library jargon, but task-based testing demonstrated that our users approach their search for information and research tools in a variety of ways. Therefore, we discovered that it is important to have multiple access points to information. Not only did we find that we had to add the help pages to a variety of locations, but we also created access points to a variety of tools and services using the "Related Links" boxes on most of the pages. We could not assume that users would look in the same places we would look for information; categories, quick links, and cross references can serve a broad spectrum of users.

General Feedback on the Site as a Whole

At the end of each session, the participants were asked to share any general observations or comments on their experience with the web site. Overall, they provided positive feedback on the new site. Users found that: the categories were straightforward; the design made more sense and was easier to navigate; fewer choices on the home page meant it was easier to get started with research; and shorter internal pages provided quicker access to essential information.

Conclusion

The redesign of the library's web site was a long overdue project. In the process, we sought to update a stagnant and complex site, making it more dynamic while consolidating research tools and information about library services. It took several months, during which we carefully studied the principles of usability, learned more about how people search for information, and looked to existing library web sites for inspiration. We discovered, however, that no redesign effort could be successful without consulting our users.

The redesign process began with discovering if the terminology on the library site made sense to our users. Through a card-sort analysis, users were enlisted in organizing the information to be featured

on the new web site. The categories and the relationships between categories that users deemed important helped to structure the web site and provided appropriate categories for research tools, library services, and information about the library. Our investigation into existing library web sites helped us determine the visual style of our site and incorporate other useful navigation elements, such as headers, footers, and breadcrumb trails. All internal pages were also rewritten and redesigned to suit our users' preference for less text and quicker access. After the site was completed, users were brought back to test the site. Task-based testing helped to fine-tune our vocabulary and navigation and provide enhanced access based on our users' experiences and suggestions.

While research into usability was important, we had to approach the redesign process with an open mind. We learned a lot by looking at other web sites: both what to do and what not to do in terms of vocabulary, design, and navigation. This knowledge was enhanced by observing participants during the task-based testing. We also had to set aside our notions of what was meaningful and useful. We found that our users have different thought processes and priorities.

Finally, at every step of the redesign process, we had to keep in mind that our web site ultimately exists to serve our users. A well-designed web site allows a library's web presence to evolve. We have already made minor adjustments to the site since the redesign based on feedback. For example, we put course-related resources together under one subcategory heading and provided more ways to access online help files. Our new design features flexible categories that can accommodate new resources and tools as they are developed to meet the needs of our users.

End Notes

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Appendix 1

Survey Questions

1. Who are you?
 - Faculty
 - Undergraduate
 - Graduate Student
 - Staff
 - Alumni
 - Unaffiliated

2. How often do you use the Library's web site?
 - Daily
 - Weekly
 - Monthly
 - First-time User
 - Less than Monthly

3. What did you use the Library's web site for today?

4. Did you successfully find what you were looking for?
 - Yes
 - No

5. How easy was it to find what you wanted?
 - Easy
 - Very Easy
 - Somewhat Easy
 - Somewhat Difficult
 - Difficult
 - Very Difficult

6. If it was difficult, how can we improve your experience?

7. Check the three resources that are the most useful to you.
 - Catalog
 - Databases
 - Journal Locator
 - Course Guides
 - Course Reserves
 - My Library
 - Library Hours
 - Selected Web Sites
 - Services
 - Faculty Services
 - Interlibrary Loan

8. If you could add one new feature, what would it be?
 - Search across multiple databases

- Way to identify useful databases
- Linked library resources in Blackboard courses
- Library news RSS feeds
- Other – please write in the new feature

9. In general, how satisfied are you with the Library web site?

- Very Satisfied
- Satisfied
- Neutral
- Unsatisfied
- Very Unsatisfied

10. What can we do to improve the Library web site?

11. Do you have any other general comments?

Appendix 2

Task-based Questions

1. Your group has to meet on Sunday at 11am in the Library in Oakdale. Is it open?
2. You're online and need research help, where would you go?
3. Does the Library have any books by Anne Rice?
4. Professor Gotsch tells you in class that she's placed items on reserve you have to read. What's the name of the first reading?
5. You need to read an article from the journal *Reading Teacher* that appeared in the October 2000 issue. Does the Library have it?
6. You need to find articles for a paper on schizophrenia. Name a database that you could use for research.
7. You're doing research at home, but you're having trouble accessing the databases and the Library is closed. Where would you look to solve the problem?
8. Find a web site that will give you information on Edgar Allan Poe.
9. How do you cite a book using APA format?
10. Where can you find out how long you can borrow a book for?