

PROCEEDINGS OF THE CONTRIBUTED PAPERS SESSION
Biomedical and Life Sciences Division



Special Libraries Association

92nd Annual Conference
San Antonio, Texas
June 13, 2001

It Looks Pretty...But is it Useful? Testing the Usability of a Library Home Page

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Introduction

In the spring of 2000, the staff at the Health Sciences Library, University at Buffalo (HSL) determined that the library's first generation Web site needed a complete overhaul. The Web site was attractive and well organized, but did not provide intuitive access to library resources or services. A revitalized Web team was charged with the task of redesigning the site to better meet the needs of health sciences students, faculty, and librarians.

Usability should be introduced at the very beginning of the redesign (or creation) of a Web site and revisited throughout the development process. A usable Web site ensures users are able to complete tasks easily and efficiently. "Characteristics that all usability testing share are: the primary goal of improving the usability of the product; participants represent real users; participants do real tasks; observe and record what the participants do and say; analyze the data, diagnose the problems, and recommend changes; and, results are used to change the product and the process" ([Dumas and Redish 1994](#)).

Redesigning the Web Page

The "HSL Web Group" was a loosely structured team of professional librarians with an interest in Web page design that met only when changes were needed. The group included reference librarians, whose primary focus was the usefulness of the page for finding internal and external health related resources, as well as librarians from various other departments, whose focus was to assure that library services were readily apparent. Eight librarians volunteered to participate on the redesigning team.

An informal needs, user, and task analysis was performed based on the Health Sciences Library staff and primary clientele -- faculty, students, and staff of the Schools of Medicine and Biological

Sciences, Dental Medicine, Nursing, Pharmacy, and Health-Related Professions. The consensus was the content was comprehensive and the site was visually appealing, but users had to search through too many "layers" to find information -- and even the reference librarians sometimes had trouble finding information on the site. The use of library jargon was another barrier.

Jakob Nielsen is a leading usability expert who has published numerous books and articles on the topic. For the redesign, the HSL Web Group utilized his theory of usability. Nielsen's "know the user" approach was used to complete the user and task analysis. "Know the user" consists of four components: individual user characteristics, task analysis, functional analysis, and evolution of the user (Nielsen 1993).

Awareness of the users' characteristics make it possible to anticipate learning difficulties and to better set appropriate limits for the complexity of the user interfaces. User characteristics include work experience, educational level, age, and previous computer experience ([Nielsen 1993](#)). At HSL, the users are generally knowledgeable about the subject matter, but may be less knowledgeable about technology. It is important for them to have access to recent clinical information and research studies in a reasonably short period of time. Many users do not have the time to learn a complex system or to search through numerous "layers" to find information.

Task analysis is the second component of "know the user." The Web site is used for access to the library's catalog and bibliographic databases, for information about the library's collections and services, and for information beyond the library. "The users' overall goals should be studied as well as how they currently approach the task, their information need, and how they deal with exceptional circumstances or emergencies" ([Nielsen 1993](#)). When helping patrons at the reference desk, reference librarians have the opportunity to observe how users interact with the Web site. Observing users performing tasks reveals the Web site's strengths and weaknesses. Identifying the weaknesses provides opportunities for improvements for the new Web site.

The third component of "know the user" is functional analysis. To improve the performance of the Web site, librarians needed to look beyond how users were currently performing the task and consider the functional reason for the task.

Evolution of the user is the fourth component of "know the user." Some users will become proficient with the Web site and will expect shortcuts or accelerators. As Nielsen states: "It is important not to design just for the way users will use the system in the first short period after its release" ([1993](#)). Librarians wanted to incorporate direct access to the resources for experienced searchers along with descriptive categories to guide novice users to the appropriate resource.

The task force members then examined the architecture and usability of other academic health sciences libraries' Web sites. Sites were chosen either by their popularity with librarians or by their uniqueness. The librarians noted such features as:

- Organization, clarity and readability (including page layout and use of color)
- Accessibility (including the need to drill down to lower level pages to access data or sources of data)
- Use of pictures and graphics (including time required for pages to load), and
- Special features, such as express or quick links.

The review generated many creative ideas. A brainstorming approach was used to identify

information that needed to be included on the top-level page and to set parameters for page design. The task force decided on the following approach:

1. The main body of the Web page would consist of broad general categories, with links to more specific information from the top-level page. The goal was an organized, easily readable page that would direct inexperienced users to the appropriate resource while promoting accessibility by limiting the need to link to lower level pages. Four categories were selected: Library Basics, Collections, Resources and Services.
2. A "Quick Links" section would be developed as an accelerator for experienced searchers.
3. The combination of a "main section" and Quick Links would result in link redundancy, but also would allow for the use of varied terminology to improve navigability (e.g., "Biomedical Databases" in Quick Links and "Find a Health-related Article" in the main section).
4. The use of graphics or images would be limited so that the page would load rapidly and could be easily revised and updated.

Librarians and technical staff took the committee's recommendations and developed a prototype of the new Web site. The next step would be to test the design to verify that it was as "usable" as the task force expected.

Usability attributes

A usability attribute is defined as "the general usability characteristic to be measured for an interface" ([Hix and Hartson 1993](#)). Common usability attributes are:

- Learnability: the ability to successfully complete a task in an appropriate amount of time ([Hix and Hartson 1993](#); [Nielsen 1993](#); [Rubin 1994](#));
- Memorability: not having to relearn the Web site after a period of non-use ([Nielsen 1993](#));
- Initial performance: the user's performance during the very first use ([Hix and Hartson 1993](#));
- Errors: if a participant does not accomplish the desired goal while performing some specified task it is considered an error ([Nielsen 1993](#));
- Advanced feature usage: ability to use shortcuts or accelerators ([Hix and Hartson 1993](#));
- Satisfaction: how pleasant is it to use ([Hix and Hartson 1993](#); [Nielsen 1993](#))

Usability attributes are chosen based on intended users of the Web site and the tasks they will perform ([Hix and Hartson 1993](#)). The Health Sciences Library considered learnability, errors, advanced feature usage, and satisfaction as usability attributes for the redesigned Web site.

Usability Testing

Participants

According to Nielsen, a small sample size is sufficient to identify trends and problems with Web page design ([2000b](#)). The team decided to observe ten library patrons. Since the goal was to design a page that was easily usable by any patron, the team decided that the sample should consist of users familiar with the World Wide Web, but not necessarily expert in using library Web pages. Students would be a natural group to observe, but because testing would take place during the summer when library use decreases, random selection of students could have delayed the testing. Therefore, it was decided to use a convenience sample of students – the circulation department assistants. Although familiar with the library, these students had no special training or expertise in using the library’s Web site to locate information or sources. Volunteers who agreed to participate could complete the test during their normal working shift.

Study Design

A subcommittee of three librarians was charged with the task of developing both a protocol and tool for testing the Web page design. Based on a review of the literature and previous experience in testing Web pages, the team decided to conduct an observational study using a paired interview technique. Two librarians would participate in each interview. One librarian would act as the moderator, asking questions and providing direction; the second would act as an observer. The University Libraries committee had developed a questionnaire to evaluate new Web pages and a method of tracking responses to identify common problems and errors. The questionnaire had been designed to assess the Web usability for various library functions and services. Each question had been evaluated to determine the most effective path for a user to follow when finding information. This tracking methodology allowed the researchers to identify if subjects selected correct choices, which links were unclear, and the patterns used to find information. The team decided to adapt that tool and methodology to test the functionality of the new Web site

Data Collection

The final tool consisted of 11 closed questions concerning library resources and services. The questions were representative of those typically asked by patrons and were written to deliberately avoid library terminology. They covered a wide range of library information, both research-oriented and directional ([Appendix A](#)). Along with the tool, the team developed a pathway leading to the correct response and suggestions the moderator could use to redirect a participant who was truly lost – without giving the exact answer.

All questions could be answered by using the library’s Web site. Links to the correct responses were found within one of the four major categories in the main body of the page; many questions could alternatively be answered using the “Quick Links” box. Although to fully answer some questions the student would need to search a database or the library’s catalog, the goal of the test was to determine if the top-level page was usable. Therefore, an answer would be considered correct if the patron selected a link that would ultimately lead to the appropriate database or catalog.

Guidelines were established to standardize the testing process ([Appendix B](#)). The moderator would ask the questions in order and give participants as much time as they needed to answer. Once students felt they had reached a satisfactory result, the moderator would accept the answers and proceed to the next question, even if the response was incorrect. The moderator would not direct students toward particular answers, but if asked, could suggest that a student try again, or look in a different section of the page. If the participant failed to find the correct link after three attempts, or seemed frustrated, the moderator would proceed to the next question.

In order to facilitate open communication, students were asked to explain their thoughts as they searched the page. Thinking aloud, a technique extrapolated from Nielsen, would help the observer to understand how the student was using the page (Nielsen 1993). Emphasis was placed on the idea that this was a test of the Web page and not the student, and that the goal was to determine the usability of the page, not the student's ability to answer the questions.

Ten students were tested over a period of one week. Upon completion of all interviews, responses were analyzed to identify terminology or links that were unclear or cumbersome. The results were compiled and presented to the task force to determine if modification of the page was indicated.

Results

Because of the small sample size, the team evaluated the total number of responses (110) in assessing the overall effectiveness of the Web page. Seventy-six percent of initial responses were correct. Only 14% of the total number of questions asked were unanswered after two attempts.

The team also analyzed the test questions for trends or problems. All participants found the correct link for nine of the eleven questions. For six of these questions, 90% found the link on the first try.

Only two questions indicated potentially significant problems. One question asked participants to find information on library classes. The correct link was labeled "Library Instruction." While seven of the ten of the participants found this link immediately, one gave up and a second found it only with prompting. Both of those students stated they did not relate the term "instruction" to library classes.

The second question highlighted several potential problems. Students were asked to "find another Western New York library" that owned a certain book." The correct link was labeled "WNYNet" and was located only in Quick Links, not under one of the four major categories in the main section. To answer this correctly, the students would need to know that they should look in a catalog, and that the name of the union catalog for western New York libraries was WNYNet. Of the first six students tested, two never found the link. The remaining four found it only after being directed to look at Quick Links, and after ruling out all other choices on Quick Links. Realizing there was a definite trend; the link was relabeled "WNYNet Catalog." After the change, 75% were able to find the link on the first or second try, although one still required prompting to check Quick Links.

This question illustrates two potential problems. Links that require knowledge of a name or title have the potential to be unclear. Secondly, locating this link only on Quick Links reinforced the need to know the jargon, since it "stood alone" without the benefit of being listed under a category that might provide some direction. Lastly, not all participants may realize the purpose of the Quick Links section and may not think to look there. All of these factors might contribute to frustration for users unfamiliar with the page.

The findings for two questions that were answered successfully were also interesting. When asked to find a journal article, not one participant chose "Biomedical Databases" located within Quick Links. All instead selected the link labeled "Find a Health-related Article." Another question asked students to "send a question to a librarian at HSL." All participants answered successfully, nine out of ten on the first try. The team expected that participants to chose the link labeled "AskHSL" (an established email reference service) located in both the main section and Quick Links – but half bypassed the direct link and chose "Reference Assistance," which eventual did lead to "AskHSL." These questions again illustrated the potential problems of using jargon or library terminology and confirmed the importance of link redundancy (with varied terminology) to make pages more accessible and navigable.

Conclusion

The team realized that librarians and students used the page differently. The librarians tended to look at Quick Links for the most direct access – and assumed other users would do the same. The study participants fell into one of two categories. Some students scanned the entire page, while others systematically reviewed each category. With both groups of students, the use of Quick Links was secondary, and they looked at that section of the page only after they couldn't identify an appropriate link in the main section – and sometimes only with prompting. However, once the participants “found” the Quick Links, they often checked there first when answering subsequent questions. This proved the use of Quick Links as an accelerator (or advanced feature) to be effective.

The informal needs, user, and task analysis was effective in determining why and how to redesign the Web site. Reviewing other health sciences library's Web sites provided ideas for navigation, terminology, and information architecture.

Conducting the study with a small sample size was advantageous. It was cost effective and efficient. With each participant new errors were identified and after the first few participants a pattern of common errors started to emerge.

Asking study participants to think aloud as they answered the questions was invaluable. Students verbalized why they selected certain links as well as why they were not choosing others. This enabled the observer to better understand which terminology “worked” and why other links were confusing. Besides the terminology obstacle, the learnability of the Web site was a success.

Results of the usability testing verified the design changes had the desired effect: improved usability and more direct access to resources and services. The method of usability testing utilized by the HSL librarians garnered information from users that otherwise would have been unavailable to them.

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Appendix A - Web Survey Questions

1. What are the Library's hours for Fridays?
2. Find the title of an electronic journal?
3. Find a book on the subject of Nursing that is owned by the UB Libraries.
4. Locate a journal article on heart disease.
5. Locate two Internet sites on Consumer Health.
6. Find information on Library classes.
7. Locate the form to request a book through interlibrary loan.
8. Find another western New York library (besides HSL) that owns the book *Harrison's Principles of Internal Medicine*.
9. Send a question to a librarian at HSL.
10. Who is the Director of the Health Sciences Library?
11. How would you renew a book through the Library's web site?

Appendix B – Survey Guidelines

Participant Greetings and Instructions:

Thanks very much for agreeing to help us test our Web site. We are in the process of redesigning the site and we want feedback from the user's perspective. THERE ARE NO RIGHT OR WRONG ANSWERS – we want to learn why you make the choices you do.

Here is how the test will work:

- You will be asked a series of 11 questions that can be answered using the new Library home page.
- Take your time while answering. If you want to start over while working on a question, use the HOME button to return to the main page.
- Please walk us through your answers. Explain what you are thinking while you are working. This “thinking aloud” process will help us to understand how you are using the Web site so we can make improvements.
- You may encounter questions you won't be able to answer. If that occurs, you can stop and move on to the next question.

- Always return to the HSL main web page before you start each question.

Remember, we are testing the web site – NOT you.

Guidelines for the Moderator:

- Never indicate that a subject has made a mistake.
- For every question, if subjects feel they have reached a satisfactory result, even if it is one that you do not consider to be correct, accept that answer and go to the next question.
- If a person becomes sidetracked, suggest starting over and trying again.
- If subjects seem uncertain, it is acceptable ask them what they are thinking (“think aloud”) and to give general prompts.
- If the person seems frustrated and not close to a satisfactory answer, suggest going on to the next question.

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