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## Testing the Design of a Library Information Gateway

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In autumn of 1999, the library World Wide Web sites at Appalachian State University and Georgia Southern University had been in place for more than a year, and many of our library users reported that certain aspects of the sites' designs were confusing. In order to alleviate the confusion, librarians from our two universities decided to redesign the sites by determining the greatest sources of confusion. To do this, we adopted an intriguing approach to studying how patrons used our Web sites. The approach is called user-centered usability testing, and we first learned about it from a presentation by University of Arizona librarians at the 1999 ACRL Conference (Dickstein, Loomis & Veldof). In the University of Arizona project student participants were asked to find specified information by searching prototype Web interfaces. The students were to express their thought processes orally, and their comments were recorded along with the selections they made at the computer. Based on the test results, the University of Arizona librarians changed their Web site design by eliminating confusing terminology, making greater use of color and icons, and reorganizing the placement of information, graphics, and selections. By the end of the process the Arizona librarians had adopted a design that was dramatically different from their original conception of what would constitute a successful library Web site.

As a part of our effort to improve our Web site designs, we wanted to determine whether the features that worked well for the University of Arizona students would work equally well for the students at Appalachian State University and Georgia Southern University. We therefore employed sixteen Georgia Southern freshmen and sixteen Appalachian freshmen to test the Arizona, Georgia Southern, and Appalachian sites. We used the same questions that the University of Arizona librarians had used in their Web site development except for two

questions that addressed search capabilities which were not applicable to the Georgia Southern and Appalachian sites. Half of the students from both Georgia Southern and Appalachian tested the Arizona site, while the other half of the Georgia Southern students tested Appalachian's site and the remaining Appalachian students tested Georgia Southern's. This approach was intended to reduce possible bias due to students using an already familiar Web design. Student responses to each of the information requests were recorded and scored according to their effectiveness and efficiency as search options, and whether the students found a correct answer.

At the most basic level, the question we sought to answer was whether Georgia Southern and Appalachian students using the Arizona design would produce a significantly greater percentage of correct answers to the Arizona questions than the students using the Appalachian State and Georgia Southern sites. What we found was that a comparison of site scores for effective, efficient, and correct answers showed that users of the Arizona site yielded the best score in 22 out of 33 possibilities. A number of design considerations were identified when we analyzed the results and the comments the students made while testing the sites. These will be discussed as we examine each search the student volunteers were asked to perform.

### *"How would you find a book about affirmative action?"*

All three sites performed well in this question since each had easily identifiable links to their online catalogs. Arizona had a prominent icon which featured a book, while Appalachian's option stated "Books and more." Georgia Southern's option was simply worded "Library Catalog" but still led to more correct responses than did the other two sites. Freshmen seem to understand that catalogs list books, for they were not confused by the term in this question.

*“Find a journal or magazine article about the management trends in a business.”*

The Arizona site’s icon clearly represented magazines and newspapers with the word “articles” prominently displayed, making it easy for the students to find the best search option. The Appalachian and Georgia Southern sites fared less well. Appalachian’s site had no icons and used the term “periodical” which did not equate to “magazine” for many freshmen. Georgia Southern’s site referred to “databases” without referring to magazines, periodicals, or articles, which also did not suggest to many students that this was where to find articles.

*“Can you find out whether the library owns Sports Illustrated, the magazine?”*

Students found this search problematic regardless of which site they were testing. Many selected the same option they were supposed to choose for finding indexes to periodical articles. In this case, Arizona’s usually effective icons may have contributed somewhat to the confusion since the students were drawn to the images of the newspaper and magazine instead of to the disk, book, and video images that identified the correct selection “Catalogs of Books & More.” Appalachian also used the description “Library Catalog - Books and more” which was no more effective a guide without an icon, while Georgia Southern’s “Library Catalog” was the most succinct description of all. A common mistake at the Appalachian and Georgia Southern site was to select “Special Collections.” This term did not convey to the freshmen anything other than that this was where catalogs of materials besides books might be found. The “Special Collections” option was also chosen in desperation for other searches as well, indicating that this is not a good term to use on an opening library Web site screen if it is not further defined.

*“How would you find what your teacher has put on reserve for your class?”*

In this case the Arizona site did not have an icon associated with the word “Reserves,” which appeared in a column of other icon-less options called “Quick Links,” located to the left of the prominent icons. Nevertheless, the Arizona site was more successful than the Appalachian or Georgia Southern sites with this question. “Reserves” did not appear on the Appalachian site. Users were required to select either “Library Catalog - Books and More” or a drop-down box that had a different background

color and was located to the right of most of the options. The Appalachian drop-down box was almost never selected or investigated by students for any of the searches. This finding, along with the clearly negative results of the “Special Collections” link noted above, led Appalachian’s Web design team to replace “Special Collections” with a “Reserves” link shortly after the usability testing was completed. Although the word “Reserves” was an explicit option on the Georgia Southern site’s opening page, it was in a different font size with a different color background and to the far left of the section where most of the options were listed. The students treated “Reserves” and all the other options on the left as if they were a filigree design in the frame of a painting. It became clear that the students assumed that the content in the middle of the page was what mattered, and they rarely explored anything else, especially if it was in a different font, script, or color. In the case of the Arizona site, what may have mitigated the perimeter location problem was that the Quick Links were in close proximity to the icons, with the same color background, and underlined clearly as links in a font similar to that of the icons.

*“Find a Web site about the Yaqui Indians.”*

The Arizona site did far better on this search request since the site contained an icon clearly labeled “Web Search.” Neither the Georgia Southern nor the Appalachian sites offered a means of connecting directly to a Web search engine from the opening screen. In Appalachian’s case, students could choose “Search Engines” from the drop-down box but as noted above, almost no one examined the options in the drop-down box. A further source of confusion was the button labeled “Search.” Students optimistically chose this but in fact the option was for searching the Appalachian site, not the Web as a whole. Georgia Southern’s site did not offer any option for jumping to a Web search engine, requiring the testers to do what several other students did regardless of the site they were using: leave the library site without selecting anything and clicking on the “Search” option in Netscape or Explorer.

*“How would you find a newspaper article about gun control?”*

The newspaper in the icon for “Indexes to ARTICLES & More” made it very easy for testers of the Arizona site to find the best search option for this question. Users of the Georgia Southern and Appalachian sites encountered similar problems to those they had with question 2, such as misinterpreting “Special Collections” and not understanding that newspaper indexes would be found in “Databases and Periodical Article Indexes.” If the precise term, such as “newspaper,” “magazine,” or “video” did not appear in the description of an option, many students thought it was probably not to be found there. What made the Arizona icons so effective was that although they were not completely exhaustive in representing what could be found in each option, they came much closer to being so than the more traditional labels at the Appalachian and Georgia Southern sites.

*“If you need to check to see if you have any overdue books or any library fine, what would you do?”*

The Appalachian and Georgia Southern sites required the user to select “Library Catalog.” This is not intuitive to the typical freshman. The Arizona site did not have an icon for “Your Borrower Info,” but it was among the same “Quick Links” as was “Reserves.” After the usability testing results were known, Appalachian added an option, “View Your Library Record,” to the drop-down box.

*“How would you look to see if the library owns a video about Shakespeare?”*

Users of the Arizona site were helped by the video image prominently featured in the icon for “What We Own: Catalogs of Books & More.” The Appalachian and Georgia Southern users did not usually get to the online catalogs. They tended to choose other options such as “Special Collections” in the expectation that videos, as a non-book medium, would not be listed in the online catalogs, which they took to be for books only.

*“How would you find articles in an encyclopedia that is online?”*

This was especially easy for the Arizona site testers since the “Online Reference” icon included a book labeled “ENCY.” Users of the Appalachian and Georgia Southern sites had to know or deduce that an online encyclopedia would be found among the electronic databases.

*“Can you find the spring schedule of classes for the university?”*

All three sites used similar buttons linking to their respective university main pages; the Arizona site’s superior score might be attributable to its site being less cluttered than the Georgia Southern site and having a color background that was more prominent than Appalachian’s.

*“Assume you are taking a class in a subject completely new to you: business, psychology, or communications. When the professor assigns a paper to you, how would you find out about information resources in that subject area?”*

In this case the Georgia Southern site yielded the highest scores since the links for various subject resources were toward the top of the list of choices. The Arizona icon “Research by Subject” had confused some users in earlier questions because they thought it would enable them to enter a subject search term in a search box. Since it did not, some students had already written it off as a selection of little interest, and they did not discover that it was specifically designed to lead them to Web sites and electronic pathfinders organized by subject. Appalachian’s site had no cue for research guides on the opening screen, and students had trouble identifying “Help Desk” as the best choice.

#### **In Short:**

- Graphics attract students, and well-designed icons really work.
- Most students do not read long descriptive or explanatory text. One sentence is often their limit.
- Most students take icons literally. If an icon shows several items, they take it as an exhaustive list rather than a sample of items accessible at the site.
- Most students are drawn to color and especially to the center of the screen. Even links with colored backgrounds are less likely to be selected if they are located on the screen perimeter.
- Many terms whose meanings seem self-evident to us are actually library jargon, which students do not always understand. Examples include “special collections,” “reserve,” and “articles.”

- The student testers never used the help/tips options on any of the sites.
- Many students have difficulty finding information if the terms they seek are not on the Web site's opening screen.
- Many students do not fully understand the relationship of "articles" to "journals/periodicals/magazines/newspapers" or to "databases."
- Most students do not understand the need to select an electronic index, or know how to do so. They want to see a search box immediately. A long list of databases and database descriptions confuses them.
- The more complex and multilayered the site, the more it confuses students. They prefer the typically simple (albeit inexact) Web search engine.
- Drop-down menus are frequently ignored if the default text does not describe what the menus will display.
- If the Web page is too large to fit on one screen, most students do not scroll down to see what more is there.
- Caveats: None of this applies to all students, and we used only freshmen in this study.

The finding that came out most forcefully was that students want a white box into which they can type their search terms. If students have to go beyond two screens to find such a box, they become frustrated and impatient. One of the student testers' most common complaints was the difficulty in finding search boxes. This is in sharp contrast to their experience using Google and other Internet search engines.

Obviously much in usability tests depends on how the questions are worded. For example, if number 2 had asked students to find an article in a periodical, the term used at the Georgia Southern and Appalachian sites, rather than journal or magazine, as was used by Arizona, the comparative results might have been different. However, this does not undermine the lesson to be learned about the confusion that arises in Web sites, online catalogs, or user brochures by the use of jargon, which is imprecisely understood by many of our patrons.

The results of the study were extremely useful to Appalachian and Georgia Southern as we worked to improve our Web site designs. What we learned will be incorporated into our library use workshops. We plan to conduct usability studies as a continuous improvement process, and recommend that others do the same and

report their findings. The fact that the University of Arizona's design made it easier for Appalachian and Georgia Southern students to find information suggests that they have identified effective features which academic librarians would be wise to utilize.

We have appended a selected bibliography of useful articles, books, and Web sites about usability testing. We will conclude with a few tips for those who would like to try this technique.

### Conclusion

First, select questions that match your own usage. Here are some categories to consider:

- Finding things in the catalog: books, journals, other formats (like videos)
- Finding articles on a common topic (e.g., gun control)
- Finding articles in a special format (e.g., newspaper articles or corporate annual reports)
- Utilizing special services offered by the library, such as regional cooperation agreements, personal information (e.g., circulation data), electronic reserves or electronic reference services, online research guides, online encyclopedias
- Locating commonly used non-library resources: class schedules, web search engines

Once you have selected your questions, make notes of what are the best and most acceptable answers to each question, especially if you are comparing Web sites or collaborating with another institution. This makes analyzing the success of the subject much easier. Also, print the questions on separate pieces of paper that you can give to your test subject. Having the written question for referral as they work helps students avoid spelling problems (e.g., Yaqui Indians) that would slow down the testing and have to be corrected.

Second, decide how much you want to investigate. Are you primarily interested in learning how people try to find information, or are you more interested in testing the functionality of a specific Web page? If the former, then more elaborate testing arrangements and longer spans of time are needed. For the latter, you can run through a list of twelve questions in a half hour or less.



We worked in teams of 2-3, recording comments on pre-recorded forms (see sample form of question form in the appendix), getting printouts of Web pages visited, and debriefing after the subject left, question by question. To do 12 this way took us 1-to-1.5 hours for each subject.

Having more than one observer is useful because everyone sees and hears different things. Having a non-librarian on the team can help you catch jargon problems. Allow time to debrief immediately after you have observed your subject because otherwise you will find your observations are not very easy to reconstruct later. Using standardized forms to record your debriefing and observations is also helpful as you compare the different sessions. The University of Arizona has posted their forms and scripts on their Web site (Dickstein, Mills, and Clairmont). Our forms may be found

at our Web page devoted to this usability test project, <http://www2.gasou.edu/library/usability/>. Most people who have employed usability testing techniques have concluded that you do not require very many subjects to identify the common failure patterns. For us, eight subjects per site were sufficient. Consider offering some kind of reward to students who participate in longer sessions, such as a bookstore gift certificate.

Finally, let your users know about your project and how you are employing the results. People will appreciate your efforts to make their research more effective and efficient, and you may find that volunteers will be even easier to come by when you conduct future tests.

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