

# Conducting Web Usability Testing with Students with Disabilities

Margaret Brown-Sica

In 2002 and 2003 the Auraria Library, which serves the University of Colorado Denver, the Metropolitan State College of Denver, and the Community College of Denver, conducted usability testing on the library Web site with students with disabilities. The feedback gathered during these testing sessions was used to inform the design of a new, more accessible site. While special considerations needed to be made for the subject recruiting process and the testing environment, the testing process and outcomes were remarkably similar in some ways to recent test results conducted with non-disabled students. Much was learned during this process regarding both how to work with and recruit students with disabilities for testing and how to make the library Web site easier for them—and everyone else—to use.<sup>1</sup> This article follows the testing project through the planning, recruiting, testing, and outcomes phases.

## Planning for Usability Testing with Disabled Students

The Auraria Campus has a high percentage of students with disabilities: 9% at the Community College of Denver, 2% at the Metropolitan State College of Denver, and 1% at the University of Colorado Denver. For this reason, the Coordinator of Library Systems wrote a Library Services and Technology Act (LSTA) grant proposal to secure funding to conduct some tests to reveal problems with the old library Web site and to make sure that the new site was more easily accessible to disabled users. The grant application was successful, and the grant money was used to pay a small fee to the test subjects for their time.<sup>2</sup>

Before beginning to recruit participants, the Coor-

dinator for Library Systems and the Web Librarian met with the Campus Coordinator for Disabled Services. She suggested sources for information on project design and options for recruiting. She also helped review legal issues which affect the Web and accessibility, and also gave feedback about the library website that she had received from students with disabilities. With the help of a consultant in Web accessibility from Assistive Technology Partners in Denver, the Web Librarian designed the test procedures and materials, which were the submitted to and approved by the human subjects committees at the three Auraria institutions.

## Recruiting Test Subjects

One of the most educational aspects of the experience was how recruitment occurred; recruiting students with disabilities was challenging in some unexpected ways. A notice was put on the Auraria Library website, and emails were sent to campus groups for students with disabilities. These methods were not very successful. It was discovered later during the testing sessions that when many students with visual disabilities used the library website, instead of reading every word on the front page with reader software, they often skipped over the news and notices because it took too long to read them. They skipped directly to research tools and resources.

The students who participated were actually very enthusiastic and motivated to help once contact was made. They appreciated what the library was doing and were very professional and

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*Meg Brown-Sica is Assistant Professor, Coordinator for Library Systems and Distance Education at the Auraria Library in Denver.*

thorough in their feedback. It was just a bit more difficult to make contact with them in ways usually used to recruit students. Referrals from the manager of the campus Access Center for Disability Accommodations and Adaptive Technology, as well as from students working there and using the facility, turned out to be the most fruitful process for recruiting. It took many contacts and conversations in order to get even a few participants. The students were busy with their studies and activities, and some were willing but just could not find the time. Some students had transportation issues. Being flexible about when testing could be done helped work around these issues. As previously mentioned, the LSTA grant allowed the library to pay a small fee to the participants, but money was generally not the most motivating factor. Most of the students had been frustrated in their research efforts and really wanted a more usable site.

### The Testing Environment

Another special consideration in doing testing with patrons with disabilities is creating the test environment. At the minimum, a workstation with screen reading software is required. Further, it is recommended to do this in a familiar and easy-to-find location. When initial test sessions were held in a librarian's office, rather than in a campus lab which most of the students used on a regular basis, time was wasted when students could not find the office. Of course this was not a pleasant situation for the student either. The Auraria Library is fortunate to house the campus Access Center for Disability Accommodations and Adaptive Technology, which specifically serves students with disabilities, and this location was used for the rest of the testing sessions. The computers used had JAWS 4.0 already installed. JAWS is software that helps people with visual disabilities use computers by using a voice synthesizer to read the text on the screen.<sup>3</sup>

### Testing Procedure

Testing was done twice, first on the old Web site in 2002 and then again on a prototype for the new Web

site in 2003. Thirteen students participated in the first round of testing. The criteria for a participant to qualify for the testing were:

- having a visual, learning, or physical disability;
- being currently enrolled or employed by the University of Colorado Denver, Metropolitan State College of Denver, or the Community College of Denver;
- having a basic understanding of the Web.

A questionnaire was used to gather information about the participants' past use of the library Web site, including their computer experience and how much time they spent each week using the Internet or a computer.

The participants were given several tasks (Appendix A and B) to complete and were read each task when they were ready to proceed. Each subject was allowed to work through the tasks at his or her own pace. After the first four students were tested, however, it was decided that time should be limited for the others in order not to let unsuccessful tasks run too long. Nine of the thirteen participants were timed at three minutes to each task. The participants were encouraged to speak while working on the task and for the most part, to work without guidance except for the description of the task itself. If the participant became lost or confused, some hints were provided. After the tasks were completed each participant was interviewed. The rationale for how each person worked was important and noted. Each testing session took between thirty and forty minutes to complete. Note that this procedure is very similar to testing students without disabilities.

Testing in 2003 on the prototype was conducted with six individuals, three of whom had participated in the first round. The Library was not able to provide any payment in exchange for the testing this time. Each participant was given information regarding the site redesign and shown a home page and one second level page, which—although not yet

functional—gave a rough sketch of the new design and function.

### Test Session Results and Outcomes

As previously noted, many of the students' reactions and impressions were similar to those of non-disabled students who participated in testing during the fall of 2006. Anyone who has conducted this kind of iterative testing is familiar with reactions such as: "The main page was confusing" or "I don't know what exactly is the difference between 'library catalog,' 'resources,' and 'search' on the home page."<sup>4</sup> There were, however, some issues more specific to the students with disabilities. Addressing these screen-reader specific issues made the site better for all.

Issues that would affect any user of the Library's site included use of jargon and inconsistency of the site architecture. Library jargon should be avoided or clarified, with explanations in natural language where necessary. For example, use phrases such as "getting books from other libraries" instead of "ILL." The testing librarians were also asked to differentiate between the library catalog and other online resources, such as article databases. Other major issues found were problems in the web architecture. If the architecture is not consistent and clear navigation can be very confusing. Templates and Cascading Style Sheets should be used to ensure consistency of content and design.

The issues that were more problematic to students who are visually disabled included the lack of "jump links" and alt tags, link labels that were not descriptive, embedded content, font size, and contrast. Jump links, sometimes called "skip navigation" links, allow screen readers to bypass the common content that is included on every web page, including navigation bars packed with drop-down menus. Imagine having to read every option included in a drop-down navigation bar before continuing on to the main content of the page. The test participants requested that a "skip navigation" link be added to the Library web pages. An alt tag is a label in HTML coding that provides a description of an image to a user who cannot see it. If the image is purely decorative this is less problematic; however, if a Web page contains buttons or other navi-

gational elements that do not have alt tags there are more serious ramifications.

JAWS and other screen readers can be used to scan a Web page for links to help users navigate quickly to the information that they need. If a link label simply reads "click here," all context for where the link is forwarding a user is lost. Embedded content—content that is hosted elsewhere, yet displayed in another web page—has its own formatting, which is sometimes not accessible or forgotten by its designer. If font size is too small and the contrast between the font and the background color of the site is too low it can be a problem for users with even mild visual disabilities. Sans serif fonts such as Verdana and Arial are also easier for patrons with low vision to read. Test participants requested higher color contrast, and Arial was used as the font for the new Web page. One very simple, yet easily overlooked, issue reported was to provide information before an object rather than after, so a person knows what it is about before it is read by a text reader. For example, use a format of (phone) number instead of number (phone). During the second round of testing in 2003 it was found that the prototype of the new Library Web site, which took these issues into account, was a vast improvement.<sup>5</sup>

Several other things were learned during the process as well. The librarians conducting the testing sessions developed a profound appreciation for how much more time students with disabilities may need to do research and reading for classes. Working with a screen reader such as JAWS can take longer than scanning material visually, though many of the students were obviously masters of the software and had the reading set at a much accelerated speed. The librarians also gained an appreciation of how wonderful electronic books and other digital materials are for people with visual disabilities when doing research. It was noted that .pdf and video files were often problematic; however, since the time the testing was done some technical improvements have been made in this area.

With the feedback from this process Auraria

Library designed a Web site that was much more accessible to patrons with disabilities, as well as all patrons. Many of the issues that arose, such as putting the preface “phone” before the number rather than after, seem obvious now but had not been previously considered. Most of these issues make complete sense when one thinks about how screen readers function. It is a great exercise for Web designers to install a screen reader and then try to navigate through a Web site with the monitor turned off. Just having access to JAWS and seeing how it works, especially when used by someone who uses it frequently, was illuminating. It was very

humbling to listen to a screen reader work its way across a site with many links and much verbiage, and realize that a user with a visual disability does not have the ability to scan the information as quickly. The students were great at showing and explaining their techniques in navigating around the Web and demonstrating which Web sites were great and which were horrible in terms of accessibility. As in all design, clarity, brevity, and consistency made the new library Web site easier to use.

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**Notes:**

1. For more information about the concept of Universal Design, which stipulates that changes made to accommodate patrons with disabilities are changes that benefit all, please see Debbie Creamer's article “Universal Instructional Design for Libraries” in this issue of *Colorado Libraries*.
2. Misha Sra and Meg Brown-Sica, LSTA Final Report, 2003. <http://carbon.cudenver.edu/~mbrown-s/documents/lsta2003.doc>.
3. For more information about JAWS and other types of assistive technology, please see Nina McHale's article, “Some Current Assistive Technology Options for Libraries” in this issue of *Colorado Libraries*.
4. Misha Sra, Website Usability Testing Report, 2002. <http://carbon.cudenver.edu/~mbrown-s/documents/usability2002.doc>.
5. Misha Sra, Website Usability Testing Report, 2003. <http://carboncudenver.edu/~mbrown-s/documents/usability2003.doc>.



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