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Taking Discovery Systems for a Test Drive

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Researchers at American University investigated user preferences for discovery layer features, interface design, and content. They tested local implementations of WorldCat Local and Aquabrowser by conducting a group test with eighteen students and individual tests with ten students. Students searched a given question and a topic of their choosing and talked about their experiences. The group usability session yielded preliminary findings and informed the individual tests. Using the constant comparative method, the researchers coded qualitative data collected during the individual tests and grouped participant preferences into three primary categories: functionality, interface display, and content. Findings revealed that underclassmen tended to prefer WorldCat Local, while upperclassmen and graduates tended to prefer Aquabrowser. Participants most preferred the following features: links to full-text articles using a link resolver, results incorporating both articles and books, and facets like date, format, and subject. They viewed word clouds, the ability to search libraries beyond the local library or consortium, and user-generated reviews as optional rather than required features. While one system did not emerge as the preferred system, understanding their preferences informed the decision to implement Summon as the permanent discovery layer for the library and determined configuration options for the new system. Other libraries may benefit from the coding system developed during the study and the methodology for testing potential systems with users.

KEYWORDS *Aquabrowser, WorldCat Local, usability testing, user preferences, discovery systems, students, discovery tools*

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INTRODUCTION

American University (AU), located in Washington, D.C., is a private, Ph.D.-granting institution with more than 6,000 undergraduates and more than 3,000 graduate students. American University Library serves the needs of the main University campus, with the Washington College of Law operating a separate law library. In addition, the Library is a member of the Washington Research Library Consortium (WRLC), which maintains a shared integrated library system (Ex Libris's Voyager) and a consortial borrowing program among member institutions.

In 2009, AU Library gained access to two different discovery layers. The WRLC consortium purchased and implemented the Aquabrowser discovery layer solution for the consortial catalog ALADIN. During the same time period, the Library started a subscription to WorldCat Local in order to take advantage of the enhanced customizations available with a full subscription, such as metasearch integration, real-time availability statements pulled from the local catalog on full records, and consortial relevancy ranking of results.

Reception of both AquaBrowser and WorldCat Local by librarians and staff was lukewarm; features in each system fell short of librarian and staff expectations. For example, consortial borrowing availability exceeded expectations in AquaBrowser but was greatly lacking in WorldCat Local, while e-resource and article availability in WorldCat Local surpassed AquaBrowser, which had no article content and only a subset of e-resources. In terms of interface, many librarians and staff found AquaBrowser's word cloud too busy but found WorldCat Local's interface too simple. Consequently, the Library launched access to both systems in the fall of 2009 as a "test period," with the goal of fully implementing a discovery solution by the fall of 2010 based on user preferences and feedback.

As part of this effort, the researchers decided to learn about user preferences by running a series of usability tests. They hoped to understand what features users preferred in each interface through a side-by-side comparison. They hypothesized that one system would emerge as the preferred system for AU users and thus deserve full implementation as a replacement for the "classic" ALADIN catalog interface.

The researchers held a group usability test in October 2009 as part of a history research seminar class session with eighteen seniors writing capstone theses. This session was followed by individual usability testing sessions in March 2010, with ten students ranging from freshmen to graduates and majoring in different disciplines.¹ The tests informed the Library's selection of a permanent discovery system and configuration options for the different systems. In addition, the testing revealed general preferences among a majority of the participants, as well as preferences based on specific participant characteristics, such as academic status.

REVIEW OF THE LITERATURE

Around 2006, discovery interfaces became an option for libraries seeking to move to a next-generation catalog. Tamar Sadeh (2007) provided a rundown of when different products were introduced, and reviews of three current systems can be found in Karen Stevenson's article "Next Generation Library Catalogues" (2009). Shortly after they were introduced, libraries began to apply established usability testing techniques, such as those found on Jakob Nielsen's Alertbox columns on web usability (2000), to these new systems. Literature on the usability of next-generation catalogs and discovery systems is still developing, and there is not yet a sizable body of work.

Some of the literature on discovery layers is comprised of tests conducted on prototypes during product development. In developing its discovery layer, WorldCat Local, the Online Computer Library Center (OCLC) partnered with academic and public libraries to conduct "close to a dozen" tests, many with pilot institutions (OCLC 2009, 1). Starting in May 2007, the University of Washington conducted two rounds of usability testing on a prototype: one round on known-item tasks, and the second round on topical searching (Ward et al. 2008). The University of California conducted two rounds of testing on WorldCat Local in 2008 and 2009 on two different campuses (Arcolio and Davidson 2010). The OCLC tests were both "summative...to validate designs or changes...[and] formative...to provoke or correct our thinking about an emerging approach or design..." (OCLC 2009, 2). Although they share some similarities with this study, the OCLC tests tied user behavior to the purpose of releasing their product. The tests' task-oriented approach was different from this set of usability tests, which focused on searching behavior.

Other tests supporting product development have been conducted with Primo, from Ex Libris. The University of Minnesota, a Primo development partner, performed two usability studies in August 2006 and January 2007 using prototype and beta versions (Sadeh 2008, 20). The researchers tested users' ability to find library materials on a topic using tasks, as well as some perception questions—for example, what system features users liked and what adjectives they thought best described Primo. In addition to using cameras and microphones to record the sessions, eye tracking software was used to record users' eye movements in the second study. Like this study, the Primo study tried to capture test participants' perceptions of their experience and of system features. In these studies, participants gave their feedback about a system in development in order to prepare for product release rather than this study's comparison of local implementations of two fully developed systems.

Comparing next-generation discovery layers with traditional catalog interfaces has been the goal of two studies. Tod Olson from the University of Chicago used a group of graduate students in the humanities and social

sciences who were writing dissertations or proposals to test Aquabrowser. Olson wanted to see if these searchers could discover new things on their topic using a discovery system. Nine out of twelve participants did find more material even though they were experts on the topic (Olson 2007, 560). Olson's study is similar to this study in its goal, to inform the purchase of a discovery system, and also in its use of experienced searchers searching on a topic of their choice.

Kristin Antelman, Emily Lynema, and Andrew Pace of North Carolina State University also conducted a usability test comparing an early next-generation approach, Endeca, with an existing catalog. Participants were randomly selected to search one system or the other. Unlike this study, the researchers did not record user perceptions of the system because they were focused on the success of task completion (Antelman et al. 2006).

Karen Joc and Kayo Chang of Zayed University in Dubai tested four discovery systems—Aquabrowser, Encore, Primo, and VuFind. While the VuFind implementation was locally hosted, they used implementations of the other systems at other libraries that had high English-as-a-second-language student populations (Joc and Chang 2010, 6). The participants' mouse movements were captured through Adobe Captivate (<http://www.adobe.com>), and subjects were asked to think aloud while performing twelve tasks. The researchers' goal was to learn how discovery platforms enhanced the searching experience for English as a Second Language students in particular, including whether the students required Arabisation of the system to be successful. They found that tag clouds and interfaces with clear displays assisted these students in searching (Joc and Chang 2010, 11).

This study is unique from much of the existing literature in that it compares two discovery layers implemented locally and focuses on capturing user preferences for features, content, and display based on normal searching behavior rather than completion of a list of tasks. In a usability test, participants are usually assigned tasks which create an artificial environment that does not represent real-life use of the system. There has been some recognition in the broader discipline of system testing that methods that simulate a user's normal work situation may provide different, more useful information. Elissa Smilowitz, Michael Darnell, and Alan Benson (1994) compared formal lab usability testing of software with beta testing, in which participants created their own tasks in their own environment, and with forum testing, which was the same as beta testing except participants were self-selected rather than recruited. They found beta testing was just as effective in identifying usability problems as controlled lab tests and at a significantly lower cost (189). Jacob Buur and Kirsten Bagger (1999) performed usability testing experiments at Danfoss, a large Danish manufacturer, which showed that allowing test participants to formulate their own scenarios helped create a dialogue that led to more innovative design. A recent study by Daniel Russell and Carrie Grimes (2007) of Google goes further to compare assigned tasks

in a searching test with user-devised tasks. The researchers found that people behave differently when searching for their own topics as opposed to pre-assigned topics: they spend more time on the task, make fewer unique queries, and explore search result lists more thoroughly (Russell and Grimes 2007, 6). Assigned task questions also give them more query terms to start with and a more defined end point than is typical with user-defined tasks. Russell and Grimes concluded that a blend of assigned and user-defined tasks can help researchers better understand Web searching behavior over the course of a session and can give an indication of how users will search outside of a lab environment (7).

USABILITY TESTING METHODOLOGY

Prior to testing, the researchers secured approval from the University's Institutional Review Board. For the group usability test, the history research seminar class was given a list of five research questions (Appendix B) and asked to take twenty minutes to complete searches on one of them in both Aquabrowser and WorldCat Local. The questions covered various subject areas in order to allow for choice and to reflect AU's range of degree programs. The researchers also encouraged the group to try searches on the topics of their senior theses, which they had already spent significant time researching. Students noted comments about each system on a paper form while searching, and subsequent feedback was collected through class discussion.

One semester later, the researchers conducted a series of individual tests. Ten participants were tested representing each affiliation on campus, with the exceptions of the Washington College of Law and School of Communication. Two participants from each academic status (freshmen, sophomores, juniors, seniors, and graduates) were tested. There were six students from the College of Arts and Sciences (CAS), two students from the School of International Service (SIS), one student from the School of Public Affairs (SPA), and one student from the Kogod School of Business (Kogod). Since the Washington College of Law administers a law library with separate library resources and search tools, the researchers chose to exclude law students from the study. American University has a social sciences focus, with the SIS, the SPA, and Kogod comprising the largest full-time enrollment on campus, especially among upperclassmen and graduate students. Therefore, it was important for the researchers to draw representation from CAS, particularly from the humanities and the sciences. Within CAS, various majors were represented, including two students majoring in the sciences, three students majoring in the humanities, and one student majoring in the social sciences.

Participants were recruited by sending e-mail messages to a university-wide listserv. A convenience sample of ten participants was selected based on academic status and major in order to provide the broadest possible coverage

The screenshot shows the American University Library WorldCat search interface. The search term is 'politics of identity o'brien'. The results are limited to 'Libraries Worldwide' and show 1-10 of about 814 results. The interface includes a search bar, navigation links, and a list of search results with filters on the left.

Format

- All Formats (814)
- Article (712)
- Book (802)
- eBook (36)
- Thesis/Dissertation (7)
- Microform (1)
- Internet resource (4)
- Computer file (3)
- Downloadable archival material (2)
- CD (2)
- VHS (1)

Refine Your Search

Author

- [Erin E O'Brien \(4\)](#)
- [Ashford Clark \(3\)](#)
- [Hoti Louisa \(3\)](#)
- [Munck Ronald \(3\)](#)
- [Aikenstock Mimi \(2\)](#)
- [Show more...](#)

Year

- [2010 \(138\)](#)
- [2009 \(108\)](#)
- [2008 \(96\)](#)
- [2007 \(84\)](#)
- [2006 \(79\)](#)
- [Show more...](#)

Language

- [English \(401\)](#)
- [Undetermined \(3\)](#)
- [Swedish \(1\)](#)

Content

- [Biography \(1\)](#)

Topic

- [Sociology \(21\)](#)
- [History & Avia... \(11\)](#)
- [Language, Lit... \(11\)](#)
- [Political Science \(7\)](#)
- [Business & Economics \(6\)](#)
- [Show more...](#)

Results 1-10 of about 814 (.28 seconds)

1. **The Politics of Identity: Solidarity Building among America's Working Poor** By **Erin E. O'Brien**
by J O Neal-Watts
Article
Language: English
Publication: LABOR STUDIES JOURNAL, 34, no. 4, (2009): 567
Database: British Library Series
Libraries that own this item: [American University Library](#)

2. **The politics of identity : solidarity building among America's working poor**
by Erin E O'Brien
Book : State or province government publication
Language: English
Publisher: Albany : State University of New York Press, 62008.
Database: WorldCat.org
Libraries that own this item: [American University Library](#)
[View all editions and formats](#)

3. **"They have to take the long way to the shortcut, too" : the politics of solidarity and identity**
by Erin Elizabeth O'Brien
Thesis/Dissertation Archival Material
Language: English
Publisher: 2003.
Database: WorldCat.org
Libraries that own this item: [American University Library](#)

4. **Theorising modernity : reflexivity, environment, and identity in Giddens' social theory**
by Martin O'Brien, Sue Penna, Colin Hay;
Book
Language: English
Publisher: London : New York : Longman, 1999.
Database: WorldCat.org
Libraries that own this item: [American University Library](#)
[View all editions and formats](#)

5. **Review of The Politics of Identity: Solidarity Building among America's Working Poor**
by Catherine M Paden, Erin E O'Brien
Article
Language: English
Publication: The Journal of Politics, Jul., 2009, vol. 71, no. 3, p. 1188-1190
Database: JSTOR
Libraries that own this item: [American University Library](#)

FIGURE 1 WorldCat AU, American University's version of WorldCat Local. (Color figure available online.)

of the student population. Participants received Amazon.com gift cards worth twenty dollars. Each participant signed a consent form which covered usability procedures, including audio and video recording and public use of results.

The researchers gave participants the same five research questions used in the group usability test (Appendix B). For this individual usability testing, participants picked one question and tried to find useful resources that would help answer the question using both WorldCat Local and Aquabrowser (see Figures 1 and 2). They were also encouraged to try their own topics as their interests led them.

One of the researchers served as a facilitator and sat with participants as they used the systems to prompt them to talk aloud about their reactions to the features of the discovery layers, to ask clarifying questions when comments or actions were unclear, and to observe the overall search process. In addition, the facilitator stressed that the purpose of the usability test was not to assess students' searching ability but to record their preferences in order to implement a useful, permanent discovery layer

FIGURE 2 ALADIN Discovery, American University's version of AquaBrowser. (Color figure available online.)

system. The second researcher served as an observer and synchronously viewed the tests using the Morae usability testing software from TechSmith (<http://www.techsmith.com/morae.asp>). The software captured participants' on-screen activity, both audio and video, as well as mouse movement, pages visited, and clicks. The software also allowed the observer to flag important comments and actions and to take notes, which were tracked in a log. The logs were exported after each test, and the recordings were saved as Windows Media Video files for data analysis. Each test recording ran between 20 to 60 minutes in length, depending on participant enthusiasm.

DATA ANALYSIS

Both quantitative and qualitative data were captured for analysis: facilitator observations and written comments from the first usability session, logs and

recordings from the second round of tests, and general usage statistics for both systems.

The researchers realized that the group nature of the first test had influenced what students stated as their preferred system, which was WorldCat Local. Examination of written student comments revealed that some students had initially preferred Aquabrowser but changed their minds as a result of the group discussion. The ten student comments received revealed mixed reactions to the two systems. Some students liked the clear interface of WorldCat Local and the fact that it contained both articles and books, user reviews, and Amazon.com-style cover photos; others found the interface “boring,” missed the lack of summaries for books, and could not figure out how to obtain some items found at other libraries. Students liked Aquabrowser’s ability to export records to social networks, its book summaries, and its facets, but had mixed reactions to its word cloud, either disliking it or liking it but not finding it useful for their topics. The researchers considered the results of the first test to be preliminary, giving an indication of what might be found in systematic testing with a more diverse group of students, and in fact, many of the issues brought up by this group were confirmed by the individual tests.

For the individual usability tests, data was gathered regarding academic status, school affiliation, question answered, and discovery system preference. Then, using the constant comparative method (Gorman and Clayton 2005, 53) to analyze logs and observation notes, the researchers coded qualitative data collected about participant preferences into three primary categories: functionality, interface display, and content.

The researchers coded the first participant log and observation notes independently to produce separate coding structures, which were then compared and reconciled into a base coding structure that included secondary categories within the three primary categories. The researchers then coded two more sets of participant logs and observation notes using the base coding structure. At this point, an intercoder check was run to test the reliability of the coding structure, which resulted in an agreement level of 82 percent. The researchers analyzed the coding disagreements found during the intercoder check, resolved coding conflicts, and refined the base coding structure. The researchers divided the remaining participant logs and observation notes to complete coding, iteratively adding any new codes not present on the base coding structure.

RESULTS

Analysis of the Individual Tests

Most participants preferred WorldCat Local over Aquabrowser or had no preference (see Figure 3). Preference organized by academic status, however, revealed that undergraduates tended to prefer WorldCat Local over Aquabrowser or had no preference, while graduate students preferred

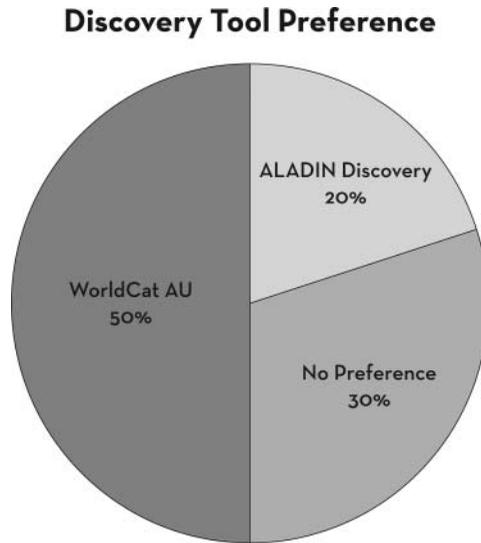


FIGURE 3 Participants’ discovery tool preferences.

Aquabrowser or reported no preference. All freshmen and sophomores preferred WorldCat Local (see Figure 4).

WorldCat Local—Functionality

The facets offered in WorldCat Local were often used by participants, with three using the date facet, three using the format facet, and five using any facet on the interface. Full-text functionality was also used widely, with four participants successfully opening up a full-text article and eight clicking on

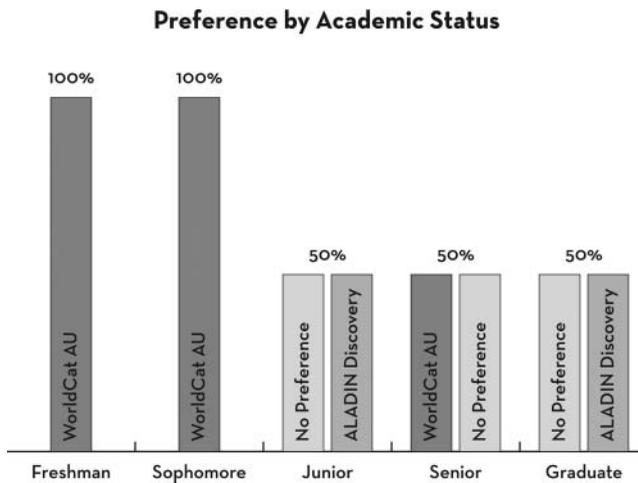


FIGURE 4 Participants’ discovery tool preferences by academic status.

TABLE 1 The Top User Preferences for WorldCat Local

| WorldCat Local | | |
|---|---------------|-----|
| | <i>n</i> = 10 | (%) |
| Functionality | | |
| Used openURL resolver | 8 | 80 |
| Used search by Libraries Worldwide | 7 | 70 |
| Used facet | 5 | 50 |
| Clicked on Find Full Text—found article successfully | 4 | 40 |
| Used Advanced Search | 3 | 30 |
| Used article format facet | 3 | 30 |
| Used date facet | 3 | 30 |
| Interface Display | | |
| Likes organization of interface/“easy to use” | 5 | 50 |
| Liked chat with a librarian | 4 | 40 |
| Liked facets | 3 | 30 |
| Liked table of contents on full record | 3 | 30 |
| User couldn't find link to full text/wanted Find Full Text@AU to stand out | 3 | 30 |
| Liked author authority record | 3 | 30 |
| Content | | |
| User commented on article content | 6 | 60 |
| Liked user reviews | 5 | 50 |
| Liked being able to search libraries worldwide | 4 | 40 |
| User comments that he/she would not use reviews for academic work | 4 | 40 |
| User recognized duplicate article results come from two different databases | 3 | 30 |
| Found Worldwide search unnecessary | 3 | 30 |
| Liked that WorldCat AU contains both books and articles | 3 | 30 |
| Used a user generated list | 3 | 30 |

the library's link resolver system. Three participants went beyond the basic search box offered in WorldCat Local to use the advanced search feature, while seven participants elected to search beyond holdings available locally to expand their search to “Libraries Worldwide” (Table 1).

WorldCat Local—Interface Display

Overall, five participants felt WorldCat Local was an “easy-to-use” interface and were pleased with the organization. Four liked the availability of the Library's chat-with-a-librarian service on both the search results and full record screens. In terms of the facets available in WorldCat Local, three participants liked the options presented to help narrow their search results. While viewing the full record, three participants liked the available table of contents and three had positive reactions to the author authority record, a feature unique to WorldCat Local. **Locating full-text availability on the full record screen, however, was problematic for three participants who felt the Library's link resolver “Find Full Text @ AU” was not visually intuitive** (see Table 1).

WorldCat Local—Content

Participants talked more about the content available in WorldCat Local than in Aquabrowser. WorldCat Local offers full-text articles while Aquabrowser does not, and this difference was highlighted in the testing. Six participants commented on the presence of full-text content, and three participants liked that WorldCat Local contained both books and articles. However, three participants pointed out that duplicate article records occurred in search results from two different databases, which they regarded as problematic. User reviews and lists, a unique set of content available in WorldCat Local, also engendered frequent comments, with five participants expressing positive comments about the reviews, four finding them useful (but not for academic work), and three actively using user-generated lists in searches. Lastly, there was a disagreement among participants regarding the ability to discover resources outside the consortial holding: four participants commented they liked the “Libraries Worldwide” search, but three found it unnecessary (Table 1).

Aquabrowser—Functionality

Features used in Aquabrowser somewhat mirrored WorldCat Local: facet use was high, with seven participants using any facet and four specifically using the subject facet. **There were, however, four participants who were confused by Aquabrowser’s facet offerings.** The word cloud, a unique visual search function in Aquabrowser, was popular, with five participants revising search results via the word cloud; these participants used the search results sort utility to hone in on better results. **Returning to original search results or restarting searches, however, posed problems for four participants when they attempted to use the browser’s back button in the system** (see Table 2).

Aquabrowser—Interface Display

The word cloud in Aquabrowser proved to be a controversial but frequently mentioned feature of the interface, with all participants reacting to it when using the system. A total of six participants liked it and four participants did not like it, with three of the participants expressing initial confusion over the word cloud’s purpose and function. Facets were also popular with participants, with seven finding the facets in Aquabrowser helpful. Six participants liked the collapsed consortial availability found on de-duplicated full records, a robust feature of Aquabrowser not found in the “classic” ALADIN Catalog, and six found the overall color and display of the availability notes helpful. Three users found Aquabrowser easier to use than the “classic” ALADIN Catalog; three participants liked the interface better than WorldCat Local. In terms of features, three mentioned that they liked that search terms were

TABLE 2 The Top User Preferences for Aquabrowser

| Aquabrowser | <i>n</i> = 10 | (%) |
|--|---------------|-----|
| Functionality | | |
| Used facet | 7 | 70 |
| Used word cloud | 5 | 50 |
| Used subject facet | 4 | 40 |
| Confused by facets | 4 | 40 |
| Used sort functionality | 4 | 40 |
| User-frustrated cannot use back button to go back | 3 | 30 |
| Interface Display | | |
| Liked facets | 7 | 70 |
| Liked word cloud | 6 | 60 |
| Liked consortium availability all in one place | 6 | 60 |
| Liked colors/display of availability note | 6 | 60 |
| Didn't like word cloud | 4 | 40 |
| User asked how word cloud works/confused by word cloud | 3 | 30 |
| More user friendly than classic catalog | 3 | 30 |
| Liked highlighting of search terms | 3 | 30 |
| Liked display better than WorldCat AU | 3 | 30 |
| User mentioned social networking features | 3 | 30 |
| Liked Google Books link | 3 | 30 |
| Content | | |
| Wanted articles but found books | 6 | 60 |

highlighted in the results list, and on the full record, three commented on the social networking features available on the full record, and three liked the Google Books link on the full record (Table 2).

Aquabrowser—Content

When using Aquabrowser, content-related comments from participants primarily focused on the lack of article content, with six searching for articles in results but only finding books (see Table 2).

DISCUSSION

This study's freshmen and sophomores preferred WorldCat Local, while upperclassmen and graduate students tended to prefer Aquabrowser or have no preference. A common reason given by participants (regardless of status) for preferring WorldCat Local was that it was a simpler interface compared to Aquabrowser, which seemed "busy," "distracting," or "scattered." This finding agrees with Karen Joc and Kayo Chang's finding that the Aquabrowser interface was considered too crowded by some people (2010, 11). When users preferred Aquabrowser, it was often because they thought the interface looked more "professional" or "more like AU."

The researchers can only speculate why academic status affected interface preferences. Perhaps underclassmen new to research need to

concentrate on the results of their search without other added features competing for their attention. More experienced users who are familiar with many different interfaces and are used to discerning between added features and search results may want the display to give equal prominence to search results and added features. More research with a greater number of participants would need to be done to develop an understanding of these preferences.

But did our underclassmen really prefer WorldCat Local because of the interface, or because of the added content available through the inclusion of full-text articles? Of the two freshmen and two sophomores in the study, only one noticed the lack of articles in Aquabrowser but still preferred WorldCat Local because of features like tags and reviews. The other three underclassmen did not mention content at all in their comments, and two did not seem to realize that Aquabrowser contained no articles. The researcher facilitating the test did not lead the student to give an opinion on content if the student did not bring it up in some way. It seems clear that the preferences of these freshmen and sophomores were driven by interface rather than by content. A future study dealing with content directly would perhaps reveal whether underclassmen care more about content or interface.

As library staff contemplate replacing traditional catalog interfaces with discovery layers, it is important to determine the extent to which users will consider the change a positive one. Olson's study (2007) showed that discovery layers were effective in finding additional sources not found by a traditional interface, and Sadeh (2008) reported that users found a discovery layer easier to use than other systems. In our study, six out of ten students showed a clear preference for either discovery layer tested over the "classic" system. Reasons given were that the discovery tool was more user-friendly, easier to use, or enabled them to find more resources. The comments of the other four students did not indicate a clear preference for either the discovery layer or the current catalog. None of the students preferred the current catalog over the discovery layer.

Finding the full text of articles and facets were some of the most used and universally liked features of the discovery layers. This finding confirmed the results of other tests that showed a generally positive reaction to facets as searching tools (OCLC 2009, 5–7). Other features sparked more controversy. For example, some users felt that Aquabrowser's word cloud was very helpful, while some disliked it. Another point of controversy was whether one should see all available resources as a default (the consortium for Aquabrowser and libraries worldwide for WorldCat Local) or only what is available locally. One surprise was the way users regarded Web 2.0 features, such as user lists or tagging. Many students who noticed the user list features did not see them as appropriate for academic work, even if they used them otherwise. OCLC's tests also found a mixed reaction to user-contributed reviews (OCLC 2009, 5–7).

Marketing to the AU community affected public use of the two discovery systems during the testing period, as overall comparative use of the systems

differed from the participants' preferences. The primary marketing tool of the two discovery systems consisted of a Web page with descriptions and links to the systems along with a letter from the Library's director of public and university relations detailing the purpose of both tools. In addition, announcements were made via a campus-wide e-mail, articles in the campus newspaper, and updates on the Library's social networking sites. However, as recorded through usage statistics, patron access to the two discovery systems differed. Access to WorldCat Local was only found on the dedicated Web page featuring both systems under the "News" section of the Library Web site. Access to Aquabrowser—a link off the "classic" Library catalog search interface—was more straightforward. Because of this, WorldCat Local only registered a total of 2,012 unique visits during the testing period, while Aquabrowser saw 133,118 unique visits, compared with over 1 million searches requested in the "classic" Library catalog. The researchers speculate that although both tools were marketed side by side, easier access to Aquabrowser facilitated significantly more unique visits than to WorldCat Local, while participant preferences in both the group and individual usability testing sessions favored WorldCat Local. This demonstrates the importance of marketing and outreach efforts alongside usability studies when launching a new discovery tool.

AU Library's implementation and subsequent testing of WorldCat Local and Aquabrowser garnered some fascinating feedback that helped lead the Library to a final decision on an appropriate discovery tool for the campus. Interestingly, the Library did not choose either discovery tool tested but ultimately adopted Serials Solutions's discovery system, Summon, in the fall of 2010. Summon was not on the market when the Library reviewed discovery tool options in 2008 and early 2009.

Summon's features, functionality, and interface combine elements found in WorldCat Local and Aquabrowser that students highlighted as desirable in testing, including results containing both electronic and print content, the need for immediate full-text availability, the ability to narrow and broaden searches via facets, and an easy-to-use but scholarly-looking interface. Summon defaults to a locally scoped search of the Library's holdings, for all formats and types, while also allowing users to broaden searches via a facet called "Add results beyond your library's collection," which includes open access content and content not held locally but available in the Summon index. In addition, the Summon search interface is straightforward, streamlined, easy-to-use, and includes scholarly features like the ability to limit to scholarly articles and the ability to include or exclude multiple facets during a search.

For now, WorldCat Local and Aquabrowser are still available to the university community as options. Library users can access the consortium Aquabrowser interface from the "classic" catalog. WorldCat Local is up and available but not promoted.

The study was limited in several ways. The researchers observed that the classroom setting of the first group usability study probably influenced what students stated as their preferred system. This group unanimously preferred WorldCat Local during class discussion, but comments written down before the discussion indicated that some students preferred Aquabrowser. The more vocal students had perhaps won classmates over from their original preferences.

Both the group test and the individual tests were conducted using students' normal searching behavior instead of a list of pre-defined tasks. Users picked a question off of a list to search according to their own interests and were encouraged to use topics taken from their own current projects. While the researchers felt there were benefits to this methodology (the primary one being to create a less artificial environment), not using assigned tasks created a less controlled environment. The more open-ended approach affected the strength of assertions the researchers can make about the results, particularly why differences in preferences occurred among different academic statuses.

A benefit of using assigned tasks for a study instead of user-developed tasks is that the researcher can make sure all aspects of the system are tested. In this study, different students addressed different aspects of the system according to their needs and interests, but were not prompted for information about what they did not use or notice. Thus, the study does not gather the opinions of all students on all aspects of the systems studied. Since all the major aspects of the systems were covered by some students, the researchers were willing to sacrifice the control of assigned tasks in order to get a better picture of how the students would use the discovery layers in their normal research environment.

A few contradictory results, such as the group test participants' enthusiasm about exporting to social networks contrasted with the individual test participants' mixed reactions to Web 2.0 features, indicate that the results need to be bolstered by further testing with more students.

In 2011, the researchers plan to employ the methodology established in this study with Summon as the test platform in order to build on the knowledge of what discovery system features are preferred by students. In addition, the researchers will analyze Summon usage statistics and techniques used in marketing via the redesigned Library Web site, which was also launched in fall 2010, to determine if these outreach mechanisms affected overall uptake and usage of the system.

CONCLUSIONS

This research showed that links to full-text articles through a link resolver, content that incorporates both articles and books, and facets—particularly date, format, and subject—were the “must haves” of discovery layers. Word

clouds, searching libraries beyond the local library or consortium, and user-generated reviews were optional rather than required. A design that is simple but also professional-looking will likely satisfy a majority of users.

The codes developed in this usability test could be used by other academic libraries as a base to test the preferences of their user populations.

The methodology of employing general research questions and users' own research interests is a model that could be useful to other libraries testing potential systems. Incorporating user-designed tasks, as well as assigned tasks, into a usability test can give a better overall picture of user search behavior.

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APPENDIX A Coding Structure

| Codes | Categories—Functionality |
|--------------------------------|--|
| 1 WorldCat AU (WorldCat Local) | |
| Searching Functions | |
| 1.1 | Used Advanced Search |
| 1.1.1 | Unsuccessful use of Advanced Search with limits |
| 1.1.2 | Limited search in Advanced Search to journal article |
| 1.1.3 | Limited search in Advanced Search by fields |
| 1.1.4 | Used multiple search terms in Advanced Search by keyword |
| 1.2 | Unsuccessful search |
| 1.3 | Used search by Libraries Worldwide |
| 1.4 | User disliked that system launched new search when clicking on subject term search |
| 1.5 | Used facet |
| 1.5.1 | Used article format facet |
| 1.5.2 | Used date facet |
| 1.5.3 | Used format facet |
| 1.5.4 | Did not find author facet useful |
| Finding More Functions | |
| 1.20 | Used subject headings in full record |
| 1.21 | Used similar items feature |
| 1.22 | Used Editions link |
| 1.23 | Used subject search in author authority record |
| 1.24 | Clicked into "sort by" drop down menu |
| 1.25 | Used sort feature |
| Saving/Citing Functions | |
| 1.30 | Used citation export feature |
| 1.31 | Used Save to . . . Things I Recommend on Results List |
| Full Text Functions | |
| 1.40 | Clicked on Find Full Text—finds article successfully |
| 1.41 | Used link resolver |
| Other Functions | |
| 1.50 | Used Covers Only Option display on the list |
| 1.51 | Collapsed/Expanded sections of screen |
| 1.52 | Used breadcrumb trail |

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APPENDIX A Coding Structure (*Continued*)

| Codes | Categories—Functionality |
|----------------------------------|---|
| 2 ALADIN Discovery (Aquabrowser) | |
| Searching Functions | |
| 2.1 | Used Advanced Search |
| 2.2 | Used facet |
| 2.2.1 | Used subject facet |
| 2.2.2 | Confused by facets |
| 2.2.3 | Used author facet |
| 2.2.4 | Used corporate author facet |
| 2.2.5 | Used geographic region facet |
| 2.2.6 | Used publication facet |
| 2.2.7 | Used format facet |
| 2.3 | Used word cloud |
| 2.3.1 | Expected clicking word cloud would add term to search |
| 2.3.2 | Commented that word cloud highlighted search trail |
| 2.3.3 | Word cloud would be useful in brainstorming topics |
| 2.4 | User finds it easy to refine search |
| 2.5 | Used breadcrumb to do “new” search |
| 2.6 | Liked that there are many ways to narrow your search |
| 2.7 | Narrowed search by university |
| 2.8 | Keyword search not clear in Advanced search |
| Finding More Functions | |
| 2.20 | Used sort functionality |
| 2.21 | Used MARC record view |
| 2.22 | Clicked on subject heading |
| 2.23 | Used link to WorldCat |
| 2.24 | Used Google Books link |
| Saving/Citing Functions | |
| 2.30 | Used citation export feature |
| 2.30.1 | Confused by citation export feature |
| 2.31 | Used save items feature |
| 2.32 | Clicked on “Take it With You” Tools |
| Full Text Functions | |
| 2.40 | Used full text link |
| Other Functions | |
| 2.50 | User frustrated cannot use back button to go back |
| 2.51 | Disliked that a new window does not open in Aquabrowser when clicking on features |
| 2.52 | Used help |
| 2.53 | Commented that making CLS requests is easy |
| Codes | Categories—Interface Display |
| 1 WorldCat AU (WorldCat Local) | |
| General Interface | |
| 1.1 | Likes organization of interface/“easy to use” |
| 1.2 | Should be structured differently |
| 1.3 | Feels separated from AU |
| 1.4 | More intuitive than current catalog |
| 1.6 | User did not like main search page |

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APPENDIX A Coding Structure (*Continued*)

| Codes | Categories—Interface Display |
|----------------------|--|
| 1.7 | User did not scroll past fold |
| 1.8 | Liked chat with a librarian |
| 1.9 | User did not like small font |
| Facets | |
| 1.20 | Liked facets |
| 1.20.1 | Ignored facets |
| 1.20.2 | Wanted facets in different place |
| 1.20.3 | Liked language facet |
| Full Record Display | |
| 1.30 | Liked ability to collapse/expand information on full record screen |
| 1.30.1 | User didn't see the point of collapsing/expanding info on full record screen |
| 1.30.2 | Liked the way information is divided with headers on full record screen |
| 1.30.3 | Liked page numbers of articles displayed on full record screen |
| 1.30.4 | User did not realize he/she could click into full record from results screen |
| 1.30.5 | Liked table of contents on full record |
| 1.30.6 | User wanted summary on all full records |
| 1.31 | User would like full text more prominent on full record |
| 1.31.1 | User liked that full text opened in new window |
| 1.31.2 | User couldn't find link to full text/wanted Find Full Text@AU to stand out |
| 1.31.3 | Liked download pdf icon |
| 1.32 | Liked citation export feature |
| 1.32.1 | User commented that he/she would like to be able to default citation style format on interface |
| 1.33 | Wondered what tags are |
| 1.33.1 | Liked ability to tag |
| 1.33.2 | Didn't think tagging appropriate for academics |
| 1.34 | Liked related subjects |
| 1.34.1 | User didn't notice similar articles link |
| 1.35 | Liked link to Google Books |
| 1.35.1 | User clicked on book review link on Item record but didn't work |
| 1.36 | Liked permalink |
| 1.37 | User had difficulty in finding the request information |
| 1.38 | Liked author authority record |
| 1.39 | User commented that he/she would not use the share feature |
| Results List Display | |
| 1.40 | Didn't know what format icons mean |
| 1.41 | User commented that book information was hard to read |
| 1.42 | Liked how title is the focus of brief record display rather than availability |
| 1.43 | User commented that availability of items not clear |
| 1.43.1 | User commented that it is helpful that AU holdings are at top of list |
| 1.44 | Liked book images |
| 1.45 | Liked relevancy sort feature |
| 1.46 | Liked date sort feature |

(Continued on next page)

APPENDIX A Coding Structure (*Continued*)

| Codes | Categories—Interface Display |
|----------------------------------|--|
| 2 ALADIN Discovery (Aquabrowser) | |
| General Interface | |
| 2.1 | Liked word cloud |
| 2.1.1 | Didn't like word cloud |
| 2.1.2 | User asked how word cloud works/confused by word cloud |
| 2.1.3 | Liked color coding on word cloud |
| 2.2 | ALADIN Discovery feels more like a library, more traditional |
| 2.2.1 | Feels like it is part of AU |
| 2.2.2 | More user friendly than classic catalog |
| 2.3 | Liked green chat bubble |
| 2.4 | Liked larger font |
| 2.5 | Confused by print button |
| 2.6 | Liked highlighting of search terms |
| 2.7 | Liked format icons |
| 2.8 | Liked display better than WorldCat AU |
| 2.9 | Word heavy |
| Facets | |
| 2.20 | Liked facets |
| 2.21 | Confused by corporate author facet |
| 2.22 | Would like facets better on left side |
| 2.23 | Liked subject topics |
| 2.24 | Liked call number facet |
| 2.25 | Didn't like series title facet |
| 2.26 | Liked publication date facet |
| 2.27 | Didn't like fact that clicking on format facet opens new window |
| Full Record Display | |
| 2.30 | Liked permanent URL feature |
| 2.30.1 | Didn't understand permanent URL feature |
| 2.31 | Display of chapter titles is too much information—prefers abstract |
| 2.31.1 | Liked table of contents and summary display |
| 2.31.2 | Liked related topics |
| 2.31.3 | Would like a browse feature |
| 2.32 | Liked consortium availability all in one place |
| 2.32.1 | Liked colors/display of availability note |
| 2.33 | User mentioned social networking features |
| 2.33.1 | Liked tagging feature |
| 2.34 | Full record screen initially overwhelming/messy |
| 2.35 | Confused by MARC record view |
| 2.36 | Liked print tools |
| 2.37 | Liked ability to print/save |
| 2.38 | Liked Google Books link |
| Results List Display | |
| 2.40 | Liked most recent published at top of results list |
| 2.41 | Didn't like availability information on results list |
| 2.42 | Likes holding information on record list |
| 2.43 | No cohesiveness to brief record display—looks “scattered” |

| Codes | Categories—Content |
|--------------------------------|-----------------------------------|
| 1 WorldCat AU (WorldCat Local) | |
| Article Content | |
| 1.1 | User commented on article content |

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APPENDIX A Coding Structure (*Continued*)

| Codes | Categories—Content |
|----------------------------------|--|
| 1.2 | User wanted more recent articles |
| 1.3 | User is frustrated by duplicate articles |
| 1.4 | User recognized duplicate article results come from two different databases |
| 1.5 | User didn't recognize difference between WorldCat AU and an article database |
| 1.6 | User couldn't find an article not available in full text |
| Other Library Content | |
| 1.20 | Found Worldwide search unnecessary |
| 1.21 | Liked being able to search libraries worldwide |
| 1.22 | Noticed AU holdings and availability |
| General Content Comments | |
| 1.30 | Liked amount of results returned |
| 1.31 | Liked e-book content |
| 1.32 | Liked that WorldCat AU contains both books and articles |
| User Generated Content | |
| 1.40 | Liked user reviews |
| 1.41 | Used a user generated list |
| 1.42 | Used watch list feature |
| 1.43 | User comments that he/she would not use reviews for academic work |
| 2 ALADIN Discovery (Aquabrowser) | |
| Article Content | |
| 2.1 | Wanted articles but found books |
| 2.2 | Did not realize there were no articles in results list |
| General Content Comments | |
| 2.20 | Liked amount of results brought back under facet |
| 2.21 | User could not figure out the format of a result |
| 2.23 | User commented that content was not as good as WorldCat AU |
| User Generated Content | |
| 2.30 | User comments that ALADIN Discovery could use more user input features |

APPENDIX B: USABILITY TEST QUESTIONS

Choose one of five research questions. Using the two search tools provided find a few good resources that would help you answer your selected question:

What effect has economic globalization had on Asian cities?

Describe the relationship between brain plasticity and Alzheimer's disease.

What is Hannah Arendt's *Eichmann in Jerusalem* about?

What were some of the major causes of the 1990's technology boom?

Explain the major themes found in post-colonial literature of the late 20th century.