Information Use Management and Policy Institute
College of Information, Florida State University

2005-2006 Florida Electronic Library Evaluation Activities: Usability, Functionality, and Accessibility Draft Final Report
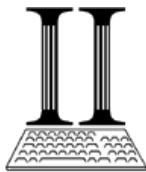
May 15, 2006

John T. Snead, <jsnead@fsu.edu>
Research Associate

Charles R. McClure, Ph. D. <cmcclure@lis.fsu.edu>
Director and Francis Eppes Professor

John Carlo Bertot, Ph. D. <bertot@lis.fsu.edu>
Associate Director and Professor

Joe Ryan <jmryan@fsu.edu>
Senior Research Associate

Executive Summary

This draft final report provides an overview of the results of 2005-2006 evaluations of the Florida Electronic Library (FEL) search and retrieval interface conducted by researchers at the Information Use Management and Policy Institute (Information Institute) of Florida State University. Evaluation results presented within this report will provide the State Library and Archives of Florida (State Library) with findings and input on the status of the usability, functionality, and accessibility of the FEL search and retrieval interface. This report builds on previous assessments of the FEL conducted by the Information Institute.

Evaluation results assess the degree to which the current FEL search and retrieval interface: (1) is usable and useful under various resource-seeking and retrieval conditions; (2) meet selected functionality requirements; and (3) are accessible in meeting selected accessibility requirements. Specific objectives for assessing the FEL search and retrieval interface are:

- Determine the usability and usefulness of the search and retrieval interface in meeting user information needs;
- Conduct a functionality assessment using functionality specifications previously developed and tested for the FEL; and
- Conduct a focused accessibility audit to determine the extent to which the search and retrieval interface meets accessibility standards of Section 508 of the Rehabilitation Act.

Functionality, usability, and accessibility evaluations focus on interactions with the FEL search and retrieval interface. The results within this report provide data that can inform the State Library, Florida Library Network Council, FEL work groups, and other interested parties in the decision-making process for continued implementation of the FEL.

Usability Results

Overall, participants feel the FEL search and retrieval interface is both usable and useful for both experienced and casual/novice users. Based on the Likert scale responses, participants generally rated the site as better than average and improved over prior evaluation periods. Participants also felt that additional future modifications within the interface (based on the findings of this study) will further enhance the site for users.

In general, participants feel the search engine is doing what a federated search engine should do – retrieve results across multiple databases. Presentation, organization, and access to results, however, are primary issues participants included within comments as part of the evaluation of the interface. Participants feel measures needed to address these issues include:

1) Increased training and education in the use of the interface;
2) Addition of viable and more visible help features;
3) Additional directions and/or tutorials in the use of many of the features present in the interface; and
4) Simplification of steps to complete search processes (i.e., selection of items to save, saving items, printing results, etc.).

Additionally, participants feel that steps to save results, to email or print results, or to create database clusters are unnecessarily over-complicated at present and may be most useful to more experienced users.

Functionality Results

Functionality testing of the FEL search and retrieval interface indicates improvements in many areas since the previous evaluations conducted by the Information Institute. Functionality testing as conducted in this study focuses on criteria identified as necessary to increase the accuracy and precision of retrieved search results. In using algorithms (to determine ranking), federated search systems by nature tend to decrease accuracy and precision. By continuing to assess the FEL search interface based on more traditional library criteria, accuracy and precision is improving along with the capability to simultaneously search across multiple library and vendor databases.

Accessibility Results

Accessibility is the level at which a technology can be used by individuals with disabilities. This can include having built-in accessibility features and working with adaptive technologies that individuals with disabilities may be using. Accessibility testing is particularly important in Florida as many seniors have disabilities including visual, hearing, and mobility impairments that impact the ability to use Web-based materials. Also, the Florida legislature has recently shown interest in accesibility related issues with State of Florida websites.

Accessibility within the FEL search and retrieval interface has vastly improved since previous evaluations were conducted by the Information Institute as well, for both the interface itself and within other FEL pages linked from the interface (i.e., FEL home page, FEL contact pages, Ask A Librarian pages, etc.). Improvement within the FEL home pages and other pages of the FEL will help to better meet the needs of Florida residents with disabilities and create a better flow (navigation) between the different aspects of the FEL as a whole.

2005-2006 FLORIDA ELECTRONIC LIBRARY EVALUATION ACTIVITIES: USABILITY, FUNCTIONALITY, AND ACCESSIBILITY DRAFT FINAL REPORT

In August 2005, the Information Use Management and Policy Institute (Information Institute) of Florida State University began preparations for the 2005-2006 Florida Electronic Library (FEL)[1] evaluation activities. This draft final report is the first deliverable for the evaluation of the FEL search and retrieval interface (Task 1, phase 1), as noted within the original 2005-2006 FEL evaluation statement of work (SOW).[2] The SOW contains updated methodologies, deliverables, and a timeline for completion of all work as part of an ongoing FEL evaluation activity planning strategy. The State Library and Archives of Florida (State Library) manages, oversees, and guides the ongoing development and testing phases of the FEL.

PROJECT TASK I (*October 1, 2005 – June 30, 2006)*

The results of current FEL evaluation activities contained within this draft final report build upon prior Information Institute FEL evaluations.[3] This draft final report completes phase 1 of Task 1 of the current study: expert usability, functionality, and accessibility testing of the FEL search and retrieval interface – the operationalized ExLibris' Metalib/SFX interface product, version 3.13.

Projected initial integration of the search and retrieval interface into the FEL website was November 2005. Actual integration activities occurred between January and February 2006 to a degree that allowed the initial evaluation of the interface to occur during March 2006. Evaluation of the FEL search and retrieval interface occurs in two phases:

1. Phase 1 (November 1, 2005 – April 15, 2006 [Extended date]): usability, functionality, and accessibility testing by Information Institute staff and selected evaluation experts. Testing and techniques are similar to those used by the Institute as reported in *Evaluation of Selected Components of the Florida Electronic Library* (2004)[4].

2. Phase 2 (April 15, 2006 – June 30, 2006): selected usability related focus group assessments by Information Institute staff that will include representative groups of participants from – library users, librarians, library staff, and other selected and interested parties.

In order to conduct phase 1 evaluations, the State Library provided Information Institute staff with regular updates on the status and integration activities of Metalib/SFX version 3.13 into the FEL website by ExLibris.

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[1] Records for the 2005-2006 evaluation activities for the FEL are designated by the Information Institute as *State Library 11– FEL.*

[2] Information Use Management and Policy Institute. (2005). *Evaluation Activities for the Florida Electronic Library October 2005-June 2006*. Tallahassee, FL: Florida State University, Information Institute (draft). Submitted to the State Library and Archives of Florida, September 15, 2005

[3] Information Use Management and Policy Institute. (2004). *Evaluation of Selected Components of the Florida Electronic Library*. Tallahassee, FL: Florida State University, Information Institute (draft).

[4] Ibid.

GOALS, OBJECTIVES, AND EVALUATION CRITERIA

The 2005-2006 FEL research goals for Information Institute evaluations are: 1) improve the FEL's success in meeting the information needs of Florida residents, the library community, and other users; and 2) assist in ongoing data collection, analysis, and reporting that measure FEL status and success. Current FEL research goals derived from prior work completed and reported to the State Library in August 2005.

Expert evaluation results presented within this draft final report assess the degree to which the current FEL search and retrieval interface (http://www.flelibrary.org): 1) is usable and useful under various resource seeking and retrieval conditions; 2) meets selected functionality requirements; and 3) is accessible in meeting selected accessibility requirements. Specific objectives for assessing the FEL search and retrieval interface are:

- Determine the usability and usefulness of the search and retrieval interface in meeting user information needs;
- Conduct a functionality assessment using functionality specifications previously developed and tested for the FEL;[5] and
- Conduct a focused accessibility audit to determine the extent to which the search and retrieval interface meets accessibility standards of Section 508 of the Rehabilitation Act.

The study team designed functionality, usability, and accessibility evaluations to focus on interactions by adult populations of public libraries with the FEL search and retrieval interface. Evaluation criteria, test instruments, and the methodologies used within this initial evaluation have been developed and applied in prior Metalib/SFX interface assessments.[6]

EVALUATION RESULTS

Results of the current evaluations included within this report provide: 1) input on how library users may interact with the interface (usability and usefulness); and 2) levels of functionality and accessibility afforded by the latest version of the search and retrieval interface. Additionally, the results help establish the need for ongoing assessment that is necessary for continued fine-tuning and improvement of the FEL in meeting the goals established for the FEL.

Six participants took part in the expert-testing phase of the FEL search and retrieval interface. Three of the participants had previously participated in expert testing of the interface. The other three participants were familiar with the FEL, had limited knowledge of the FEL search and retrieval interface, and had participated in similar digital library interface testing (search and retrieve interface functionality and accessibility testing) before this study.

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[5] The consultants conducted assessments of several pilot project implementations and their functionality. This assessment serves as the beginning point for the pilot portal's functionality requirements. See Bertot, J. C., McClure, C. R., Thompson, K. M., Jaeger, P. T., and Langa, L. (2003). *Florida Electronic Library: Pilot Project Functionality Assessment*. Tallahassee, FL: Florida Division of Libraries, Department of State. Available at: http://www.ii.fsu.edu/projects/2003/state_library6/functionality.report.09_14_03.pdf.

[6] Information Use Management and Policy Institute. (2004). *Evaluation of Selected Components of the Florida Electronic Library*. Tallahassee, FL: Florida State University, Information Institute (draft).

Each participant evaluated the FEL search and retrieval interface independently of the other participants. Results have been combined and generalized where possible and are presented by type of test (i.e. usability, functionality, and accessibility).

Usability Results

The study team developed a standard usability protocol to evaluate the FEL search and retrieval interface based on prior usability instruments. Factors to determine interaction success rates in meeting information usability needs include:

- Navigation within interface;
- Selection of search terms or phrases matched to predetermined clusters of databases;
- Understanding and dissemination of retrieved results;
- Retrieval of relevant items including use of the SFX function;
- Modification of initial search terms and phrases as needed;
- Ability of users to save searches and results of searches; and
- Ability of users to create customized clusters of databases.

The degree and extent test participants achieve in interaction with an operational and functional FEL search and retrieval interface determine interaction success rates. Participants of the usability study include Information Institute staff and other selected evaluation experts. Six participants evaluated the usability of the FEL interface. The usability test instrument is available within this document (See Appendix A).

The study team presents summaries of the usability results by question, or logically grouped sets of questions as presented within the survey form. The study team also differentiates summaries of participant replies to the questions when applicable by survey response (Likert scale) and by general comments. Suggested solutions for identified concerns and/or problem areas are included whenever possible along with suggested improvements offered to enhance the search and retrieval experience for users when applicable.

Questions 1-9:

Questions 1-3 relate searches to retrievals. Questions 4-9 consist of comment boxes provided for participants for each search conducted (questions 1-3). Comments and suggestions from 4-9 follow data presentation for questions 1-3 (and where relevant in answering questions 10-17).

The study team encouraged participants to include any thoughts, concerns, and suggestions they had concerning the searches in the comment boxes for each search. Each participant conducted five separate searches; and each participant freely selected data clusters, type of search used (simple or advanced), and search terms (i.e., each participant selected topics of personal interest) for each search made. Additionally, the study team encouraged each participant to: 1) explore the interface as they conducted the searches; 2) examine the results as they would for any other type of research; and 3) explore any and as many aspects of the interface as possible (i.e., search limiters, result presentations, saving results, etc.).

Figure 1 (below) presents selected samples of completed search results within the search form. The study team presents results of all searches by question and includes relevant comments from participants of the usability testing.

		Search 1		Search 2		Search 3	
1. Search Data	a. Category/or Subcategory	Magazine-Newspaper		Health & Medicine		Espanol	
	b. Search Term(s)	"mardi gras"		"high blood pressure"		"Puerto Rico"	
	c. Search Type	Initial search from log-in box		QuickSearch, Simple		Initial search from log-in	
2. Database Use Page	a. Enter the Names of ALL Databases (Db) Listed	Info Trac OneFile (Gale)	X	Health and Wellness (Gale)	X	Informe (Gale)	X
		Electronic Collections (OCLC)	X	Health Reference Center (Gale)	X	Clase Periodica (OCLC)	X
		Article First (OCLC)	X	PubMed	X		
	b. Place X if Db had Items Retrieved	Findarticles.com		Gale Encyclopedia of Genetic disorders	X		
				Gale Encyclopedia of Medicine (GVRL)	X		
3. View Results Page	a. Total Results Found	12578		215,724		1685	
	b. Total Items Retrieved	90		202		30	

Figure 1: Sample Search Form with Selected Results for Questions 1-3

1. *Search Data*

   a. Category or Subcategory – there are 10 pre-determined clusters of databases on the quick search page; of the 30 total searches conducted, the participants used all 10 pre-determined clusters.
   b. Search Term(s) – terms used within the searches included simple and complex (i.e. accessibility, mardi gras, etc.); phrases such as "computer virus" and "how to find a house"; and author/title searches.
   c. Search Type – 20 of the searches used the Quick Search feature with 7 of the 20 occurring from the initial log-in box; 10 of the searches used the Advanced Search feature (i.e. term or phrase by subject, author; term/year; search phrase using Boolean operators; etc.).

Comments:

   1. The barcode for login entry does not allow for spacing between the numbers. Each library number has spaces between the numbers.
   2. The default for the initial login search is "Magazine – Newspaper" yet the first database cluster on the Quick Search page is "Books + Authors".
   3. Use of the connectors (i.e., "+", "/", and "-") within the Quick Search cluster labels is inconsistent and potentially confusing.

4. The log-out feature does not always function properly in Internet Explorer. Individuals using the FEL search interface can remain logged-in, after selecting log-out until the browser is closed.
5. The taskbar at the top of the search pages offers a choice between QuickSearch and Search. Both offer the identical Simple and Advanced searching pages.

Suggestions:

1. Include a note below or next to the login box to omit spacing, or insert an example showing no spaces between the numbers below the login box.
2. Change the initial login search default or the Quick Search page to match the order of pre-determined database clusters. Note: The drop down menu (arrow box beside the Search In text box) lists Books + Authors first as well.
3. Change the connectors between terms in the labels of database clusters to "/" for consistency and to remove potential ambiguities as to what the connector means (i.e., what the "+" means compared to the "-", and "/").
4. Add metadata to the log-off feature stating, "Please close the browser window upon exiting the system" to insure the individual fully logs off. Also, check/fix the log-off feature to actually log the individual out of the system.
5. If the emphasis for all searches is quick searches, drop the term "Search" from the taskbar unless there are future additions expected that would distinguish between a Quick Search and a Search. If the emphasis for the search interface is on "Simple" vs. "Advanced" searches, drop the term "QuickSearch" and keep Search as the more generic label. As presented now, the two terms present potential differences to users of the search interface but are not actually different in use or in action.

2. *Database Use Page*

a. Enter the Names of ALL Databases (Db) Listed – participants list up to five databases shown (first five listed) during the "search for results" process.
b. Place X if Db had Items Retrieved – participants note which databases had items retrieved.

Comments:

1. Using "Magazine-Newspaper", the "Findarticles.com" database consistently returned no results and several times had the notation "Hits were found", yet the search engine selected no items from this database for seven separate searches.
2. A search made for "Puerto Rico" in the "Espanol" database showed two databases available, "Informe (Gale)" and "Clase Periodica (OCLC)". The "Informe" database, however, was not available.
3. Inconsistencies between "Found" and "Retrieved" items. A search using the "Advanced" search feature for "Folkways (Title search) AND Sumner (Author search)" showed items found in both databases (19 and 24 items) but retrieved none.
4. It appears from viewing numbers of retrieved items for most searches that the default for the maximum retrieved items from each database is 30 with a maximum of 90 items

retrieved. The actual numbers retrieved, however, are not consistent for all searches. Ex: 1501 results found in 4 databases with 37 total items retrieved; 279 results found in 3 databases with 54 retrieved; 19,128 results found in 4 databases with 93 results.

5. Approximately 1/3 of each web page within the search and retrieve interface is unused. The large unused portion to the right of each page appears to needlessly compact the results of searches into 2/3 of the available space.

Suggestions:

1. Drop "Findarticles.com" from the "Magazine-Newspaper" database cluster.
2. Periodically test each database cluster using a variety of search terms, and/or assess database use from log statistics to identify no-use or limited use databases. Remove no-use or limited use databases from the clusters.
3. Inconsistencies between number of found and number of retrieved items, number retrieved from each database, etc. may confuse or possibly anger some users (i.e., those who want to view more results that are shown as available). Add a visible link that includes an explanation of the retrieval process and of the presentation of retrieved and presented results next to the result table in the blank area. The link should use language such as "how this works" or "learn more".
4. Expand the results to cover the entire page to make reading the results easier and less congested; and/or utilize the blank space for highly visible links to pages offering explanations on: how to search (i.e., does author name order matter as to first then last or last/first? The answer is yes, last name then first.); how to select terms; how to narrow or limit searches; what do the numbers of retrieved items vs. found mean; etc.

3. *View Results Page*

a. Total Results Found – participants note the total number of items found from the results page (i.e., page resulting from selecting "View Retrieved" on the database page).
b. Total Items Retrieved – participants note the total number of records retrieved (i.e., 1-10 of 90 where 90 is the total retrieved).
c. The study team encouraged participants to explore the results. Tasks include:
   1. Explore the different views of results available (i.e., table, brief, and full);
   2. Attempt to retrieve more results;
   3. Try a Metadata search from the result page;
   4. Assess the results of the search based on the titles retrieved; and
   5. Find full-text results from the result page, etc.

I. Comments: Search Results

1. Participants noted that search terms are highlighted within the individual records, the full citation/record is available, and one can navigate from brief view of the record to full view with ease.
2. Duplicated items are present within the results and leads to fewer actual retrieved items.
3. When selecting "view retrieved," the result page only shows 10 retrieved items per page. Having only a set of 10 results to view at a time is too few per page.

4. The default maximum retrieved items for most, but not all databases seem to be 30 per database. There is a link to "retrieve more", but the added results are small and actually annoying. Example: when "retrieve more" is selected on an initial search with 90 items retrieved of 12,273 results found, the additional results still seem to include the original 90 items as the first 9 pages and adds 23 results at the end of the result pages for a total now of 113 items retrieved. To reach the new items retrieved, the user has to forward, one page at a time, thru the original nine pages of results.

5. A search of "Books + Authors" for the title "Little Old Man Who Could Not Read" retrieved a selection of children's books (right genre); however, none of the results matches the title or author. Results of the search include lots of Grimm and Hans Christian Andersen books, but none that look like they fit the search criteria nor is there any indication of which libraries have "The Little Old Man Who Could Not Read." There is no apparent connection for this search between retrieved results and search parameters.

6. There were adequate results from searches conducted within the "Espanol" database cluster; however, the results include a mix of books written in Spanish with books with Spanish authors and/or Spanish titles with English text. In addition, is there any way they could make it say "Español" for political correctness?

7. Results page needs a feature like "Search within results" to delimit the search after retrieving items. Delimiting will help to refine and filter the search without having to begin again. If not, patrons must begin with a good search term strategy to find accurate items that they want to view, or they have to re-search (begin the search process again) until they can find the search term strategy that works.

Suggestions: Search Results

1. Highlighted search terms within records and ease of navigation between views are common in library and/or vendor supplied search and retrieval systems. Having these features available in this interface indicate that other types of helpful features can be incorporated into this search and retrieval system as well.

2. Electronically eliminate duplicate items within the results need to be electronically eliminated before the results are viewed. This programming issue can and should be resolved.

3. It is possible and desirable to allow the user to select and/or set the number of results retrieved per page; or to select from a list of numbers/page. Other library and vendor systems offer this feature. This would be a positive feature to add.

4. There may be economic or budgetary reasons for limiting results per database to a maximum of 30; however, from the perspectives of precision and accuracy in retrieving desired results, limiting the maximum to 30 from a single database may negatively affect the accuracy and precision of each search. Limiting each search may deny access to what could be the most precise and accurate results held in a single database.

5. When the retrieval of no exact matches occurs, metadata explaining "No Results Found" or "No Exact Matches Found" is common in many libraries and vendor related systems. This allows a user to immediately refine search terms and saves time searching through pages of results for matches that may not be there and still leaves the user the option to search through retrieved results if they choose to seek similar or related type items.

6. Metadata can be added explaining that the "i" icon is a link to descriptions of the databases within each cluster. Having a database cluster, labeled "Espanol" without clear explanations of content can be misleading, particularly if users are expecting to use a source to only retrieve Spanish language items.
7. Add "Search within Results" capabilities for delimiting results to this system. At minimum, the capability to search within results by delimiting results should be equivalent to the most basic of library systems.

II. Comments: Navigation

1. The navigation aide for moving through the results is too basic. The only navigation aides available are page forward and page back arrow buttons. There are no clickable page numbers within the metadata of the search result table to find page results by page number, no home page or end page buttons, etc.
2. It is difficult at times to go back to the original search results page from several pages into the results (very slow and occasionally freezes the browser). Clicking the "BACK" button on the browser does not seem to work well either.

Suggestions: Navigation

1. It is common in other search-and-retrieve systems to have a series of arrows for navigation backward and forward and to the beginning or end pages. It is also common to have page numbers for use in navigating through multiple pages of results. Having to move forward or back one page at a time is very time-consuming and annoying when users expect common navigation features.
2. For some reason, going back within the results from page to page is very slow, as if the system is reloading results of prior pages each time. Use of the "Back" button (browser) is also very slow at times and sometimes the system freezes.

III. Comments: Links

1. There is a "Summary" feature that allows the user to see the original database "found" and "retrieved" numbers, but it is not an intuitive hyperlink nor does it do anything more than show the original "Items Found" and "Items Retrieved" by database.
2. Some of the links have a mouse-over capability. They contain metadata such as "Previous", "Next", or "Jump" in a pop-up text box; however, many of the links do not have mouse-over capability which makes the results page inconsistent. In addition, when the text appears with a mouse over, the metadata in the pop-up box does not add much to an understanding of the intent of the link (minimal or no additional information is gained).
3. "MetaSearch", when selected from within the search results toolbar either is not working or is simply replicating the original search (results did not appear to be different).
4. "Search and Link Results" and "Summary" links are not available when using the "MetaSearch" link from within the search result toolbar even though the results are the same.

Suggestions: Links

1. The "Summary" feature produces disappointing results. Remove or rename "Summary" to "Database Summary" to better reflect its action.
2. Mouse-over capability adds useful explanatory metadata to links; however, if used, all similar links should possess the mouse-over capability for consistency. In adding explanatory metadata, use language that will further define the action.
3. Remove "MetaSearch" (as a link within the search results toolbar) from the result page toolbar until further development can occur and it can become a useful function of this interface from this point in the site. "MetaSearch", however, as a starting point (top search page toolbar) is very useful, particularly for subject searches. Having the term "MetaSearch" in two different locations on the page where only one appears to be affective as a tool is confusing to users.
4. If "MetaSearch" is kept as a link within the search result toolbar, it should also have other features appear that are deemed important to the "Simple" and "Advanced" search (i.e., features such as "Summary" and "Search and Link Results").

Questions 10 – 17:

Questions 10 through 17 of the survey allow participants to follow a prepared protocol that presents selected aspects of the interface, along with instructions when needed on how to utilize the selected aspects of the interface. As participants work through the protocol, they respond to embedded questions related directly to specific aspects within the protocol. The protocol used in this study in included as part of the usability study. (See Appendix A)

Participants supply responses to the questions using a Likert scale (below) with a range from *Strongly Disagree* (1) to *Strongly Agree* (5). Each question includes a comment box for participant use based on the search experience. The scale includes a sixth potential response, *Unable to Assess* (6).

	Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Unable to Assess
Questions 10 through 17	1	2	3	4	5	6
Please comment:						

Figure 2: Example of Likert Scale and Comment Box.

10. *The databases are logically grouped by relevant general search areas*.

The question directs attention to the pre-developed clusters (groupings) of databases located on the initial search screen (See Figure 3 below).

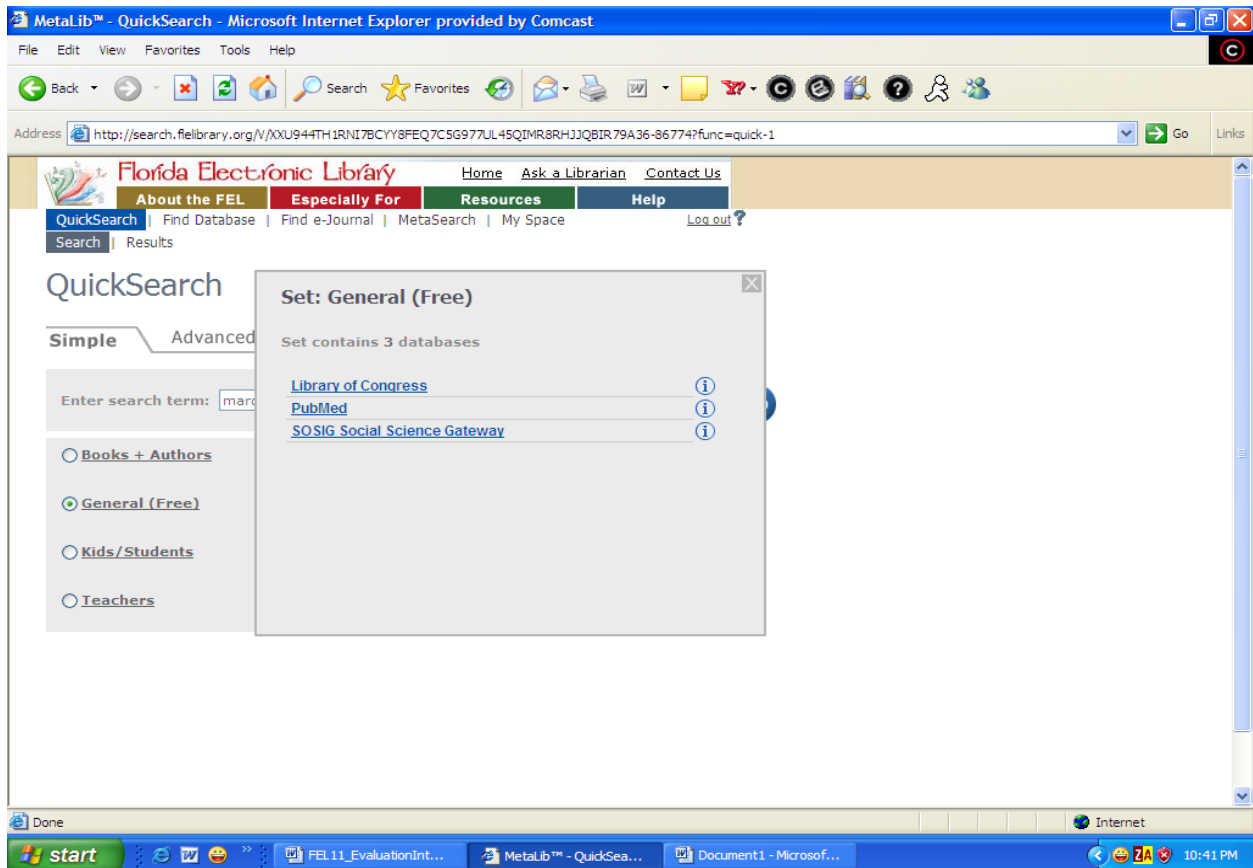Participant Likert Scale Responses: 4 Agree, 1 Undecided, and 1 Disagree

Figure 3: Pop-up from QuickSearch page showing databases contained within the General (Free) database cluster.

Comments:

1. There is no indicator available for users to show which database clusters they have already tried (searched).
2. In general, the name of each database cluster is relatively clear as to content type with the exception of "Espanol" as noted by two participants and the "General (free)" database cluster.
3. One participant noted that grouping "PubMed", "Social Science Gateway", and "LOC" did not make sense in the "General (free)" cluster unless these are the only freely available databases for any user.
4. Having pop-up boxes with live links to the databases contained within a cluster is useful. In addition, having metadata associated with the database as linked from the circle with the "i" is very informative. The icon for more information (circled "i"), however, may be confusing or overlooked by users.
5. Some of the individual databases are simply links directly to the login page for the database and users are required to re-enter their library card number. These pages offer very little information on content of the databases.

Suggestions:

1. Apply a color scheme to differentiate the unopened (unused) clusters from searched clusters.
2. Some clusters, such as "Espanol" and "General (free)" need metadata added explaining the mix of databases, such as whether the databases include only Spanish language documents or why a medical database is included with social science and Library of Congress databases.
3. Add more metadata to explain options, such as a mouse-over for the database cluster names to alert users, that database information contained within the cluster is available. In addition, add more metadata in the pop-up window explaining how to find additional information about each database instead of just showing the information icon ("i") by each database listed.
4. Links to pages within databases from the pop-up box associated with each cluster should be consistent if at all possible, meaning each database is linked via a help, introductory, or other explanatory page. The information icon needs a label.
5. If possible, upgrade the authentication process to include direct access into linked databases. If not possible, then perhaps other databases should be included within the clusters or access to the databases not be linked from the pop-up box. Add a separate link from the search page to a separate page of individual databases requiring an additional login along with an explanation of why this is necessary for these specific databases.

11. *The results are displayed in an easy to read and understand format*.

The question addresses the aesthetics of the display of results from the variety of searches conducted by participants (See Figure 4 below).

Participant Likert Scale Responses: 1 Strongly Agree, 4 Agree, and 1 Undecided

Comments:

1. One participant felt the default view should be the "Brief View" rather than "Table View;" however, other participants felt the Brief View was the better default. All of the participants preferred to have more results per page or at least the option to have more shown.
2. All participants noted that the display area occupied only about two-thirds of the display page leaving the results cramped and harder to read.
3. Participants prefer a rating by percentage for ranking as opposed to the green line.
4. The FEL taskbar at the top and the search interface taskbar beneath need space or a line of demarcation between them (i.e., too closely grouped together, cramped, and potentially confusing).
5. Help features should be clearly located and labeled "Help" or some other clear label instead of a question mark. The question mark is too close to the log-off feature and may only be associated with logging out of the system.
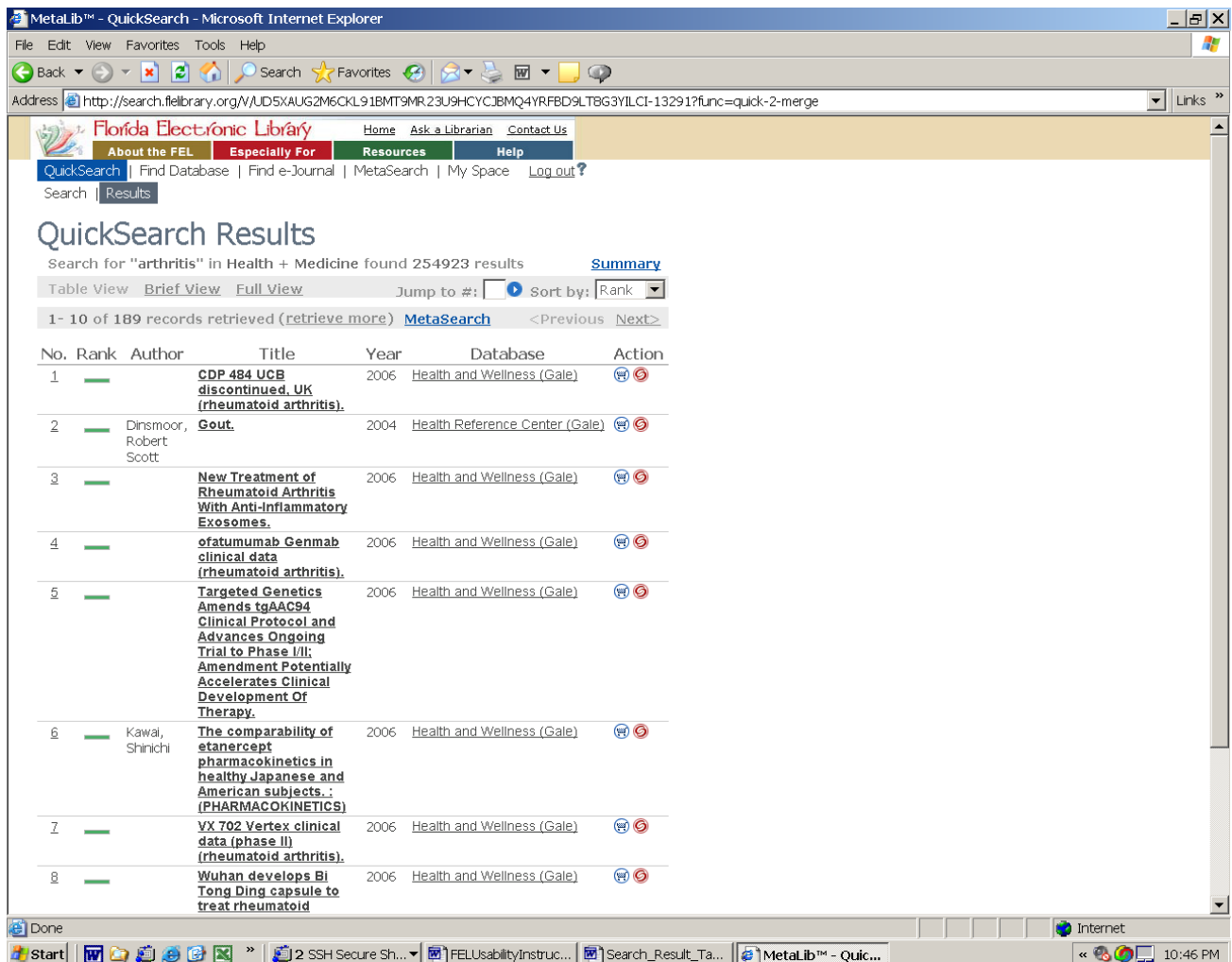
Figure 4: QuickSearch Simple Search Results Page.

Suggestions:

1. Offer more results presented per page.
2. Expand the results to cover the entire page. Extend the Title column to make the displayed titles easier to read.
3. Change the "Rank" from the visual and difficult to see/read green line to a percentage.
4. Add a definitive line between FEL links and "QuickSearch" links (top of "QuickSearch" page). Stack the tasks for "QuickSearch" links into two balanced lines of links.
5. Re-label the help icon ("?") to a text label (Help) and move the "Help" feature from the position beside the "log-out" link.

12. *The Basket feature will enhance my search experience*.

The question focuses upon the ability of users to save search results into a personal "Basket" of saved items (See Figure 5 below).

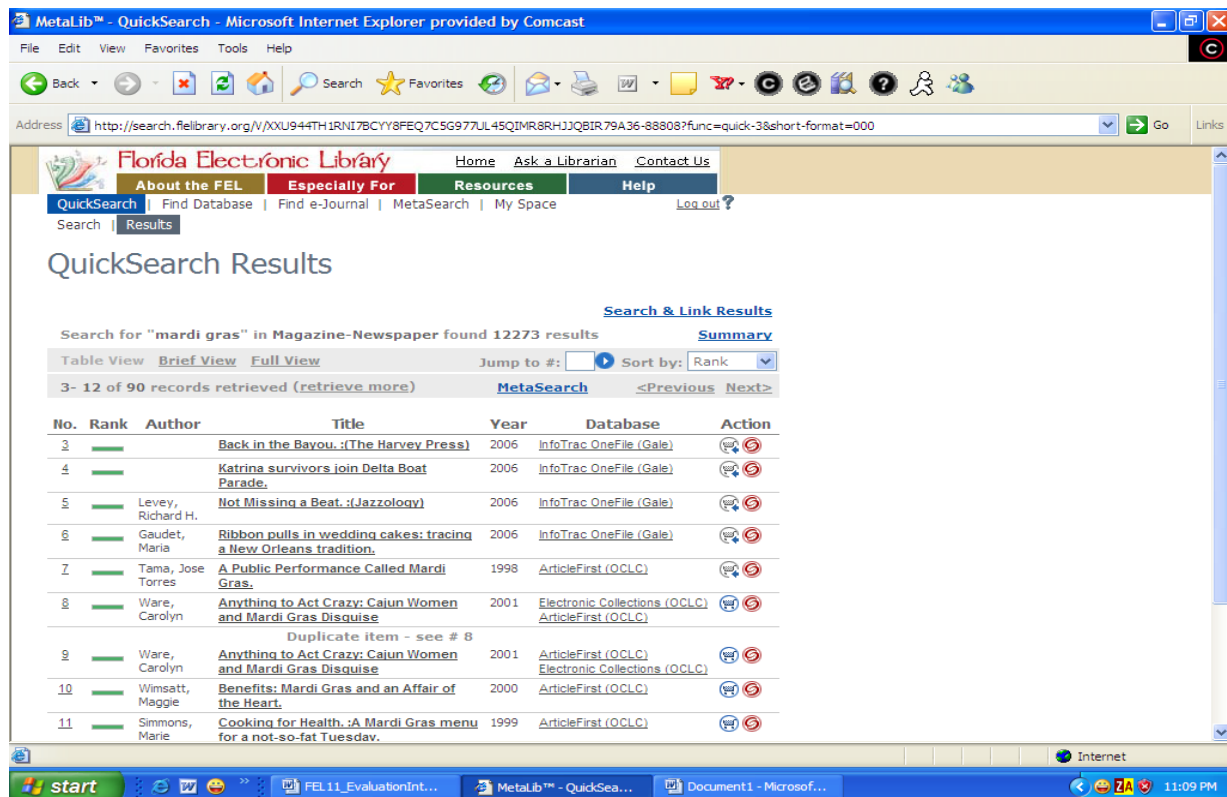Participant Likert Scale Responses: 1 Agree, 4 Undecided, and 1 Disagree

Figure 5: Saving Items to Basket.

Comments:

1. When saving items to the basket from multiple searches, it is common to save duplicate items as well.
2. A color change occurs when selecting (clicking) the "Basket" icon (cart symbol) next to an item selected for saving and a small arrow appears beneath the icon. Unlike other systems, however, no message appears informing the user the "Item Saved" (See gray cart icons for the first five items in Figure 5 above to note color change). New users may click the icon and have no idea what to do next or where to go to find the saved item.
3. The shopping cart symbol often appears on commercial websites and symbolizes items saved to a cart for purchase, as does the term "Basket".
4. The button "My Space" that links the search results page to the "Basket" is physically too far removed from the results based on the proximity principle of relevant resources of web design.
5. Finding the "Basket" within "My Space" is not intuitive and no directions, guidelines, or help of any kind is visibly available.
6. It is impossible to de-select items selected. Once selected, items appear in the "Basket". Once the "My Space" page is open within the current window, users cannot retrieve the original search result page.
7. The basket feature is useful in that it allows patrons to save items from their searches for future use; however, there are too many independent steps involved in the process and that creates a non-intuitive learning curve for users to overcome.

8. The Basket does not automatically clear at the end of a session. The next time a user logs-in, the previous saved items are still in the Basket.
9. Too many steps appear in the process of clearing and organizing the "Basket". Example: previous searches conducted by participants led to confusion as to location of results for current searches. The system places the newest saved results at the bottom of the list, below all prior saved items.

Suggestions:

1. Duplicate items should never appear in the results or within the "Basket" feature.
2. A message should appear announcing, "Item has been saved to the Basket" when the shopping cart icon is clicked.
3. Either change the shopping cart icon to reflect more common library terminology or add metadata to better label what the icon does.
4. Embed a direct link to the "Basket" feature within the search result table (i.e., above the save icon where the page navigation symbols are currently located).
5. A link directly to the "Basket" needs to be in the table. In addition, there are some directions on saving items to the "Basket" within the help feature (the question mark), but the help icon is easy to overlook.
6. A toggle function for selection/de-selection of items feature needs to replace the current "select only" shopping cart button.
7. A direct link to the "Basket" from the result table will take users directly to the "Basket". If this is not possible, add a help link labeled, "Want to save your searches?" or something similar with instructions that remain visible in a side window on how to add items to the "Basket".
8. The "Basket" feature should be set to clear all saved items upon log-out of the interface along with a pop-up warning when clicking log-out that all items not saved into separate folders from the "Basket" will be lost.
9. The most recent items saved should move to the top of the "Basket" list if a user forgot to clear a prior search and not to the bottom. Otherwise, users may assume they failed to properly save the items to begin with.

13. ***Saving items to search folders that I can name will enhance future search sessions***.

This question addresses the ability of participants to transfer items from "My Basket" into "Temporary" search folders users can name and save for future reference. This feature allows users to sort and group similar items into named and saved folders.

Participant Likert Scale Responses: 5 Agree and 1 Disagree

Comments:

1. First time or non-regular users may find this process too difficult to use.
2. Saving to "Temporary" folders is a follow-up process to saving items to the "Basket" feature and that makes it a non-intuitive and too complicated procedure.
3. The process may be more confusing than helpful for many users.

4. Once a user goes to the "Basket", it is difficult and at times impossible to go back to the original search.

Suggestions:

1. Provide clear and simple instructions for both saving to the "Basket" folder and to the "Temporary" folders.
2. The site needs additional instructions on how to navigate from searches to "Basket" and "Temporary" folders and back to the original folder.

14. *The labels, i.e. Find Database, My Shelf, My Databases, and the icons, i.e.,* 🖼️, 🔴 *etc. adequately guide me through the process of creating a customized database group*.

This question is directed at the use and understanding of icons and labels presented within this interface.

Participant Likert Scale Responses: 2 Agree, 2 Undecided, 1 Disagree, and 1 Strongly Disagree

Comments:

1. Functions of symbols, such as ⓘ⊕, might be difficult to understand.
2. Once selection of an action occurs (i.e., labeled link, icon, etc.), it is difficult to cancel or back out of the action.
3. Creating database clusters does follow a logical sequence of steps, but they are numerous, not intuitive, and it is difficult to recall the complicated procedures for a regular user much less for a first-time or non-regular user.
4. The icons do not enlarge well for those using or needing larger text, and when enlarged, they look awful with alternate color schemes (they get fuzzy and distorted for some reason).

Suggestions:

1. Create and add a legend for icons and links to explain the meaning/definition of all symbols, icons, labels, etc.
2. Each action needs an opt-out feature for patrons to change their mind.
3. Saving databases to a customized database cluster should occur from the "Basket" feature and/or the search results page. There may be a feature to directly save these databases from either the "Basket" or "Search Results" page (there was a way to do this; Ex Libris personnel demonstrated it at the training session); but if there is, none of the participants could find it or it may be turned off. The original testing of this interface included a feature that directly saved databases without having to individually write them down on a piece of paper and then search through a list of databases to add them to a cluster and name the cluster. There was a shortcut. Either include directions to the shortcut or as a separate side help window.
4. Icons or labels should enlarge properly (for accessibility purposes). Text boxes that readily enlarge can replace icons that do not.

15. ***The ability to create and change customized databases during future sessions is useful to me.***

This question addresses the ability of patrons and other users to create their own customized database groupings for use in searches.

Participant Likert Scale Responses: 3 Agree, 2 Undecided, and 1 Disagree

Comments:

1. One drawback of the customized database-grouping feature is its inability to automatically clear the content in the "Selection Set." Databases accumulate if the user forgets to intentionally clear them.
2. The ability to create and customize databases for future sessions is an extremely useful feature; however, the process at present is too complicated (i.e. no directions and too many steps to easily accomplish even for experienced users).
3. Prior use of the site left the "Florida on Florida" and "Florida Cat" databases within the "My Database" area. Re-clicking them did not deselect them from the initial area of selecting databases. Participants had to go to "My Shelf" and select "My Databases" to deselect and cancel the database cluster. Users have to develop a good sense of the "My Space" features and area to know where to go and what to do with managing customized database clusters.
4. Users have to manually check out all the databases needed (find the databases and select them). On the left area of the screen where the system prompts users to enter the database-related information (Identify Databases), the first option (My Databases) of the drop-down menu is not functional (which may be the shortcut from earlier training sessions).
5. Within the "Identify Databases" area, no descriptive paragraphs provide insight on the differences between the four available options.

Suggestions:

1. Contrary to the "Basket" feature, the "Selection Set" should continue to save databases for a number of reasons including difficulty of remembering useful databases from prior searches, difficulty of locating and saving databases to begin with, and the many steps involved in creating customized database clusters. Automatically clearing databases does not seem to be a good idea; however, users need the option to manually delete databases from this location.
2. Need directions in the form of a separate side help window for users (creating customizable database clusters). A help link is also needed that will open the help page to explain differences between finding database options, directions to create database clusters, etc.
3. Recommend adding "Check all" and "Uncheck" buttons to simplify the "database cluster creation procedure" in selecting databases from the database "Selection Set." Users should be able to create and manage database clusters from the same location within the interface.

4. Periodically test features throughout the interface on a regular basis for operational status. Fix or remove those not working to minimize confusion.
5. For specific areas such as "Identify Databases", add pop-up windows with definitions/explanations (similar to those that pop-up from the pre-selected database "QuickSearch" page).

16. *The SFX search process simplifies the search experience*.

Participants were not able to assess this feature at this time.

17. *SFX helps me locate items*.

Participants were not able to assess this feature at this time.

Questions 18-21:

Questions 18-21 allows participants to supply additional feedback from their experience in viewing the FEL search and retrieve interface.

18. *Please identify the 3 most useful search features on the site*.

a. Full text availability
b. Quick Search
c. Add to basket

19. *Please identify the 3 least useful search features on the site*.

a. MetaSearch
b. Find Databases
c. Help

20. *What suggestions would you make to improve the site*?

1. Why do patrons use this site? It is because in most cases they want to find specific items and view them on their screen if possible since FEL provides access to resources electronically. Therefore, it is very important and necessary for FEL to prepare how-to-find manuals and have them available on the web or place step-by-step search strategies linked from the "QuickSearch" page.
2. Add tutorials need to train users in many of the features within the site (i.e., creating temporary baskets or customized databases.)

21. *How usable do you feel the site is overall*?

1. Overall, the search site is usable and useful. With some future modification, it will be more enhanced for users to use efficiently and effectively.

2. Overall okay. If users have prior experience with search databases, interfaces, features, etc., using the site will become a normal and positive experience. If not, the user will need training in the form of tutorials. In other words, as is, the site is not intuitive.
3. The site has the potential to serve a range of users.
4. First time users and novice searchers would primarily use "QuickSearch". Over time, regular users might figure out some of the other features.
5. Professional users (i.e., librarians and library staff, researchers, etc.) would probably use it more to the extent of its capabilities.
6. The site is a little rigid in some areas (i.e., cannot select and deselect databases in same view, have to go to "My Space" to deselect, move databases around, etc.). With practice/use, the addition of some instructions/directions, and the addition of features such as additional "Help" links, a more direct link to the "Basket", etc., users will become familiar with the site and utilize it more fully.
7. There are navigation issues throughout the site. It is difficult to find previous pages and to navigate out of a very messy search.
8. Changing the view of the search (i.e., table, brief, or full) is not particularly useful; meaning if a user wanted more information they could just click directly on a specific record instead of changing the view. The multiple displays (views) for search results can bog down the navigation.

Suggestions:

1. Implementing suggestions offered within this report (above) will improve the usability of this site and that in turn will help improve the effectiveness and efficiency of this site for a wider array of users (i.e., from experienced to casual/novice users).
2. To improve the site and make it more intuitive, visuals need to be improved (i.e., explanatory metadata added as information boxes, icons need to be enlarged, explained, and in some cases replaced with more readily identifiable icons). In addition, navigation needs to improve throughout the site (i.e., additional navigation features added, better visual separation of different page taskbars), and add more help features (i.e., directions, explanations, etc.).
3. Databases included within this site offer potential resources that a wide array of users and stakeholder groups could find useful; however, issues discussed within this report (above), such as difficulty with the use of the search and retrieval interface may limit access to databases and actually create a barrier to use of resources for many users.
4. The site design encourages use of "QuickSearch" and the "Advanced" search by first time and/or novice users. Features such as saving search items to a "Basket" and other actions related to results (i.e., printing results, saving results to desktop [See Functionality results]) currently lack visual confirmations (i.e., item saved text box appearing when item is saved) and directions (i.e., indications or directions on where the items are saved).
5. Professional users (i.e., library staff, researchers, experienced users) typically have experience in accessing a variety of databases and may be more willing to spend the time necessary to explore the site and the site's features. In addition, professional users of typical library databases are also more accustomed to more customized search aides, such as limiters and a wider variety of help features. Their experience with other sites may also create unwillingness among these users to spend time exploring and learning the site.

6. Some features, such as the "Basket" feature and creating customized database clusters just seem to have an inordinate amount of steps to take and seem unnecessarily complicated. Not having the ability to change one's mind (i.e., deselect features) may mandate new searches or taking extra steps in saving items and could be seen as creating rigidity within the search and retrieve process.
7. Navigation throughout a complex site requires clear, readily visible, visual navigation features. Without these, users just may not spend the time it takes to learn this site, particularly after a negative experience.
8. Libraries often offer alternate views of results (i.e., table, brief, or full), so comments concerning differing views may not relate as directly to the views as the comment above suggests. With this current interface, navigation while in alternate views tend to slow the movement between pages of results, particularly in navigating backwards through pages.

Additional Participant Comments

In general, participants feel that if a user has prior experience with library and vendor databases, search and retrieve interfaces (with related features), "SFX", saving searches to baskets, etc., the user will have a positive experience when visiting and using this site. If users do not have much experience, participants feel these novices, or casual patrons will need additional training to use certain aspects of the site such as the "Basket" feature or creating customized databases. Participants also feel that use and navigation of the site is not intuitive. Learning to use the site over time is possible; however, training less experienced users seems to be a better alternative. The pages of the search and retrieval interface offer limited help and navigation aides, but more advanced and readily available help and navigation features need to be developed. When users can navigate a site with ease and within a comfort level, intuitive use of the site will improve as well.

Participants feel that more experienced users may find the site a bit rigid in some areas (i.e., cannot select and deselect databases in same view, have to go to "My Space" to deselect, move databases around, etc.). Part of this rigidity stems from the lack of more sophisticated search options from the "Advanced" screen as well as the lack of delimiter features professional researchers typically have available for refining search results in other settings (i.e., more typical library search and retrieval interfaces). Experienced users may also simply be accustomed to a set and established method of conducting their searches in a more traditional library setting, and as a result, reluctant to learn a new system.

Additionally, experienced users may not equate the loss of accuracy and precision they are accustomed to having, to their own lack of understanding of federated search engines. At present, federated search engine technology tends to decrease accuracy and precision as a trade-off for the ability of the search engine to simultaneously locate items across multiple databases. The purpose of the FEL search and retrieval interface appears geared towards simultaneously locating items available in full-text electronic formats from multiple databases. More traditional library search and retrieval interfaces focus upon precision and accuracy in conducting specific searches of a single database. The addition of links to information on how federated search engines work may help to decrease the feel of "rigidity" of the site.

Functionality Testing

Members of the study team evaluated the FEL search and retrieve interface for functionality using a modified version of a functionality form previously created for evaluation of the FEL (See Appendix B). Functionality criteria evaluated were:

- Ability to group—user can group results by lending library;
- Limiting—user can limit searches by library (e.g. selecting a specific library or group of libraries, limiting by types of libraries or locations of libraries, etc.);
- Search process options—user can perform basic and advanced searches; searches can be done by subject, author, keyword, and title;
- Stated location and availability of resources—results include the name of the lending institution and the availability, call number, and format of the item retrieved;
- Languages—search can be performed in a language or languages other than English;
- Ability to refine searches—user can search results at a greater level of specificity once results have been retrieved;
- Equivalence of results—same items are retrieved across test public library portals and native online public access catalogs (OPACs);
- Support/instructions/help tools—instructional rubrics guide users through the search process;
- Save/print functions—users can save entire results listing or select portions of the results list and can print results in whole or by selection; and

These functions cover a diverse range of search and retrieval interface capabilities.

The study team presents results of the functionality assessment based on a Functional Requirement Capability Index.[7] Each individual functional requirement (and its subcomponents, if applicable) receives a score from each evaluator. The index indicates the extent the FEL search and retrieval interface satisfies potential capability for each function tested. Each function tested receives points using the following values:

- Yes, the feature or function was present = 2
- Somewhat, the feature or function was partially present = 1
- No, the feature or function was not present = 0
- Not applicable = N/A

The study team assigns each function a value between 0-2. Researchers: conduct four searches, average the results of each search, and present the result as a percentage between 0 and 100% (i.e., Range from 0 pts = 0% to 8 pts = 100%). Researchers assign values to each sub-part within each function tested as a separate total score.

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[7] The study team applied this index in the assessment of online virtual catalogs in previous studies. See Texas Center for Digital Knowledge. (2002). *Assessment of ZLOT Resource Discovery Service Proof of Concept Prototypes*. Denton, TX: University of North Texas.

To test the specific functions as described above, the study team used the following search strings (below):

Search Type	Search String I	Search String II
Subject	Arthritis	West Nile Virus
Author	Austen Jane	Gould Stephen Jay
Keyword	Mosquito	Kayak
Title	To Kill a Mockingbird	Living History

Figure 6: Search Strings for Functionality Evaluation

The procedure for evaluation begins with "Search String I". For terms within "Search String I" that retrieve no results, the study team uses replacement terms from "Search String II" to obtain search results. The functionality instrument used to guide this assessment is attached at the end of this report (See Appendix B). The results for specific functions assessed are presented in the following table (below).

Question	Functionality	Points	%
Question 1 (Q1)	Can users group items in searches (e.g. by type, format, author, date)?	4	50
Question 2 (Q2)	Can a search be limited to particular location(s)?	0	0

Question 3 (Q3)	Do the search results indicate an item's:
	    A: call number?
	    B: location?
	    C: availability?
	    D: format?
		
		8
		4
		4
		4
			
			100
			50
			50
			50

Question 4 (Q4)	Does the search process have functions for:
	    A: advanced searching (ability to search 2 or more fields at once)?
	    B: keyword?
	    C: subject?
	    D: author?
	    E: title?
		
		8
		
		8
		8
		4
		4
			
			100
			
			100
			100
			50
			50

Question 5 (Q5)	Can searches be performed in any languages other than English?	0	0
Question 6 (Q6)	Can searches be refined?	0	0

Question 7 (Q7)	Does the site provide:
	    A: support?
	    B: instructions?
	    C: help tools?
		
		4
		4
		4
			
			50
			50
			50

Question 8 (Q8)	Can user:
	    A: save entire results?
	    B: save selected results?
	    C: print entire results?
	    D: print selected results?
		
		0
		8
		0
		0
			
			0
			100
			0
			0

Figure 7: Functionality Results for FEL Search and Retrieve Interface

Results:

Participants conducted searches using only "Search String 1" (Figure 6). Each of the searches were conducted several times per term using multiple database clusters to obtain as full a survey as possible based on various formats (i.e., books, articles, etc.) and locations (i.e., electronic full-text, databases, library holdings, etc.).

Q1: *Can users group items in searches (e.g. by type, format, author, date)?*

Simple and advanced search do not provide users the option of initial searching by fields or by grouping. Original results page present items by rank. Re-grouping of search results can occur by title, author, date, or database (See Figure 8 below).

Figure 8: Options for Grouping Results of a Search

Q2: *Can a search be limited to particular location(s)?*

Evaluators were unable to locate a way to limit the search by location within either the simple or the advanced search.

Q3: *Do the search results indicate an item's: call number, location, availability, or format?*

Call numbers are available within retrieved item records that would normally have a call number (books). For location, records list the database where item can be found if item is not readily available in full-text but not the actual location of items that would normally only be found in a library. Links within the record direct users to another site to find non-electronic

available items. Ex: for items located in "FirstSearch", the "FirstSearch" search interface opens and users re-search for the item to find location held and/or availability.

Records retrieved typically do not present a separate field for format of the item (i.e., E-book, microfiche, CD, etc.); however, fields within the record do at times indicate the format of the item. Full-text electronic versions are either immediately available (as part of the full record) or the URL is noted, and some records indicate the item is a short article or part of a series within the record. Some formats (i.e. books, articles in databases not available through the FEL interface, etc.) may be intuitive for users to determine, users familiar with library record fields such as publisher, ISBN, ISSN, etc. where the format can often be determined.

Q4: *Does the search process have functions for: advanced searching (ability to search 2 or more fields at once), keyword, subject, author, or title?*

- Advanced search of this interface allows a user to search two terms with each term limited to one of the available fields: "All Fields", "Subject", "Title", "Author", "ISSN", "ISBN", or "Year"**.** Additionally, advanced search offers Boolean operators "And", "Or", and "Without".
- All of the fields available for search in both the simple and advanced searches appear to be keyword searches (i.e., keyword author, subject, title), but *keyword* does not appear in the list as a separate search field.
- Advanced search allows searching by subject; however, the advanced search interface does not have a means of selecting specific subject areas as part of a search strategy. The metadata search page does offer subject searching of selected subjects.
- Author and title searches are keyword author and keyword title searches (see fields within records of retrieved items). As keyword searches, the results are limited in terms of accuracy and precision. All searches conducted for author or title produced results; however, results that had actual author or actual title sought were seldom found within the first few returned results, and at times were not within the first few pages of items.

Q5: *Can searches be performed in any languages other than English?*

No feature could be located to allow converting the interface to another language or for conducting searches in other languages.

Q6: *Can searches be refined?*

Searches cannot be refined. Initial results page presents items by "Rank". Re-grouping of search results can then occur by title, author, date, or database [See Q1 and Figure 8 above].

Q7: *Does the site provide support, instructions, or help tools?*

- Support functions, such as email for technical support exist via a link from the search site to other pages outside the interface (i.e., within the FEL website as linked from the FEL taskbar, top of interface pages). The FEL link offers contact with FEL support staff through the Contact link [See Figure 9 below].

- The search interface offers limited instructions in the use of the interface through the help icon (question mark beside the log-out label, see Figure 9 below).
- Instructions within the help window (as a pop-up) offer limited help as a help tool; however, the interface link to "Help" is via an icon (i.e., a question mark, "?") located next to the log-out feature and may be confusing or hard to see for users [See Figure 9 below].

Figure 9: Shows "Contact Us" link in FEL taskbar.

Q8: Can user:

A: save entire results? The result page does not have a feature to save the entire search results. Users may save the results page by page using the browser feature.

B: save selected results? Users may select individual items, save them to the basket, and from the basket select items to save to the desktop or disc.

C: print entire results? The result page does not have a feature to print the entire results.

D: print selected results? The result page does not have a feature to print selected results.

Accessibility Testing

The accessibility of websites is commonly measured using two sets of standards—the World Wide Web Consortium guidelines for accessibility (http://www.w3c.org) and the federal legal standards of accessibility established by Section 508 of the Rehabilitation Act (htpp://www.section508.gov).[8] Members of the study team evaluated the FEL search and retrieve interface to ascertain levels of accessibility of the website for persons with disabilities using a modified version of accessibility form previously created for evaluation of the FEL (See Appendix C).

The study team focused on: established principles of accessibility such as clear layouts, obvious navigation features, and website design; and on how the website functioned when interacting with assistive technologies such as screen enlargements, alternate color schemes, and screen readers. The goal of the testing was to provide a basic understanding of accessibility issues that users with a range of disabilities (including visual impairments, hearing impairments, learning disabilities, and mobility impairments) might encounter when using the site. Each testing question is accompanied suggested solutions for addressing the issues. Guidance for addressing these suggestions can be found at the World Wide Web Consortium website (http://www.w3c.org) or the Section 508 website (http://www.section508.gov), though the Section 508 guidelines are of greater importance to state websites.

Test Questions:

The study team evaluated the FEL search and retrieval interface using specific questions to frame the testing. Listed below are the questions, a description of the findings related to the questions, and suggested solutions when applicable.

1. *Provides equivalent alternatives to auditory and visual content?*

   When screen enlargement is used, the search interface pages adequately enlarge with the exception of the navigation links in the toolbar of the search interface and the top toolbar of the FEL site. From the "Basket" page, items held in the "Basket" disappeared when switching from "Simple" to "Advanced". In addition, icons do not enlarge well (remain small and blurry). Screen readers do not work well with this site (See Figure 10 below).

   Suggested solutions

   For the site to be fully accessible for users with disabilities, address programming issues of the site to accommodate screen enlargement software. Code the content of the site to automatically enlarge when a user employs screen enlargement software. Create dialog boxes to facilitate the use of screen readers. Use alternatives to icons, such as text box links to improve the site as well.

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[8] Section 508 of the Rehabilitation Act Amendments of 1998 requires that Federal agencies ensure the accessibility of their web-based intranet and Internet information and applications.
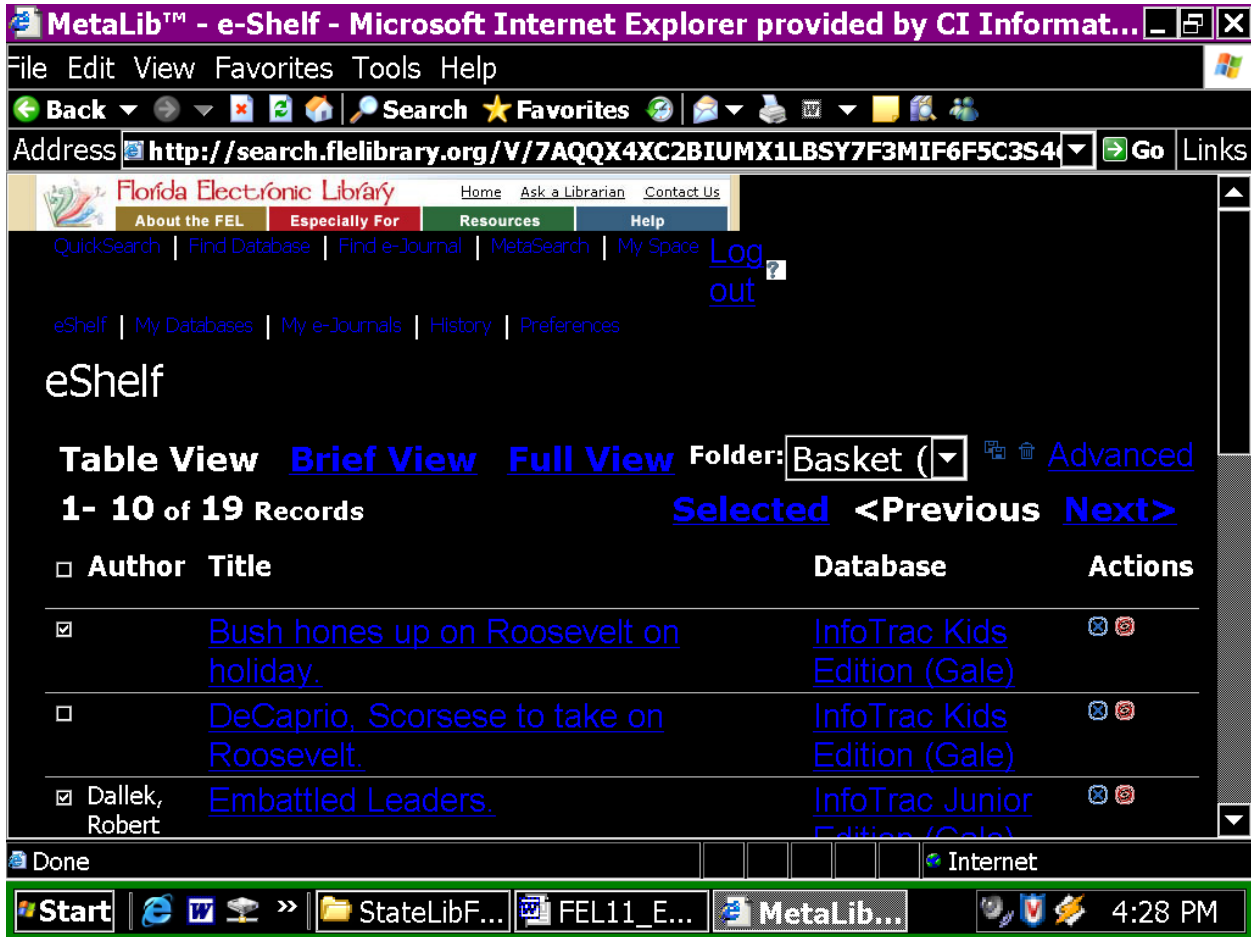
Figure 10: Saved Items within the Basket feature.

2. *Does not rely on color alone?*

Color is an issue in some cases on the site. When an alternate color scheme of white on black (i.e., high contrast black) is used, some of the buttons and links do not change color, making them very hard to see (i.e., blue on black). Additionally, button icons such as the trashcan, save, and SFX buttons within the Basket feature are static in size and color (blue) making them hard to read and potentially unusable [See Figure 10 above]. Save and SFX icon buttons on the result page are also unreadable.

Suggested solutions

Design the site so that the colors on the pages are not static, allowing the user to view the pages with alternate color settings without losing any content or the functions

3. *Creates tables that transform gracefully?*

The site does not use many tables on any of the pages and the text within the sites generally transforms well with size and alternate color schemes; however, much of the text remains blue, which may be difficult for some users to see, particularly against a black background.

Graphics also generally tend to adjust successfully to enlargement and color scheme changes with the exception of the icons. Tables and other text do not appear to be color dependent for the most part.

On the initial search screen when screen enlargement is used, the "Go" button used to enter a search remains blue, blurred, and un-readable. On the "Basket" page, the icons are unreadable and the Basket folder drop-down box is static even though the text inside enlarges making the text unreadable.

There are some minor overlaps on the "MetaSearch" page between the category and subject drop-down menu boxes within the search table (See Figure 11 below). The selected "Category" text box cuts off the end of the word "Current" leaving only "Cur" visible. Subject headings located within the scroll box do not enlarge much and are also blue making them difficult to read.
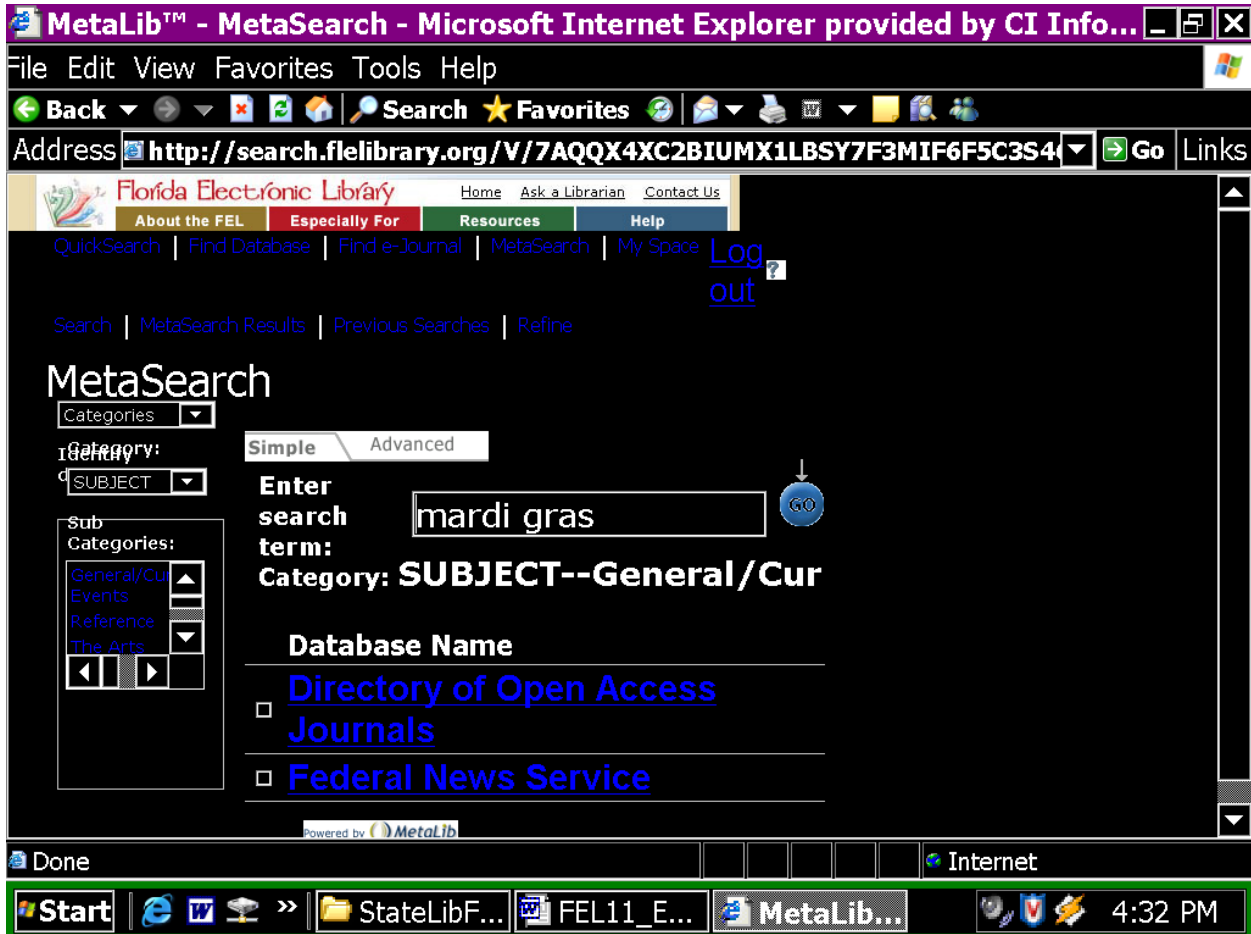

Figure 11: MetaSearch View.

Suggested solutions

The site needs an alternative color to the blue text (yellow or white) and to address the issue of enlargement the icons need to be replaced with text box links or links encoded to enlarge.

Code the "MetaSearch" table so the entire table will expand without overlap or cutting off portions of words.

5. *Ensures direct accessibility of embedded user interfaces?*

Embedded links (Ask a librarian, Contact Page of the FEL, help page from FEL Contact Page) in the site open in the same window as the interface instead of a separate window. Text within these sites transforms well for size increase and contrast; however, text within some of the columns on the FEL pages is crowded together without space between the lines of text. In addition, each of these pages has large amounts of blue text. Navigation back to the search interface is only available via the browser Back button but appears to function well; however, as part of the FEL website, a "Back to Search" button would be useful (See Figure 12 below).
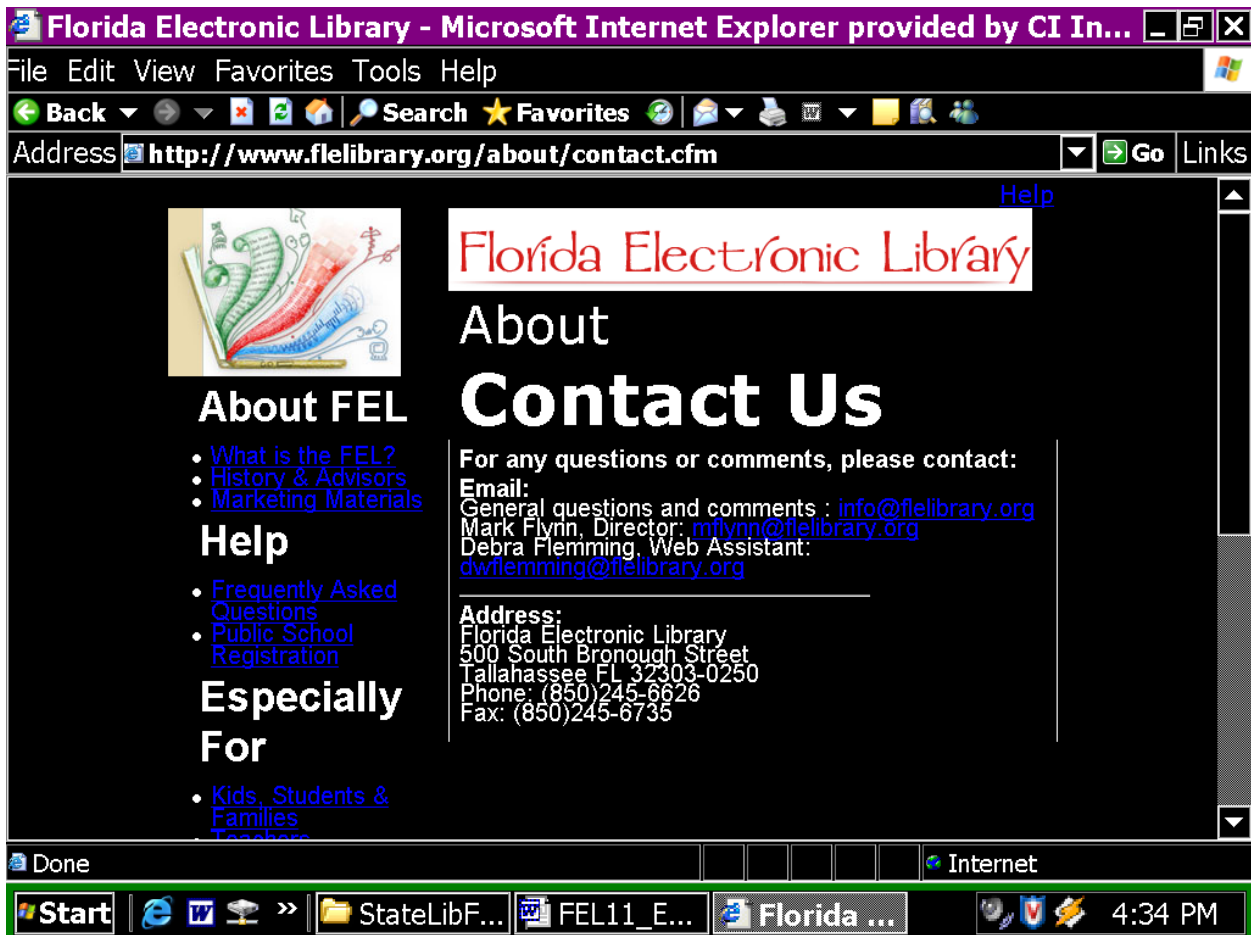

Figure 12: FEL Contact Us Page

Suggested solutions

To ensure full accessibility, a website should encourage linked sites to comply with accessibility principles as well. The FEL home pages and help pages show a vast improvement from the last time viewed. The pages still need some changes, however, such as

addressing the issue with text lines within columns touching and text color remaining or changing to blue when high contrast is used.

6. *Provides context and orientation information?*

Headings of the pages within the search interface adequately enlarge; however, with the toolbar text not completely enlarging, navigation around the site may still be difficult. The links at the top of the pages are clear enough for most users to know where they are on the site and where they can go next, but the smallish size and blue color still limit accessibility for some users.

Suggested solutions

Text within the toolbars can be encoded to enlarge more and in a different color to make navigation throughout the site more accessible. In addition, *breadcrumbs*[9] may be a useful element to add to the site so that users are always aware of where they are located and how to get to other parts of the site. Breadcrumbs are a hierarchy that indicates where on the site the user has been and where they currently are located (i.e., Home > Index > QuickSearch > QuickSearch Results). Breadcrumbs are an excellent technique to include on a website to aid users in navigation of the website, particularly if terms within the hierarchy actively link back to the related website page (i.e., click on Home in the hierarchy and the user returns to the Home page).

7. *Provides clear navigation mechanisms?*

The navigation tools remain a static size when viewed through screen enlargement and are blue when the high contrast is on. A "Help" function (in the form of a question mark) appears on all screens, although the icon needs additional metadata to clearly identify the help function, and like the other icons, the help icon does not enlarge (static).

Suggested solutions

Program the navigation tools to enlarge, since these are what users need to indicate where they are as to location within the site and to maneuver around the site. There should be a more distinct and obvious header at the top of the page so the user understands they have selected the correct page. Replace the "Help" icon with clearly identified text, or a better-labeled link icon.

8. *Ensures that documents are clear and simple?*

In general, the pages of the site and of full text documents linked to the site successfully avoid a cluttered or disorganized appearance. Full text documents viewed during this evaluation that open directly from the search results page have transformed well for the most

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[9] Rogers, B.L. & Chaparro, B. (2003). Breadcrumb navigation: Further investigation of usage. Usability News, 5(2). Available 11 April 2006 at http://psychology.wichita.edu/surl/usabilitynews/52/breadcrumb.htm. This online article describes *breadcrumbs* and the use and application of *breadcrumbs*.

part. The text is white on the black background and the text has generally uniformly enlarged and adapted to fit the page.

CONCLUSION

Overall, the selected participants of this evaluation of the FEL search and retrieval interface found the interface usable and useful for both experienced and casual, or novice users. Based on the Likert scale responses, participants generally rated the site as better than average and improved over prior evaluation periods. Participants also felt that additional future modifications within the interface (based on the findings of this study) will further enhance the site for users and will effectively and efficiently improve the information seeking process of users.

In general, participants feel the search engine is doing what a federated search engine should do – retrieve results across multiple databases. Presentation, organization, and access to results, however, are primary issues participants identify as improvements needed for the site. Participants feel measures needed to address these issues include:

1) Increased training and education in the use of the interface;
2) Addition of viable and more visible help features;
3) Additional directions in the use of many of the features present in the interface; and
4) Simplification of steps to complete search processes such as with saving items or creating customized database bundles.

Additionally, participants feel that steps to save results, to email or print results, or to create database clusters are unnecessarily over-complicated at present and may be most useful to more experienced users.

The results of functionality testing of the FEL search and retrieval interface indicate improvement in many areas of the FEL site compared to prior testing. Functionality testing, as conducted in this study focuses on the availability and degree of the functionality of components of a search and retrieval interface using traditional library functionality criteria for comparison. Members of the study team developed and refined criteria used in the functionality testing over time in several research projects specific to digital library, and library vendor search and retrieval interfaces.

In using algorithms for calculating rankings, federated search systems by nature tend to decrease accuracy and precision. By continuing to assess the FEL interface and to apply the findings based on more traditional library criteria (as used in this study), accuracy and precision can continue to improve, along with the capability to simultaneously search across multiple and more traditional library and vendor-supplied databases. Results of the evaluation, based on the criteria provide insights on how to increase and improve the accuracy and precision of retrieved search results.

Accessibility is the level at which a technology can be used by individuals with disabilities. This can include having built-in accessibility features and working with adaptive

technologies individuals with disabilities may already use. Accessibility testing is particularly important in Florida as many seniors have some level of disability that may include visual, hearing, and mobility impairments that impact their ability to use Web-based materials. Additionally, accessibility testing has gained importance as the Florida legislature has recently shown interest in accesibility related issues within State of Florida websites.

Accessibility within the FEL search and retrieve interface has vastly improved for both the interface itself and within other FEL pages linked from the interface (i.e., FEL home page, FEL contact pages, Ask A Librarian pages, etc.). Improvement within the FEL home pages and other pages of the FEL will help to better meet the needs of Florida residents with disabilities and create a better flow (navigation) between the different aspects of the FEL as a whole.

The results of these three evaluation efforts provide a window of observation on how library users interact with an implemented and operationalized FEL search and retrieval interface. The results provide:

1. Input on the usability and usefulness of the interface and on the levels of functionality and accessibility afforded by the interface;
2. Guidance for the future organization, development, and refinement of methodologies and test instruments needed for the continued collection, analysis, and dissemination of data; and
3. Recommendations for immediate improvements to the interface.

Additionally, in the course of conducting this study, researchers were able to identify a number of primary as well as minor issues to address related to the presentation, organization, and access of results.

This report identifies a number of issues and problem areas within the interface and provides practical and actionable solutions for the issues. The identification of these issues and the provision of actionable solutions can be utilized by State Library managers as part of their decision making process to continue to improve the FEL search and retrieval interface. Based on input provided by the participants of this study, members of the research team are able to identify improvements made to the site comparative to prior evaluation periods in terms of usability, usefulness, functionality, and accessibility. Additionally, members of the research team feel that additional future modifications within this interface (based on the findings of this study) will further enhance the usability and usefulness of this site for users and will effectively and efficiently improve the overall information seeking process of users.

Limitations of the FEL Web Page Interface Evaluations

1. The study team designed each of the evaluations to collect qualitative data in the form of comments and suggestions. Although the number of participants was small, input from the participants in the form of qualitative data provided a broad range of data to assess and improve the interface.
2. The study team was unable to assess SFX at this time (i.e., questions 16 and 17 of the Usability Study).

Recommendations and Next Steps

There are a number of recommendations and possible next steps related to the usability, functionality, and accessibility of the FEL, these include:

1. Results of the evaluations presented within this report should be considered and implemented as much as possible to improve the usability, usefulness, functionality, and accessibility of this search and retrieve interface.
2. Assessment of the instruments used for this evaluation needs to occur for continued development and refinement of customized evaluation methodologies for future assessments.
3. Members of the State Library who review the results included within this report are encouraged to supply feedback to the research team in the form of usefulness of data collected by this study, methodologies used in the assessment, future data needs, etc. Feedback will aid in future customizations of data collection techniques and methodologies developed specifically for assessment of this site.
4. Evaluations of this site, such as functionality, usability, and accessibility testing should continue as part of an ongoing assessment strategy.
5. Further development of the FEL and related web sites or components such as this search and retrieve interface should not be undertaken without concurrent usability, functionality, and accessibility evaluations included.
6. An important part of the process of further development of the FEL should include a rigorous "needs analysis". Needs analysis should occur before design development and implementation of additional aspects of the components of the FEL occur.
7. Use the findings reported here in context with other evaluations completed and in process of the FEL.

Finally, the study team wishes to stress that the testing done on the FEL as summarized in this report resulted from an assessment done by a number of *adults* who are relatively *well acquainted* with online databases and searching such databases. During the past year, the State Library has made a concentrated effort to market the FEL to the K-12 community as well as to youth in the public library community.

The results reported here, however, are not likely to accurately represent usability and functionality testing of the FEL if such tests had been conducted with *students* in K-12. The study team knows from preliminary findings of the 2006 User and Marketing Study of the FEL (yet to be delivered to the State Library), that students have encountered a number of issues related to the content, use, navigability, presentation, search techniques, etc. of the FEL. Thus, the State Library may wish to consider conducting a more formal usability and functionality testing of the FEL from the perspective of K-12 students, youth in the public library setting, and the broader K-12 community.

APPENDIX A

2006 FLORIDA ELECTRONIC LIBRARY SURVEY ANSWER FORM # _____

Part I: Search Results

		Example		Search 1		Search 2	
1. Search Data	a. Category/or Subcategory	Magazine-Newspaper					
	b. Search Term(s)	"mardi gras"					
	c. Search Type	Initial search from log-in box					
2. Database Use Page	a. Enter the Names of ALL Databases (Db) Listed	Info Trac OneFile (Gale)	X				
		Electronic Collections (OCLC)	X				
		Article First (OCLC)	X				
	b. Place X if Db had Items Retrieved	Findarticles.com					
3. View Results Page	a. Total Results Found	12578					
	b. Total Items Retrieved	90					

Search Results (Continued)

		Search 3		**Search 4**		**Search 5**	
Search Data	a. Category/or Subcategory						
	b. Search Term(s)						
	c. Search Type						
Database Use Page	a. Enter the Names of ALL Databases (Db) Listed						
	b. Place X if Db had Items Retrieved						
View Results Page	a. Total Results Found						
	b. Total Items Retrieved						

4. Notes for search 1:

5. Notes for search 2:

6. Notes for search 3:

7. Notes for search 4:

8. Notes for search 5:

9. Compare and Contrast Searches 1-5:

Part II: Search Interface Review Process

Please circle the number that best reflects your opinion for each statement.

	Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Unable to Assess
10. Databases are logically grouped by relevant general search areas.	1	2	3	4	5	6
Please comment:						
11. Search results are displayed in an easy to read and understand format.	1	2	3	4	5	6
Please comment:						
12. The Basket feature will enhance search experiences.	1	2	3	4	5	6
Please comment:						
13. Saving items to search folders that can be named will enhance future search sessions.	1	2	3	4	5	6
Please comment:						
14. The labels, i.e. Find Database, My Shelf, My Databases, and the icons, i.e. , , etc. adequately guide users through the process of creating a database cluster.	1	2	3	4	5	6
Please comment:						
15. The ability to create and customize						

databases for future sessions is useful.	1	2	3	4	5	6
Please comment:						
16. The SFX search process simplifies the search experience.	1	2	3	4	5	6
Please comment:						
17. SFX helps me locate items.	1	2	3	4	5	6
Please comment:						

Part III: Feedback about the FEL Search Interface

18. Please identify the 3 most useful search features of the search site:
    a.
    b.
    c.

19. Please identify the 3 least useful search features on the search site:
    a.
    b.
    c.

20. What suggestions would you make to improve the search site?

21. How usable and/or useful do you feel the search site is overall?

APPENDIX B

Sample Functionality Testing Instrument

Evaluator Name: _____

Virtual Library: _____

Date/Time Accessed: _____/_____

Time Completed: _____

Computer Type: _____

Operating System: _____

Browser and Version: _____

Screen Resolution: _____

Connection Type: _____

Comments on access to site or other general access issues:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Search Type	Search String I	Search String II
Subject	*Arthritis*	*West Nile Virus*
Author	*Austen Jane*	*Gould Stephen Jay*
Keyword	*Mosquito*	*Kayak*
Title	*To Kill a Mockingbird*	*Living History*

Functional Requirement	Results			Comments
Can users group items in searches?	Yes	No	Somewhat	
Can a search be limited to particular location(s)?	Yes	No	Somewhat	
Do the search results indicate an item's:				
-call number?	Yes	No	Somewhat	
-location?	Yes	No	Somewhat	
-availability?	Yes	No	Somewhat	
-format	Yes	No	Somewhat	
Does the search process have functions for:				
-advanced searching (ability to search 2 or more fields at once)?	Yes	No	Somewhat	
-keyword?	Yes	No	Somewhat	
-subject?	Yes	No	Somewhat	
-author?	Yes	No	Somewhat	
-title?	Yes	No	Somewhat	
Can searches be performed in any languages other than English?	Yes	No	Somewhat	
Can searches be refined?	Yes	No	Somewhat	
Does the site provide:				
-support?	Yes	No	Somewhat	
-instructions?	Yes	No	Somewhat	
-help tools?	Yes	No	Somewhat	
Can user:				
-save entire results?	Yes	No	Somewhat	
-save selected results?	Yes	No	Somewhat	
-print entire results?	Yes	No	Somewhat	
-print selected results?	Yes	No	Somewhat	

APPENDIX C

Accessibility Instrument

Functional Requirement	Results			Comments
Do the appearance and function of the site comply with the accessibility principles mandated by Section 508 of the Rehabilitation Act by complying with W3C principles that:				
-Provides equivalent alternatives to auditory and visual content?	Yes	No	Somewhat	
-Does not rely on color alone?	Yes	No	Somewhat	
-Uses markup and style sheets and does so properly?	Yes	No	Somewhat	
-Creates tables that transform gracefully?	Yes	No	Somewhat	
-Ensures user control of time-sensitive content changes?	Yes	No	Somewhat	
-Ensures direct accessibility of embedded user interfaces?	Yes	No	Somewhat	
-Designs for device-independence?	Yes	No	Somewhat	
-Provides context and orientation information?	Yes	No	Somewhat	
-Provides clear navigation mechanisms?	Yes	No	Somewhat	
-Ensures that documents are clear and simple?	Yes	No	Somewhat	