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Do, or Do Not, Make Them Think?: A Usability Study of an Academic Library Search Box

Kenneth C. Haggerty  and Rachel E. Scott 

Library Information Systems, University of Memphis, Memphis, Tennessee, USA

ABSTRACT

This usability study explores whether patrons prefer and are well-served by specialized, format-based searches or simpler, single-box searches, and the implications of these practices and preferences for information literacy. Qualitative data suggest that format-specific searches can confuse and slow down users and single-box searches are often faster and more successful. These findings highlight the potential conflict between user experience (UX) design and traditional conceptualizations of research and library-based search.

KEYWORDS

Usability; user experience; information literacy; academic libraries; web design; resource discovery tools; information-seeking behaviors

Introduction

The search function is arguably the most important feature of a library website. Decisions concerning what content to search, what features to include, and how to label various elements have an outsized impact on user experience (UX) and overall satisfaction with the library. As users interact increasingly - and sometimes exclusively - with the library's digital interface, usability and intuitiveness take on even more importance. In academic library web design, however, there is a tension between the educational mission of the institution and the principle of *Don't Make Me Think* inherent to UX design (Krug, 2013). This study investigates one aspect of this tension, the question of whether patrons prefer and are well served by specialized, format-based searches or simpler, single-box searches, and the implications of these practices and preferences for information literacy.

This usability study investigates the native search feature of the University of Memphis, University Libraries, through the eyes of its undergraduate students, graduate students, staff, and faculty. The native search, currently a search box with three tabs and numerous features, was tested using Morae usability software (Techsmith, n.d.) and additional observations were captured using think-aloud techniques. The goal of this research

CONTACT Kenneth C. Haggerty  khhgerty@memphis.edu  Library Information Systems, University of Memphis, Memphis, Tennessee, USA.

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is to discover usability issues and user preferences in the functionality of the native search and its resultant screens as users search for a variety of library resources.

Research questions

1. When unprompted, do participants use specialized search functions in the existing search box?
2. When prompted, do users understand and value specialized search functions in the existing search box?

Literature review

Usability is a valuable tool to measure the experience of users. In the context of the library, usability can be used as a methodology to discover how patrons search for information resources. According to the Digital Communications Division of the U.S. Department of Health and Human Services, “usability refers to the quality of a user’s experience when interacting with products or systems, including websites, software, devices, or applications” (2017). Factors involved with measuring usability include intuitive design, ease of learning, efficiency of use, memorability, error frequency/severity, and subject satisfaction. Some examples of methods to measure these factors are interviews, surveys, card sorting, focus groups, and task analysis.

The usability of academic library websites and their native search functionality has been thoroughly researched. Early usability studies that established best practices for library websites and search include the work of Augustine and Greene (2002), Battleson, Booth, and Weintrop (2001), and Lehman and Nikkel (2008). Subsequent usability studies explored how specific resources were discovered from library websites, such as Fry and Rich’s usability study on electronic resource discovery from academic library websites (2011). Importantly for the study at hand, Swanson and Green’s usability study uncovered that, “Users do not appear to be very aware of differences between databases, catalogs, and other tools. They search whatever search box is readily available” (2011, p. 227).

Several notable studies of native search interfaces have been conducted by harvesting search transaction logs. Lown, Sierra, and Boyer investigated search logs to understand how a single search box on library webpages is used and found that patrons used the search to find predominantly (though not exclusively) bibliographic information and resources (2013). Chapman, Desai, Hagedorn, Varnum, Mishra, and Piacentine investigated search logs to classify academic library website search queries and found that specific

databases (28 percent), topical/exploratory (28 percent), and books (16 percent) were among the most frequent query types (2013).

As discovery layers gained popularity and familiarity, several authors conducted usability studies on the topic. Williams and Foster conducted usability testing comparing EBSCO Discovery Service (EDS) to federated search, and found that users preferred discovery (2011). Using EDS, Fagan, Mandernach, Nelson, Paulo, and Saunders conducted a usability study with 10 participants to investigate, among other questions, “how users completed a common, broad task with and without a discovery tool, whether they would be more successful with or without the tool, and what barriers existed with and without the tool” (2012, p. 112). Perrin, Clark, De-Leon, and Edgar conducted an 8-person usability study to uncover problems and identify solutions before implementing the Primo discovery layer (2014).

Despite the increasing popularity of linking the native search interface to discovery layer results, there remain challenges to this approach. Several authors have enumerated the challenges of using a single box to search and find disparate resources. McKay conducted focus groups in an academic library to explore preferences for the native search function and discovered that users conceptualize and use books and articles so differently that a single search box to discover both may not be effective (2011). Additionally, Thomale argues, “nobody has ‘solved’ relevance ranking for full library discovery the way Google solved it for the Web” (2015, line 376).

There are admittedly challenges with adopting a single search box as the native search in academic library settings. However, single search boxes are nonetheless increasingly common. In addition to identifying challenges with this approach, several authors also identify solutions. Behnert and Lewandowski analyzed search transactions to classify the causes of zero hits for known-item searches and proposed that librarians adopt Google-inspired solutions, including query reformulation, correction of metadata, and “Did you mean?”-type suggestions for alternatives (2017). Several commercially available and open-source discovery layers have such solutions built in.

The tension between UX’s desire for simplicity and information literacy’s commitment to iterative and complex research processes has not been adequately addressed in the academic library literature. The topic surfaces in information literacy publications that stress process and engagement over checklists and skills (Swanson & Jagman, 2015; Scott, 2016; Seeber, 2018). The library UX design literature, however, has not comprehensively engaged with the responsibility to teach users library systems or promote thought and understanding of search platforms. Very few usability studies engage directly with information literacy (recent exceptions include Baird & Soares, 2018; Overduin, 2019). One explanation for this avoidance is that



Figure 1. Default search box.

the majority of library resource use takes place outside of contexts in which the librarian is directly mediating resource selection or use, for example in reference or instruction settings. This can be confirmed by most academic libraries' website usage statistics. Accordingly, librarians rarely have the opportunity to teach library systems at the point of use. Consumers increasingly use commercial online platforms like Amazon and Netflix without help. In fact, it is notoriously difficult to get assistance or instruction from a human being in both cases. Similarly, library systems are increasingly built to make search simple and successful, and reduce the need for human instruction on search mechanics.

The question persists: in a UX environment, can librarians reasonably perpetuate specialized platforms that require individual instruction? Although many patrons are accustomed to searching single boxes to meet casual, commercial, and other nonacademic information needs, some librarians maintain that library platforms are uniquely complex and must be taught. This study explores UX with discovery and specialized searches. The University Libraries' tabbed search box has been in place for almost a decade and was created during a time in which searching specialized indices was more common, and sometimes necessary to find desired resources. By investigating user preferences and expectations for the University Libraries' native search function, the authors can acknowledge current design practices and better serve those who interact with library platforms independently.

Setting

The University of Memphis is an urban, public research university with a Spring 2019 enrollment over 21,000. The University Libraries at the University of Memphis have updated the native search function only slightly in the eight years since it was initially designed. The current search box includes three tabs that direct to the EDS discovery layer, the EBSCO publications search, and the Sierra WebPAC databases search respectively. The default setting for native search includes links to the traditional OPAC

Figure 2. Search box "Journal Titles" tab.

Figure 3. Search box "Databases" tab.

(Innovative Interfaces's Sierra WebPAC); research guides, (Springshare's LibGuides); and OCLC WorldCat. See Figure 1.

The "Journal Titles" tab includes links to "Browse Journals" (BrowZine); "Find Full Text from Citation" (EDS); and, again, research guides. See Figure 2.

The "Databases" tab includes a link to "All Databases," a search interface in the WebPAC; "Library Passwords," a password-protected page in the University of Memphis's institutional wiki; "Which Database?," a skip logic survey designed to suggest a database based on user input; and "Access Problems?" a research guide dedicated to troubleshooting frequent access concerns. See Figure 3.

Methods

For this study, the researchers conducted a task analysis and think-aloud interviews with 20 participants to measure the intuitive design, efficiency of use, and ease of learning of the University Libraries' search box and interfaces. Data collection began in November 2018 and concluded in April 2019. The time on task and mouse click data provided by the Morae software were excluded because the relatively small sample renders them not generalizable. All University of Memphis students, staff, and faculty were eligible to participate in the study. Participants were recruited through emails and flyers distributed throughout campus.

A total of 20 participants, divided into two groups comprising 10 undergraduates and 10 graduate students, faculty, or staff completed the study, which consisted of conducting nine searches using the University Libraries search box and interfaces (Table 1). The first six searches asked users to

Table 1. Participant demographics.

Participant number	Status	Department or major
P1	Undergraduate	Computer science
P2	Graduate student	Applied behavior analysis
P3	Graduate student	Counseling psychology
P4	Faculty	Library
P5	Undergraduate	Computer science
P6	Faculty	Library
P7	Staff	Student affairs
P8	Graduate student	Social work
P9	Graduate student	Biology
P10	Graduate student	Anthropology
P11	Undergraduate	Health studies
P12	Undergraduate	Graphic design
P13	Undergraduate	Integrative studies
P14	Undergraduate	Biology
P15	Undergraduate	Art
P16	Undergraduate	Psychology
P17	Graduate student	Clinical psychology
P18	Graduate student	Art history
P19	Undergraduate	English
P20	Undergraduate	Computer science

access a specific resource and the last three searches asked users to search for topics of interest while thinking aloud, meaning they were encouraged to share their opinions on the University Libraries native search functionality and interfaces. The complete instrument is included as Appendix A.

Findings

Research question 1: do participants use specialized search functions in the existing search box?

To address the question of whether or not students, faculty and staff use the existing tabs (“QuickSearch,” “Journal Titles,” “Databases”) in the default search box, the participants’ practices were observed and recorded. The platforms selected to search for eBooks and articles in tasks 1–6 may be indicative of each participants’ actual and habitual search practices. The following section summarizes participants’ search practices, noting platforms searched while completing the first six tasks.

All 20 participants conducted at least one search within the default “QuickSearch” tab. Those participants who conducted all searches from the “QuickSearch” tab on the Libraries’ homepage or conducted the initial search on the “QuickSearch” tab and subsequent searches in EDS by clicking on the “New Search” option, completed the tasks more quickly and successfully than peers who attempted to negotiate journal and database tabs, or to search by journal and database name. Those who seemingly ignored the journal and database names, and searched by the title of the desired resource instead quickly found it via the discovery search. This

success is due in part to the fact that fewer mouse clicks and searches were involved.

Only seven participants, or 35%, used the “Journal Titles” tab. Some of these users searched article titles in the “Journal Titles” tab and returned zero results. It is interesting to note, however, that after a failed initial search, some of these participants successfully searched the “Journal Titles” tab for the second article task (task 4). In many cases, “Looking for this Publication?,” “Search within this publication,” and the autocomplete feature within EDS assisted users and helped them complete the task. For example, one participant noted the EDS search within publication feature “Looking for this Publication?” and used it successfully to access the specified article in task 3.

Eleven participants, or 55%, used the “Databases” tab, again with varying degrees of success. Once again, some participants searched article titles in the “Databases” search box. Doing so will not yield results, because this form only searches the title index of databases in the ILS electronic resource management (ERM) module. The University of Memphis does not create or load MARC bibliographic records for databases into catalogs or discovery layers and relies on the ERM records, which are not harvested into the discovery layer. Accordingly, those participants who searched a database name, such as “JSTOR” into QuickSearch were unsuccessful in finding a link to the desired database. Some participants who searched the “Databases” tab did not find the desired databases due to spelling errors and had to return to the initial query and correct it. The “All Databases” page caused users to look for another path, but in that situation most were able to successfully use the “Most-Used Databases” dropdown menu as an alternative to searching by database.

Some participants went to great lengths to avoid the “Databases” tab in the default search box. One participant first selected the “All Databases” link under the “Databases” tab of the library homepage, clicked “j,” but did not notice JSTOR listed at the bottom, and searched Google for “jstor University of Memphis.” The institutional Springshare A-Z list appeared high on the list of Google results, in which the user easily found JSTOR. Database access via Springshare occurred on three occasions in this study.

When unprompted, all users searched the default “QuickSearch” tab, but only around half used the “Databases” tab and even fewer used the “Journal Titles” tab. This finding is supported by local analytics data, which shows searches within EDS to significantly outnumber searches of the ILS database index or EBSCO publication search, and by studies showing that searching by database name in discovery layers is not uncommon (Rodgers & Harrington, 2017). More importantly, perhaps, than the preference for the default QuickSearch, is the low rate of success and inefficiency

experienced by those who searched the “Journal Titles” and “Databases” tabs in ways that these tabs simply will not work. Some participants retrieved relevant results by persistently trying a variety of search options, but it cannot be assumed that most users searching library platforms would do this.

Research question 2: do users understand and value specialized search tabs?

To address the question of whether users understand and value additional search tabs in the existing default search box, the final three questions of the instrument invited participants to think aloud and “share your thoughts and opinions of the website functionality and design” about the “QuickSearch,” “Journal Titles,” and “Database” tabs, respectively. The following section leverages participants’ responses to evaluate the perceptions of the value and function of specialized searches and the native search as it currently exists. The researcher prompted participants to consider the various tabs and whether they should be merged or remain separate. Most participants indicated that they would support shifting from the current search box with three tabs and various links to a single search tab, but they did so for various reasons. Four major themes arose in responses indicating that the native search should be updated: UX, simplicity, confusion, and user knowledge of scholarly communications.

In the first set of tasks, all participants searched QuickSearch at least once, and most searched it several times. Not surprisingly, this was the search tab with which participants expressed the most familiarity. The experience of an undergraduate computer science student was representative of most undergraduate participants: they had previous experience using QuickSearch, finds it easy to navigate, and had not previously used the “Journal Titles” and “Databases” tabs. An undergraduate graphic design student suggested they found QuickSearch the easiest tab to use and that searching the specialized search options “never goes well.” An undergraduate student in health studies shared that they had been taught to go straight to QuickSearch when faced with a research question. Like most undergraduate participants, he had not previously searched the “Journal Titles” tab or BrowZine, and supported combining the existing search tabs.

A graduate student in applied behavioral analysis reported primarily searching QuickSearch, only infrequently searching in the “Journal Titles” and “Databases” tabs, and never using the links underneath the QuickSearch search bar. A graduate student in counseling psychology reported using the “Databases” tab when assigned to search a specific database by a professor, an experience echoed by a few undergraduate participants. Only one participant, a graduate student in art history, indicated

that their primary experience with the University Libraries was with the interlibrary loan service, though they had previously used QuickSearch and searched JSTOR natively. They supported combining all search tabs, suggesting “most students do not know the difference between the three.”

A faculty participant found the native search box too crowded and supported the simplification of a single search tab and removal of extraneous links. This participant believed there are too many links in each of the tabs and that the “Databases” tab, in particular, is challenging for students, which leads to confusion and unsuccessful searches. A staff member likened their preference to the QuickSearch tab to their preference for Google and its simple, single search box. This participant did not really understand the presence or utility of the links, specifically “Find Full Text from Citation,” and thought their presence was a distraction. An undergraduate in biology indicated that they search QuickSearch almost exclusively, effectively treating it like a single search box.

An undergraduate computer science major cited previous experience using QuickSearch and reported finding it easy to navigate. They had not previously used specialized journal or database searches, and unsuccessfully searched an author name in the “Journal Titles” search field during this study’s initial tasks. Similarly, a staff participant who had not previously conducted specialized journal or database searches was confused during their initial attempts, and expressed as much during the think-aloud activity. A faculty librarian confirmed reports that users type keyword search terms in the “Databases” and “Journal Titles” search tabs. This librarian indicated that combining the search tabs would likely address undergraduate confusion, but asserted that options to search journals and databases should be retained somewhere.

During the think-aloud portion, a graduate student in anthropology commented on the lack of utility of the “Journal Titles” search tab, which they never use. They stated that “searching for a journal isn’t really applicable to the type of searching that students do.” An undergraduate computer science major hypothetically liked the ability to search by subject on the journal results interface, but as they did, they related that they were not familiar with publishers such as Springer or Wiley. A lack of familiarity with scholarly publishers and platforms was evident among many participants; this can serve as an obstacle to searching for, identifying, accessing, or comprehending the desired content.

Although most study participants supported an overall simplification of the native search, several participants spoke in favor of retaining various specialized search options. In the same way that those who suggested removing search tabs did so for a variety of reasons, those speaking in favor of retaining specialized search options expressed a variety of

motivations for doing so. Only one participant, an undergraduate in psychology, indicated that a single search option might overwhelm incoming students. Several participants identified unfamiliar features that they asserted should be retained for their potential utility: **one librarian identified didactic purposes for some specialized search features; and several graduate students spoke to the need for specialized tools in order to properly research.**

The primary theme that surfaced in the analysis of reasons for retaining specialized search functionality was “just in case.” A graduate student reported that although the benefits of combining all three search tabs are obvious, having options is also desirable and, “it’s just one extra click.” An undergraduate student in biology, who had previously searched only QuickSearch, indicated that they liked having options. Despite never using the “Journal Titles” tab or any of the links, they were reluctant to lose them. Although few participants had previous experience using BrowZine, several expressed interest. One graduate student indicated that the interface was intuitive and journal ranking information was useful. Two other graduate students exclaimed as they explored the platform, “really interesting and cool,” and “Wow this is amazing!” One undergraduate student and one librarian suggested adding advanced searching options within the search box itself.

A faculty librarian uses the journal search when unable to find a citation through EDS. They also use it when demonstrating how to look for newspapers to students. Some participants commented on their need to conduct searches that are more advanced. One graduate student in social work highlighted the need to search PsycINFO natively. This participant was less interested in combining search tabs and highlighted the importance of specialized journal and database search options. **Several participants noted their preference for the advanced search and filter options in EDS and other EBSCO databases.** Another graduate student participant, in anthropology, typically performs only known-item searches using the University Libraries’ native search and strongly prefers searching EBSCO databases because of the filters and advanced search options.

Discussion: thinking about searching ... too much to ask?

Some participants commented on their **perceived understanding that there is a right and wrong way to search for library resources.** One participant, for example, stopped after finding the article in task five and exclaimed, “I did that wrong!” The participant stopped midcourse, returned to the University Libraries homepage, selected JSTOR from the “Most Used Databases” dropdown, found the article from within the database, and completed the task. The participant added several additional steps, because

they perceived it as the correct way to proceed. The self-consciousness demonstrated by this participant may be a result of participation in a usability study that was monitored and promoted think-aloud strategies. Being watched as one searches and having each action recorded and monitored is an exceptional circumstance. Nonetheless, this participant's explicit acknowledgement of "right" and "wrong" suggests that these categories do exist, even when the perceived "wrong" way yielded the desired result.

This example demonstrates that searching without thinking, or perhaps with minimal deliberation, can increasingly yield the desired results. Before Google Scholar and discovery layers made it possible to retrieve millions of scholarly resources from a keyword search, there were indeed "wrong," or at least profoundly unsuccessful, ways to search. The historical necessity of precise searching contributes to the profession's legacy of preferring specialized search to efficiency and ease. As our systems grow smarter and more inclusive, and our interactions with users increasingly remote, librarians' opportunities for face-to-face instruction of platforms diminish. This study supports the conclusion that the timing is right for the University of Memphis, University Libraries to simplify. If we do not do so, we risk alienating our growing population of distance students, and the countless students that we will not encounter face-to-face.

This example also highlights that there are, in fact, many ways to accomplish the same task. Historic bibliographic instruction and platform-based "show and tells" may have asserted the "right" way to do things, but increasingly, there are a variety of right ways to find things and the only "wrong" way is one that does not work. Developing work-arounds and exploring alternate paths are signs of research persistence that should be encouraged. In fact, these are among the dispositions for "Searching as Strategic Exploration" in the *Framework for Information Literacy for Higher Education (Framework)*: "exhibit mental flexibility and creativity" and "persist in the face of search challenges, and know when they have enough information to complete the information task" (ACRL, 2015). Although there are many ways to find the desired content, the most efficient route in all of these examples was to search directly for it, and not to use a specialized search. Per the ACRL *Framework*, persistence and flexibility are desirable habits of a researcher. Efficiency does not, however, support the construct of research as iterative and search as exploration.

Within the *Framework*, another frame explicitly addresses format. Previously termed "Format as a Process," "Information Creation as a Process" highlights that "Information in any format is produced to convey a message and is shared via a selected delivery method" (2015). In other words, the format matters, and may influence how the information is accessed and understood. Unlike format-specific, specialized searches that

deliver results in a single format, discovery layers deliver diverse formats into a single results list. Records for journals, eBooks, articles, streaming media, musical scores, and other resources commingle irrespective of format. This introduces a level of complexity into the user's process of understanding and evaluating search results. Making the search process simpler and the evaluation process more complex is a calculated risk that many libraries have embraced as discovery layers have gained traction. It is nonetheless a risk, and the implications for information literacy should be openly addressed among library personnel across departments.

The resource landscape is complex and only growing more so. An encouraging though unintended outcome of this study was that several participants learned about unfamiliar resources or services. By completing the search tasks, for example, one participant was pleasantly surprised to learn that University Libraries provided access to some content to which the participant personally subscribed. Many others were delighted by BrowZine and indicated a desire to explore it further in the future. A potential downside of simplification is that users may get what they need and leave before exploring othering potentially useful resources, like BrowZine.

Recommendations

Conducting this study and evaluating the resultant data provided the authors with insight into the searching habits of the students, faculty, and staff at the University of Memphis. An analysis of the results of the nine tasks, led the authors to draw the following conclusions:

- The students, faculty and staff rarely used the links located below the search box on all three tabs. These **links will be revised or removed to simplify the design.**
- The students, faculty and staff rarely used specialized journal searches and many did not understand how it worked. **The “Journal Titles” tab will be removed and access to the “Journal Titles” search and BrowZine will be relocated.**
- Although students, faculty, and staff used the “Databases” tab more often than the “Journal Titles” tab, many participants struggled to access the desired database. **The “Databases” tab will be removed, and databases will be searchable by title in the discovery layer.**

Most users supported the idea of combining the three search tabs, yet some participants mentioned that they would like to retain specialized journal or database search options. **All design work is iterative; we plan to test these recommendations after implementing a redesigned search box.**

Each library faces different challenges and opportunities specific to the users it serves. University of Memphis users, especially undergraduate students, expressed considerable confusion with the current native search interface and all of the specialized options therein. This study provided insight into the usability issues students, faculty, and staff encounter as they search and access information via the University Libraries website. These insights will shape the rebuilding of a new native search interface, one that is simplified and requires less understanding of scholarly communications. The authors hope that this new approach will meaningfully address the issues of confusion that prompted the study at hand.

About the Authors

Kenneth C. Haggerty is an assistant professor and user interfaces librarian at the University of Memphis.

Rachel E. Scott is an associate professor and interim coordinator for cataloging, collection management, and library information systems at the University of Memphis.

ORCID

Kenneth C. Haggerty  <http://orcid.org/0000-0003-0892-418X>

Rachel E. Scott  <http://orcid.org/0000-0001-5847-3378>

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Appendix A: Study instrument

Quantitative

- 1) Open up the PDF Full Text of the book Everything You Need to Know About MLA Citations.
- 2) Open up the PDF Full Text of the book The Columbia Guide to Online Style
- 3) Find and open up the article “Noirscapes: Using the screen to rewrite Los Angeles noir as urban historiography” within Journal of Writing in Creative Practice.
- 4) Find and open up the article “Development of Heavy Rain Damage Prediction Model Using Machine Learning Based on Big Data” within the journal Advances in Meteorology.

- 5) In JSTOR download the article “‘I Am a Man’: A Civil Rights-Era Declaration with Roots in the 1700s.”
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