

# Lessons Learned: A Primo Usability Study

Kelsey Brett,  
Ashley Lierman,  
and Cherie Turner

---

## ABSTRACT

*The University of Houston Libraries implemented Primo as the primary search option on the library website in May 2014. In May 2015, the Libraries released a redesigned interface to improve user experience with the tool. The Libraries took a user-centered approach to redesigning the Primo interface, conducting a “think-aloud” usability test to gather user feedback and identify needed improvements. This article describes the method and findings from the usability study, the changes that were made to the Primo interface as a result, and implications for discovery-system vendor relations and library instruction.*

## INTRODUCTION

Index-based discovery systems have become commonplace in academic libraries over the past several years, and academic libraries have invested a great deal of time and money into implementing them. Frequently, discovery platforms serve as the primary access point to library resources, and in some libraries they have even replaced traditional online public access catalogs. Because of the prominence of these systems in academic libraries and the important function that they serve, libraries have a vested interest in presenting users with a positive and seamless experience while using a discovery system to find and access library information. Libraries commonly conduct user testing on their discovery systems, make local customizations when possible, and sometimes even change products to present the most user-friendly experience possible.

University of Houston Libraries has adopted new discovery technologies as they became available in an effort to provide simplified discovery and access to library resources. As a first step, the Libraries implemented Innovative Interface’s Encore, a federated search tool, in 2007. When index-based discovery systems became available, the Libraries saw them as a way to provide an improved and intuitive search experience. In 2010, the Libraries implemented Serials Solutions’ Summon. After three years and a thorough process of evaluating priorities and investigating alternatives, the Libraries made the decision to move to Ex Libris’ Primo, which was done in May of 2014.

The Libraries’ intention was to continually assess and customize Primo to improve functionality and user experience. The Libraries conducted research and performed user testing, and in May

---

**Kelsey Brett** ([krbrett@ua.edu](mailto:krbrett@ua.edu)) is Discovery Systems Librarian, **Ashley Lierman** ([arlierman@uh.edu](mailto:arlierman@uh.edu)) is Instructional Design Librarian, and **Cherie Turner** ([ckturner2@uh.edu](mailto:ckturner2@uh.edu)) is Chemical Sciences Librarian, University of Houston Libraries, Houston, Texas.

---

2015 a redesigned Primo search results page was released. One of the activities that informed the Primo redesign was a “think-aloud” usability test that required users to complete a set of two tasks using Primo. This article will present the method and results of the testing as well as the customizations that were made to the discovery system as a result. It will also discuss some broader implications for library discovery and its effect on information literacy instruction.

## LITERATURE REVIEW

There is a substantial body of literature discussing usability testing of discovery systems. In the interest of brevity, we will focus solely on studies and overviews involving Primo implementations, from which several patterns have emerged.

Multiple studies have indicated that users’ responses to the system are generally positive; even in testing of very early versions by a development partner users responded positively overall.<sup>1</sup> Interestingly, some studies found that in many cases users rated Primo positively in post-testing surveys even when their task completion rate in the testing had been low.<sup>2</sup> Multiple studies also found evidence that, although users may struggle with Primo initially, the system is learnable over time. Comeaux found that the time it took users to use facets or locate resources decreased significantly with each task they performed,<sup>3</sup> while other studies saw the use of facets per task increase for each user over the course of the testing.<sup>4</sup>

User reactions to facets and other post-limiting functions in Primo were divided. In one of the earliest studies, Sadeh found that users responded positively to facets,<sup>5</sup> and some authors found users came to use them heavily while searching,<sup>6</sup> while others found that facets were generally underused.<sup>7</sup> Multiple studies found that users tended to repeat their searches with slightly different terms rather than use post-limiting options.<sup>8</sup> Thomsett-Scott and Reese, in a survey of the literature on discovery tools, reported evidence of a trend that users reacted more positively to post-limiting in earlier discovery studies,<sup>9</sup> while the broader literature shows more negative reactions in more recent studies. This could indicate that shifts in the software, user expectations, or both may have decreased users’ interest in these options.

A few specific types of usability problems seem common across tests of Primo and other discovery systems. Across a large number of studies, it has been found that users—especially undergraduate students—struggle to understand library and academic terminology used in discovery. Some terminology changes were made after users had difficulty in the earliest usability tests of Primo,<sup>10</sup> but users continued to struggle with terms like *hold* and *recall* in item records.<sup>11</sup> Users also failed to understand the labels of limiters,<sup>12</sup> and they also failed to recognize the internal names of repositories and collections.<sup>13</sup> Literature reviews on discovery systems have found terminology to be a common stumbling block for searchers across a wide number of individual studies.<sup>14</sup>

Similarly, users often struggle to understand the scope of options available to them when searching and the holdings information in item records. Users failed in multiple tests to distinguish between the article level and the journal level,<sup>15</sup> could not interpret bibliographic

---

information sufficiently to determine that they had found the desired item,<sup>16</sup> and chose incorrect options for scoping their searches.<sup>17</sup> Many studies found that users were unable to distinguish between multiple editions of a held item when all item types or editions were listed in the record.<sup>18</sup> In other cases, users had difficulty interpreting locations and holdings information for physical items.<sup>19</sup>

Among the needs and desires expressed by and for Primo users in the literature, two in particular stand out. First, many users expressed a desire for more advanced search options; some wanted more complexity in certain facets and the ability to search within results,<sup>20</sup> while other users simply wanted an advanced search option to be available.<sup>21</sup> Secondly, a large number of studies indicated that instruction on Primo or other discovery systems was needed for users to search effectively. In some cases this was the conclusion of the researchers conducting the study,<sup>22</sup> while in other cases users themselves either suggested or requested instruction on the system.<sup>23</sup>

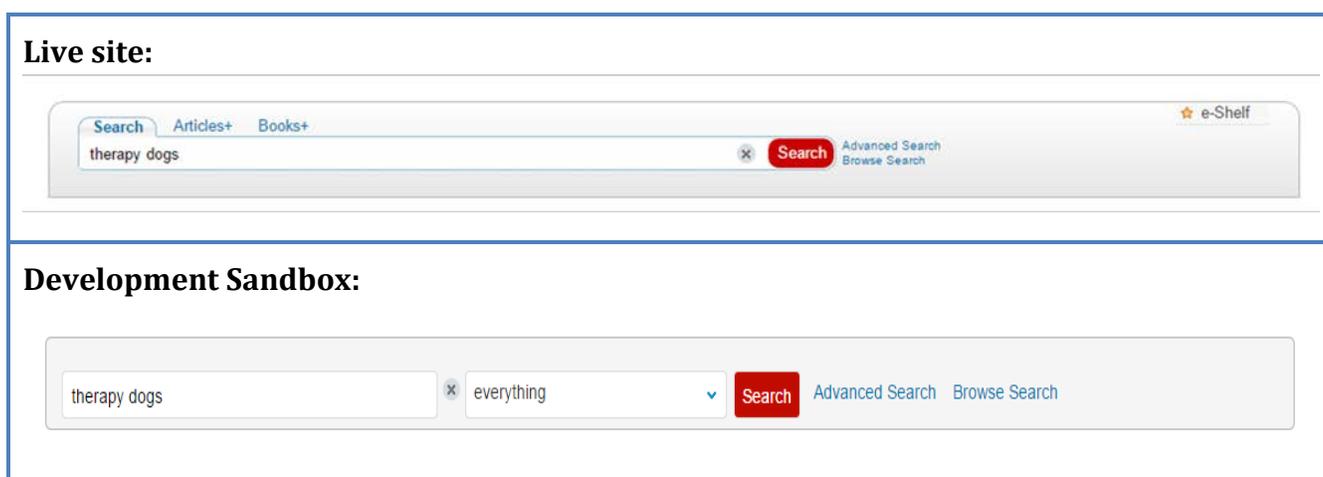
It is also worth noting that it has been questioned whether usability testing as a whole is a sufficient mechanism for evaluating discovery-system functionality. Prommann and Zhang found that usability testing has focused almost exclusively on the technical functioning of the software and not adequately revealed the ability of discovery systems like Primo to successfully complete users' desired tasks.<sup>24</sup> They proposed hierarchical task analysis (HTA) as an alternative, to examine users' most frequent desires and the capacity of discovery systems to meet them. Prommann and Zhang acknowledged, however, that as HTA is completed by an expert on the system rather than by an actual user, some of the valuable information derived from usability testing (including terms and functions that users do not understand, however well-designed) is lost in the process; they concluded that a combination of the two systems of testing is ideal to retain the best of both.

## **BACKGROUND**

At the University of Houston Libraries, the Resource Discovery Systems department (RDS) is responsible for the maintenance and development of Primo. However, it is important to RDS to gather feedback and foster buy-in from stakeholders in the Library before making changes to the system. To that end, RDS works with two committees to assess the system and make recommendations for its improvement. The Discovery Usability Group and the Discovery Advisory Group include members from public services, technical services, and systems; each member brings a unique perspective on discovery. The Discovery Usability Group is charged with assessing the discovery system through a variety of methods including usability testing, focus groups, and user interviews. The Discovery Advisory Group reviews results of user testing and makes recommendations for improvement. All changes to the discovery system are reviewed by the Groups before they are released for public use.

In fall 2014, several months after the Primo implementation, the Discovery Usability Group conducted a focus group with student workers from the library's information desk (a dual reference and circulation desk) to solicit feedback about the functionality of Primo and suggestions for its improvement. In the meantime, the Discovery Advisory Group was testing Primo and evaluating Primo sites at peer and aspirational institutions. The groups used the information collected through the focus group and research on Primo to make recommendations for improvement. RDS has access to a Primo development sandbox, and many of the recommended changes were made in the sandbox environment and reviewed by the two groups prior to public release.

Changes to the search box can be seen in figure 1. Rarely used tabs were replaced with a drop-down menu to the right of the search box to allow users to limit to "everything," "books+," or "digital library." To increase visibility, links to "Advanced Search" and "Browse Search" were made larger and more spacing was added.



**Figure 1.** Search Box in Live Site (Above) and Development Sandbox (Below) at Time of Testing

Changes were also made to create a cleaner and less cluttered search results page (see figure 2). More white space was added, and the links (or tabs) to "View Online," "Request," "Details," etc., were redesigned and renamed for clarity. For example, the "View Online" link was renamed to "Preview Online" because it opens a box within the search results page that displays the item. The groups believed "Preview Online" more accurately represents what the link does.

## Live Site:

Results 1 - 10 of 19,508 for Everything

Sorted by: Relevance ▾

1 2 3 4 5 →

Show only [Peer-reviewed Journals](#) (9,903) | [Full Text Online](#) (19,495)



Article

☆ [Can Therapy Dogs Improve Pain and Satisfaction After Total Joint Arthroplasty? A Randomized Controlled Trial](#)  
Harper, Carl M. ; Dong, Yan ; Thornhill, Thomas S. ; Wright, John ; Ready, John ; Brick, Gregory W. ; Dyer, George  
Clinical Orthopaedics and Related Research, 2014, Vol.473(1), pp.372-379

● Full text available

[View Online](#) [Details](#) [More](#)

[View all versions](#)



eBook

☆ [Physical therapy and massage for the dog](#)  
Julia. Robertson Andy Mead 2013

● Online access

[View Online](#) [Locations](#) [Details](#) [More](#)

## Development Sandbox:

Results 1 - 10 of 19,487 for everything

Sorted by: Relevance ▾

1 2 3 4 5 →



Article

☆ [Can Therapy Dogs Improve Pain and Satisfaction After Total Joint Arthroplasty? A Randomized Controlled Trial](#)  
Harper, Carl M. ; Dong, Yan ; Thornhill, Thomas S. ; Wright, John ; Ready, John ; Brick, Gregory W. ; Dyer, George

Clinical Orthopaedics and Related Research, 2014, Vol.473(1), pp.372-379

● Full text available

[View all versions](#)

[Preview Online](#)

[Details and Related Links](#)

[Recommendations](#)

[More](#)



Book

☆ [It could happen to anyone : why battered women stay](#)

Alyce D. LaViolette Ola W Barnett 2014

Los Angeles, California : SAGE

● Check holdings at ANDERSON/GENERAL COLLECTION HV6626.2 .B27 2014

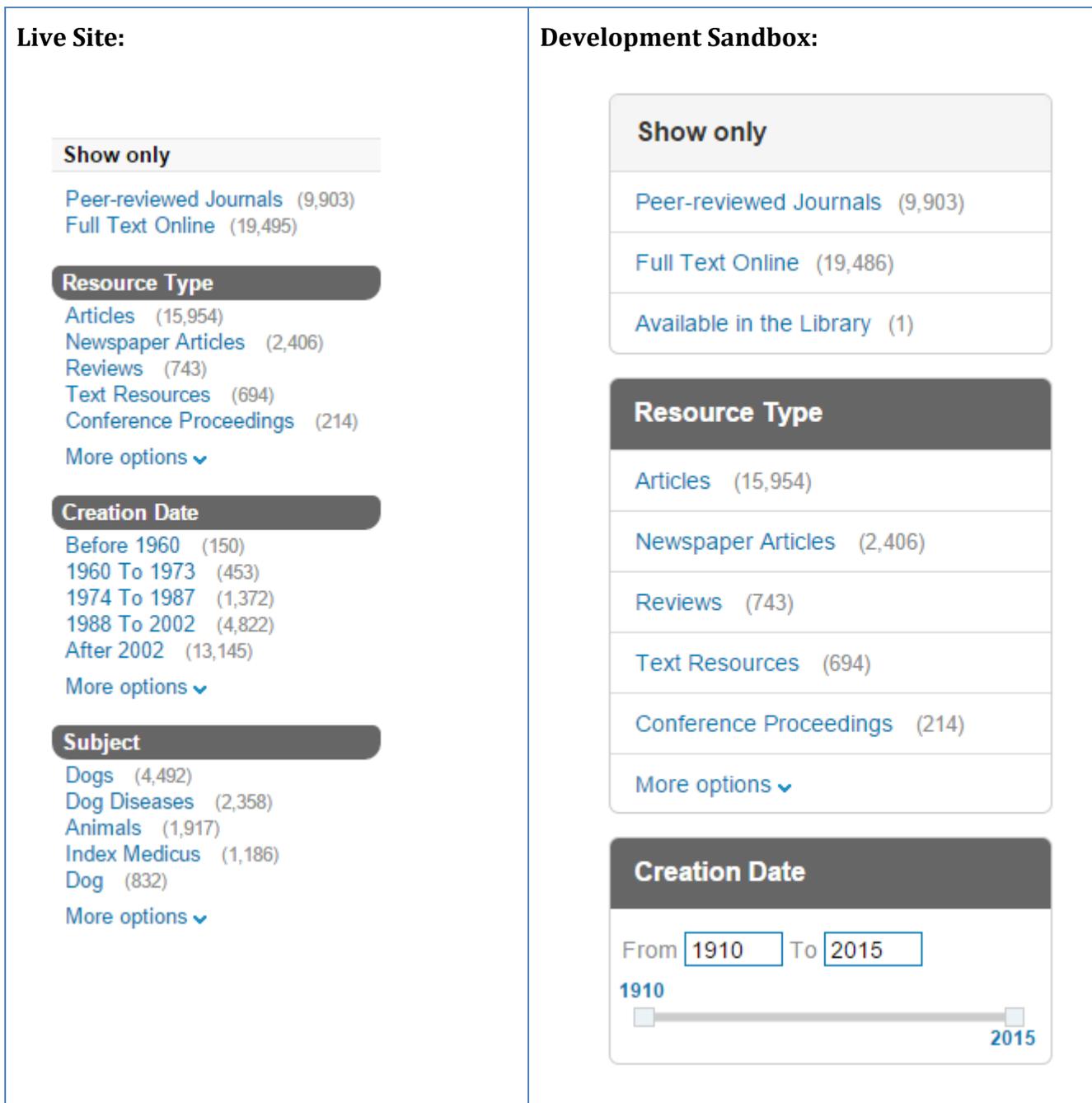
[Request](#)

[Locations and Status](#)

[Details and Related Links](#)

**Figure 2.** Search Results in Live Site (Above) and Development Sandbox (Below) at Time of Testing

The facets were also redesigned to look cleaner and larger to attract users' attention (see figure 3).



**Figure 3.** Facets in Live Site and Development Sandbox at Time of Testing

Both groups were happy with the changes to the Primo development sandbox but wanted to test the effect of the changes on user search behavior before updating the live site. **The Discovery Usability Group conducted a usability test within the development sandbox. The goal of the test was to find out if users could effectively complete common research tasks using Primo.** With that goal in mind, the group developed a usability test and conducted it during the spring semester of 2015.

---

## METHODOLOGY

The Discovery Usability Group developed a usability test using a “think-aloud” methodology, where users were asked to verbalize their thought process as they completed research tasks through Primo. Four tasks were designed to mirror tasks that users are likely to complete for class assignments or for general research. To minimize the testing time, each participant completed two tasks, with the facilitators alternating between two sets of tasks from one participant to the next.

### Test 1

Task 1: *You are trying to find an article that was cited in a paper you read recently. You have the following citation:*

Clapp, E., & Edwards, L. (2013). Expanding our vision for the arts in education. *Harvard Educational Review*, 83(1), 5–14.

*Please find this article using OneSearch [the public-facing name given to the Libraries’ Primo implementation].*

Task 2: *You are doing a research project on the effects of video games on early childhood development. Find a peer-reviewed article on this topic, using OneSearch.*

### Test 2

Task 1: *Recently your friend recommended the book *The Lighthouse* by P. D. James. Use OneSearch to find out if you can check this book out from the library.*

Task 2: *You are writing a paper about the drug cartels’ influence on Mexico’s relationship with the United States. Find a newspaper article on this topic, using OneSearch.*

Two facilitators set up a table with a laptop in the front entrance of the library. They alternated between the facilitator and note-taker roles. Another group member took on the role of “caller” and recruited library patrons to participate in the study. The caller set up a table visible to those passing by with library-branded T-shirts and umbrellas to incentivize participation. The caller explained what would be expected of the potential participant and went over the informed-consent document. After signing the form, the participant performed two tasks. After the test the participant received a library T-shirt or umbrella, and snacks.

The facilitators used Morae Usability Software to record the screen and audio of each test. Participants were asked for permission to record their sessions, but could opt out. During the three hour testing period, fifteen library patrons participated in the study, and fourteen sessions were recorded. Of the fifteen participants, thirteen were undergraduate students (four freshman, one sophomore, seven juniors, and two seniors), one was a graduate student, and one was a post-baccalaureate student. The majority of the participants were from the sciences, along with two students from the College of Business and two from the School of Communications. There were no participants from the humanities.

The facilitators took notes on a rubric (see table 1) that simplified the processes of coding and reviewing the recordings. After the usability testing, the facilitators reviewed the notes and recordings, coded them for common themes and breakdowns, and prepared a report of their findings and design recommendations. The facilitators sent the report, along with audio and screen recordings, to the Discovery Advisory Group, who reviewed them along with RDS. The Discovery Advisory Group made additional design recommendations, and RDS used the information and recommendations to implement additional customizations to the Primo development sandbox.

Preliminary Questions	
ASK: What is your affiliation with the University of Houston? Year? Major?	
ASK: How often do you use the library website? For what purpose(s)?	
Task 1	
Describe the steps the participant took to complete the task	S/U
ASK: How did you feel about this task? What was simple? What was difficult?	
ASK: Is there anything that would make completing this task easier?	
Task 2	
Describe the steps the participant took to complete the task	S/U
ASK: How did you feel about this task? What was simple? What was difficult?	
ASK: Is there anything that would make completing this task easier?	
Follow-up Question	
ASK: What can we do to improve the overall experience using OneSearch?	

**Table 1.** Task Completion Rubric for Test 1

---

## RESULTS

### Test 1, Task 1

You are trying to find an article that was cited in a paper you read recently. You have the following citation:

Clapp, E., & Edwards, L. (2013). Expanding our vision for the arts in education. *Harvard Educational Review*, 83(1), 5–14.

Please find this article using OneSearch.

Participant	Time on Task	Task Completion
1	1m 54s	Y
2	4m 13s	Y
3	1m 26s	Y
4	1m 17s	Y
5	1m 26s	Y (required assistance)
6	1m 43s	Y
7	1m 27s	Y
8	1m 5s	Y

**Table 2.** Results for Test 1, Task 1

All eight participants successfully completed this task, although sophistication and efficiency varied between participants. Some searched by the authors' last names, which was not specific enough to return the item in question. Four participants attempted to use advanced search or the drop-down menu to the right of the search box to pre-filter their results. Two participants viewed the options in the drop-down menu, which were "everything," "books+," and "digital library," and left it on the default "everything" search. When prompted, the participants explained that they were expecting the drop-down to contain title and/or author limiters. Similarly, participants expected an author limiter in the advanced search.

The citation format seemed to confuse participants, and they tended to search for the piece of information that was listed first—the authors—rather than the most unique piece of information—the title. If the first search did not return the correct item in the first few results, the participant would modify their search by searching for a different element of the citation or adding another element of the citation to the initial search until the item they were looking for appeared as one of the first few results. Participant 5 thought they had successfully completed the

---

task, but the facilitator had to point out that the item they chose did not meet the citation exactly, and on the second try they found the correct item.

Participant 2 worked on the task for more than four minutes, significantly longer than the other seven participants. They immediately navigated to advanced search and filled out several fields in the advanced search form with the elements of the citation. If the search did not return their item, they added more elements until they finally found it. Simply searching the title in the citation would have returned the item as the first search result. Filling out the advanced search form with all of the information from the citation does not necessarily increase a user’s chances of finding the item in a discovery system, though it might do so when searching in an online catalog or subject database.

The Discovery Advisory and Usability Groups made two recommendations to address some of the identified issues: include an author search option in the advanced search, and add an “articles+” option to the drop-down menu on the basic search. RDS implemented both recommendations. The Discovery Usability Group identified confusion around citations as a common breakdown during this task. The groups recommended providing instructional information about searching for known items to address this breakdown; however, RDS is still working on an effective method to provide this information in a simple and visible way.

#### *Test 1, Task 2*

*You are doing a research project on the effects of video games on early childhood development. Find a peer-reviewed article on this topic, using OneSearch.*

Participant	Time on Task	Task Completion
1	3m 44s	Y
2	2m 21s	Y
3	5m 23s	Y (required assistance)
4	2m 5s	Y
5	3m 32s	Y
6	2m 45s	Y
7	3m 8s	Y
8	3m 1s	Y (required assistance)

**Table 3.** Results for Test 1, Task 2

All eight participants successfully found an article on this topic, but were less successful in determining whether the article was peer-reviewed. Only one participant used the “Peer-reviewed

Journals” facet without being prompted. Three users noticed the “[Peer-reviewed Journal]” note in the record information for search results, and used it to determine if the article was peer-reviewed. One participant went to the full-text of an article, and said it “seemed” like it was peer-reviewed and considered the task complete. The resource type facets were more heavily used during this task than the “Peer-reviewed Journals” facet, despite its being promoted to the top of the list of facets. Two participants used the “Articles” facet, and two participants used the “Reviews” facet, thinking it limited to peer-reviewed articles. Participants 3 and 8 needed help from the facilitator to determine whether a source was peer-reviewed. There was an overall misunderstanding of what peer-reviewed means, which affected participants’ confidence in completing the task.

The design recommendations based on this task included changing the “Peer-reviewed Journals” facet to “Peer-reviewed Articles” or simply, “Peer-reviewed.” RDS changed the facet to “Peer-reviewed Articles” to help alleviate confusion. Additionally, the groups recommended emphasizing the “[Peer-reviewed Journal]” designations within the search results and providing a method for limiting to peer-reviewed materials before conducting a search. Customization limitations of the system have prevented RDS from implementing these design recommendations yet. A way to address the breakdowns caused by misunderstanding terminology also has yet to be identified. It was disheartening that participants did not use the “Peer-reviewed Journals” facet despite its being purposefully emphasized on the search results page.

#### *Test 2, Task 1*

*Recently your friend recommended the book The Lighthouse by P. D. James. Use OneSearch to find out if you can check this book out from the library.*

Participant	Time on Task	Task Completion
1	1m 7s	Y
2	56s	Y
3	No recording	Y
4	2m 21s	Y
5	1m 8s	Y
6	2m 14s	Y
7	1m 15s	Y

**Table 4.** Results for Test 2, Task 1

All seven participants were able to find this book using Primo, but had difficulty in determining what to do once they found it. For this task every participant searched by title and found the book as the first search result. Four users limited to “books+” before searching using the drop-down

menu, while the other three remained in the default “everything” search. Only one participant used the locations tab within the search results to determine availability; the others clicked the title and went to the item’s catalog record. All participants were able to determine that the book was available in the library, but there was an overall lack of understanding about how to use the information in the catalog to check out a book. Participant 1 said that they would write down the call number, take it to the information desk, and ask how to find it, which was the most sophisticated response of all seven participants. Participant 4 spent nearly two minutes clicking through links in the OPAC expecting to find a “Check Out” button and only stopped when the facilitator stepped in.

A recommended design change based on this task was to have call numbers in Primo and the online catalog link to a stacks guide or map. This is a feature that may be developed in the future, but technical limitations prevented RDS from implementing it in time for the release of the redesigned search interface. Like the previous tasks, some of the breakdowns occurred because of a lack of understanding of library services. Users easily figured out that there was a copy of the book in the library, but had little sense of what to do next. None of the participants successfully located the stacks guide or the request feature that would put the item on hold for them. Steps should be taken to direct users to these features more effectively.

*Test 2, Task 2*

*You are writing a paper about the drug cartels’ influence on Mexico’s relationship with the United States. Find a newspaper article on this topic, using OneSearch.*

Participant	Time on Task	Task Completion
1	4m 45s	Y (required assistance)
2	59s	Y
3	No recording	N
4	7m 47s	Y
5	2m 52s	Y
6	1m 33s	Y
7	1m 30s	Y

**Table 5.** Results for Test 2, Task 2

This task was difficult for participants. Two users limited their search initially to “digital library” using the drop-down menu, thinking it would be a place to find newspaper articles; their searches returned zero results. Only two users used the “Newspaper Articles” facet without being prompted, and users did not seem to readily distinguish newspaper articles as a resource type. Participants

---

did not notice the resource type icons without being prompted. Several participants needed to be reminded that the task was to find a *newspaper* article, and not any other type of article. With guidance, most participants were able to complete the task. Participant 4 remained on the task for almost eight minutes because of their dissatisfaction with the relevancy of the results to the prompt. Interestingly, they found the “Newspaper Articles” facet and reapplied it after each modified search, suggesting that they learned to use system features as they went.

One of the recommendations based on this task was to remove “digital library” as an option in the drop-down menu on the basic search. It was evident that “digital library” did not have the same meaning to end users as it does to internal users. This recommendation was easily implemented. Another recommendation was to emphasize the resource type icons within the search results, but we have not determined a way to do so effectively. One suggestion from the Discovery Usability Group was to exclude newspaper articles from the search results as a default, but no consensus was reached on this issue.

## LIMITATIONS

The Discovery Usability Group identified limitations to the usability test that should be noted. Testing was done in a high-traffic portion of the library’s lobby, which is used as study space by a broad range of students. Participants were recruited from this study space, and we chose not to screen participants. The fifteen participants in the study did not constitute a representative sample. Almost all participants were undergraduate students, and no humanities majors participated. The outcomes might have been different if our participants had included more experienced researchers or students from a broader range of disciplines. By adding screening questions or choosing a more neutral location, we would have limited the number of participants who could complete our testing.

Another limitation was that the participants started the usability test within the Primo interface. Because Primo is integrated into the Libraries’ website, users would typically begin searching the system from within the library homepage. The goals of the study required testing of our Primo development sandbox, which was not yet available to the public, and therefore could not be accessed in the same way. This gave participants some additional options from the initial search pages that are not usually available through the main search interface. While testing an active version of the interface would be preferable, one of our goals was to understand how our modifications affected user behavior, so testing the unmodified version was not an acceptable substitute. Additionally, the usability study presented tasks out of context and did not replicate a true user-searching experience. Despite the limitations, we learned valuable lessons from the participants in this study.

## DISCUSSION

Users successfully completed the tasks in this usability study. Unfortunately, they did not take advantage of many of the features that can make such tasks easier—particularly facets. This was

---

especially apparent when we asked users to find a peer-reviewed journal article (Test 1, Task 2). Primo has a facet that will limit a search to only peer-reviewed journal articles, and only one out of eight participants used this facet during this task. Participants appreciated the pre-search filtering options, and requested more of them (such as an author search), while post-search facets were underutilized.

Similarly, participants almost uniformly ignored the links, or tabs, within the search results, which would provide users with more information, a preview of the full-text, and additional features such as an email function. Users bypassed these options and clicked on the title instead. The Discovery Usability Group theorized that users clicked on the title of the item because that behavior would be successful in a more familiar search interface like Google. The team customized the configuration so that a title click would open either the full-text of electronic items or the catalog record for physical items to accommodate users' instinctive search behaviors. The tabs, though a prominent feature of the discovery system, have proved to have little value for users.

Throughout the implementation of discovery systems in academic libraries, both research studies and anecdotal evidence have suggested that users do not find end-user features like facets valuable; however, discovery system vendors have made no apparent attempt to reimagine the possibilities for search refinements. Indeed, most of the findings in this study will present few surprises to anyone familiar with the discovery usability literature, which is itself concerning. As our literature review has shown, many of the same general usability issues have repeated throughout studies of Primo since 2008, and most are very similar to usability issues in other, competitor discovery systems. This raises some concerns about the pace of innovation in the discovery field, and whether discovery vendors are genuinely taking into account the research findings about the needs of our users as they refine their products. In a recent article, David Nelson and Linda Turney identified many issues with discovery facets in their current form that may be barriers to usage, particularly labeling and library jargon; we join them in urging vendors and libraries to collaborate more closely for deep analysis of actual facet usage by users, and to address those factors that have negatively affected facets' value.<sup>25</sup>

During our usability study, a common barrier to the successful completion of a task was not the technology itself but a lack of understanding of the task. Participants had difficulty deciphering a citation, which may have led to their tendency to search for a journal article by author and not by title. Many participants struggled with using call numbers, and how to find and check out books in the library. Peer review also proved to be a difficult or unfamiliar concept for many; when looking for peer-reviewed articles, some participants clicked on the "Reviews" facet, which limited their searches to an inappropriate resource type. Additionally, participants did not differentiate between journal articles and newspaper articles, which may indicate a broader inability to differentiate between scholarly and nonscholarly resources. This effect may be exaggerated by the high percentage of science students who participated, as these students may not have frequent need for newspaper articles. All of these challenges, however, are indicative of a deeper problem

---

with terminology. Regardless of how simple it is to limit a search to peer-reviewed articles, a user who does not understand what peer review means cannot complete the task with confidence or certainty.

Librarians struggle with presenting understandable language and avoiding library terminology; as we discovered, academic language, like “peer-reviewed” and “citation,” presents a similar problem. These are not issues that can be resolved with a technological solution. Rather, we join previous authors in suggesting that instruction may be a reasonable way to address many usability issues in Primo. From our findings and from those in the wider literature, we conclude that general instruction in information literacy is prerequisite for effective use of this or any research tool, particularly for undergraduates. Nichols et al. “recommend studying how to effectively provide instruction on Primo searching and results interpretation,”<sup>26</sup> but instruction on the use of a single tool is of limited utility to students in their academic lives. Instead libraries could bolster information literacy instruction on key concepts around the production and storage of information, scholarly communications, and differences in information types. Teaching these concepts effectively should help to alleviate the most common user issues, including understanding terminology and different types of information, as well as helping students to understand key elements of research in general. This is a particularly important point to note for librarians working as advocates for information literacy instruction, especially in cases where administrators or faculty may feel that more advanced tools, like discovery systems, should make instruction obsolete.

## CONCLUSION

Several changes were made to the Primo interface in response to breakdowns identified during the usability study. Resource Discovery Systems first implemented the changes to the Primo development sandbox. After the Discovery Usability and Advisory Groups agreed on the changes, they were made available on the live site (see figure 4). The redesigned search results page became available to the general public between the spring and summer academic sessions of 2015. In addition to the changes that were made because the usability study, RDS made changes to the look and feel to make the search results interface more aesthetically pleasing and more in line with the University of Houston brand.

## Before (live site):

The screenshot shows the Primo search interface before usability testing. At the top, there is a search bar with the text "therapy dogs" and a "Search" button. To the right of the search bar are links for "Articles+", "Books+", "Advanced Search", and "Browse Search". Below the search bar, there are filters for "Show only" (Peer-reviewed Journals (9,903), Full Text Online (19,495)), "Resource Type" (Articles (15,954), Newspaper Articles (2,406), Reviews (743), Text Resources (694), Conference Proceedings (214)), "Creation Date" (Before 1960 (150), 1960 To 1973 (453), 1974 To 1987 (1,372), 1988 To 2002 (4,822), After 2002 (13,145)), and "Subject" (Dogs (4,492), Dog Diseases (2,358), Animals (1,917), Index Medicus (1,186), Dog (832)).

The main results area shows "Results 1 - 10 of 19,508 for Everything" sorted by "Relevance". The first three results are:

- Can Therapy Dogs Improve Pain and Satisfaction After Total Joint Arthroplasty? A Randomized Controlled Trial** by Harper, Carl M.; Dong, Yan; Thornhill, Thomas S.; Wright, John; Ready, John; Brick, Gregory W.; Dyer, George. Clinical Orthopaedics and Related Research, 2014, Vol.473(1), pp.372-379. Full text available.
- Physical therapy and massage for the dog** by Julia, Robertson Andy Mead 2013. Online access.
- Therapy dogs help library patrons to learn.(news desk)** Library Journal, March 1, 2012, Vol.137(4), p.12(1). Connecticut, Massachusetts Institute of Technology, Yale Law School, and the University of San Diego have brought in therapy dogs during finals to reduce. Full text available.

The fourth result is a book: **Great Dane : gentle giant** by Stephen, Person 2012. Check holdings at UHCL/JUVENILE 636.73 Per 2012.

Figure 4. Primo Interface before Usability Testing

## During (development sandbox):

The screenshot shows the Primo search interface during usability testing. The search bar contains "therapy dogs" and the filter dropdown is set to "everything". The results area shows "Results 1 - 10 of 19,487 for everything" sorted by "Relevance". The first three results are:

- Can Therapy Dogs Improve Pain and Satisfaction After Total Joint Arthroplasty? A Randomized Controlled Trial** by Harper, Carl M.; Dong, Yan; Thornhill, Thomas S.; Wright, John; Ready, John; Brick, Gregory W.; Dyer, George. Clinical Orthopaedics and Related Research, 2014, Vol.473(1), pp.372-379. Full text available.
- It could happen to anyone : why battered women stay** by Alyce D. LaViolette Ola W Barnett 2014. Los Angeles, California : SAGE. Check holdings at ANDERSON/GENERAL COLLECTION HV6626.2 .B27 2014.
- Therapy dogs help library patrons to learn.(news desk)** Library Journal, March 1, 2012, Vol.137(4), p.12(1). Connecticut, Massachusetts Institute of Technology, Yale Law School, and the University of San Diego have brought in therapy dogs during finals to reduce. Full text available.

The left sidebar shows filters for "Show only" (Peer-reviewed Journals (9,903), Full Text Online (19,486), Available in the Library (1)), "Resource Type" (Articles (15,954), Newspaper Articles (2,406), Reviews (743), Text Resources (694), Conference Proceedings (214)), "Creation Date" (From 1910 To 2015), and "Subject/Topic" (Dogs (4,485)).

Figure 5. Primo Interface during Usability Testing

## After (live site):

The screenshot shows the Primo interface after a search for 'therapy dogs'. The search bar is at the top, and the results are displayed in a list. The first result is 'Therapy dogs' by Roth, Bob, from the Jewish News of Greater Phoenix. The second result is 'Physical therapy and massage for the dog' by Julia Robertson and Andy Mead. The third result is 'Can Therapy Dogs Improve Pain and Satisfaction After Total Joint Arthroplasty? A Randomized Controlled Trial' by Harper, Carl, et al. The interface includes navigation links like 'New Search', 'Library Home', 'Contact Us', and 'Help'. There are also filters for 'Personalize your results' and 'Show only' (Peer-reviewed Articles, Full Text Online, Available in the Library). The 'Resource Type' filter shows 'Articles' (17,657), 'Newspaper Articles' (5,201), 'Dissertations' (1,399), 'Reviews' (864), 'Text Resources' (581), and 'More options'.

**Figure 6.** Primo Interface after Usability Testing

Many larger assertions of this study, encompassing implications for instruction and our needs from discovery vendors, will require further study to address. The authors intend to continue to investigate these issues as additional usability testing is conducted and to use the data to support future vendor relations and instructional curriculum development discussions.

## REFERENCES

1. Tamar Sadeh, "User Experience in the Library: A Case Study," *New Library World* 109, no. 1/2 (2008): 7–24, doi:[10.1108/03074800810845976](https://doi.org/10.1108/03074800810845976).
2. Aaron Nichols et al., "Kicking the Tires: A Usability Study of the Primo Discovery Tool," *Journal of Web Librarianship* 8, no. 2 (2014): 172–95, doi: [10.1080/19322909.2014.903133](https://doi.org/10.1080/19322909.2014.903133); Scott Hanrath and Miloche Kottman, "Use and Usability of a Discovery Tool in an Academic Library," *Journal of Web Librarianship* 9, no. 1 (2015): 1–21, doi:[10.1080/19322909.2014.983259](https://doi.org/10.1080/19322909.2014.983259).
3. David J. Comeaux, "Usability Testing of a Web-Scale Discovery System at an Academic Library," *College & Undergraduate Libraries* 19, no. 2–4 (2012): 189–206, doi:[10.1080/10691316.2012.695671](https://doi.org/10.1080/10691316.2012.695671).
4. Kylie Jarrett, "FindIt@ Flinders: User Experiences of the Primo Discovery Search Solution," *Australian Academic & Research Libraries* 43, no. 4 (2012): 278–300; Nichols et al., "Kicking the Tires."
5. Sadeh, "User Experience in the Library."

- 
6. Jarrett, "FindIt@ Flinders"; Nichols et al., "Kicking the Tires."
  7. Xi Niu, Tao Zhang, and Hsin-liang Chen, "Study of User Search Activities with Two Discovery Tools at an Academic Library," *Libraries Faculty and Staff Scholarship and Research* 30, no. 5 (2014), doi:[10.1080/10447318.2013.873281](https://doi.org/10.1080/10447318.2013.873281); Hanrath and Kottman, "Use and Usability of a Discovery Tool in an Academic Library."
  8. Rice Majors, "Comparative User Experiences of Next-Generation Catalogue Interfaces," *Library Trends* 61, no. 1 (2012): 186–207, doi:[10.1353/lib.2012.0029](https://doi.org/10.1353/lib.2012.0029); Niu, Zhang, and Chen, "Study of User Search Activities with Two Discovery Tools at an Academic Library."
  9. Beth Thomsett-Scott and Patricia E. Reese, "Academic Libraries and Discovery Tools: A Survey of the Literature," *College & Undergraduate Libraries* 19, no. 2–4 (2012): 123–43, doi:[10.1080/10691316.2012.697009](https://doi.org/10.1080/10691316.2012.697009).
  10. Sadeh, "User Experience in the Library."
  11. Comeaux, "Usability Testing of a Web-Scale Discovery System at an Academic Library."
  12. Jessica Mahoney and Susan Leach-Murray, "Implementation of a Discovery Layer: The Franklin College Experience," *College & Undergraduate Libraries* 19, no. 2–4 (2012): 327–43, doi:[10.1080/10691316.2012.693435](https://doi.org/10.1080/10691316.2012.693435).
  13. Joy Marie Perrin et al., "Usability Testing for Greater Impact: A Primo Case Study," *Information Technology & Libraries* 33, no. 4 (2014): 57–67.
  14. Majors, "Comparative User Experiences of Next-Generation Catalogue Interfaces"; Thomsett-Scott and Reese, "Academic Libraries and Discovery Tools."
  15. Jarrett, "FindIt@ Flinders"; Mahoney and Leach-Murray, "Implementation of a Discovery Layer."
  16. Jarrett, "FindIt@ Flinders"; Mahoney and Leach-Murray, "Implementation of a Discovery Layer"; Nichols et al., "Kicking the Tires."
  17. Jarrett, "FindIt@ Flinders"; Mahoney and Leach-Murray, "Implementation of a Discovery Layer"; Perrin et al., "Usability Testing for Greater Impact : A Primo Case Study."
  18. Jarrett, "FindIt@ Flinders"; Nichols et al., "Kicking the Tires"; Hanrath and Kottman, "Use and Usability of a Discovery Tool in an Academic Library"; Majors, "Comparative User Experiences of Next-Generation Catalogue Interfaces."
  19. Comeaux, "Usability Testing of a Web-Scale Discovery System at an Academic Library"; Thomsett-Scott and Reese, "Academic Libraries and Discovery Tools."
  20. Jarrett, "FindIt@ Flinders."
  21. Mahoney and Leach-Murray, "Implementation of a Discovery Layer"; Perrin et al., "Usability Testing for Greater Impact."

- 
22. Mahoney and Leach-Murray, "Implementation of a Discovery Layer"; Nichols et al., "Kicking the Tires"; Niu, Zhang, and Chen, "Study of User Search Activities with Two Discovery Tools at an Academic Library."
  23. Thomsett-Scott and Reese, "Academic Libraries and Discovery Tools."
  24. Tao Zhang and Merlen Prommann, "Applying Hierarchical Task Analysis Method to Discovery Layer Evaluation," *Information Technology & Libraries* 34, no. 1 (2015): 77–105, doi:[10.6017/ital.v34i1.5600](https://doi.org/10.6017/ital.v34i1.5600).
  25. David Nelson and Linda Turney, "What's in a Word? Rethinking Facet Headings in a Discovery Service," *Information Technology & Libraries* 34, no. 2 (2015): 76–91, doi:[10.6017/ital.v34i2.5629](https://doi.org/10.6017/ital.v34i2.5629).
  26. Nichols et al., "Kicking the Tires," 184.