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Abstract

In an effort to assess user experience and satisfaction with searching the University of Michigan Library catalog, we developed an online data collection instrument that captured both data on user searches and their reports on various aspects of the search experience. We successfully piloted the tool, demonstrating both the usefulness of the assessment data and the readiness of the tool for use with a larger group of campus stakeholders. We focus in this paper on the features and deployment of the data collection tool, and we also discuss our pilot phase findings and our plan to use the tool in future assessment work.

I. Introduction

At the University of Michigan Library, we created a unique data collection tool to assess our users’ satisfaction with the catalog portion of Library Search, the discovery interface within our library’s web presence. This paper starts off with a background discussion, providing insight into our discovery environment and how we designed and user-tested it. We provide some contextual background about the challenges with using Library Search and why we made the decision to assess it in the way we did. We then focus on the methodology, the main portion of this paper, and discuss our approach to pilot testing the tool with key library stakeholders. We briefly highlight some of the findings from the pilot, and then share some practical implications that detail how we plan to use the tool to gauge user satisfaction over time, and to regularly gather actionable data on the strengths and shortcomings of our catalog interface. We conclude with the next steps for using the tool with a broader user audience and how we continually improve our discovery environment through assessment.

II. Background

In the summer of 2018, the University of Michigan Library (https://lib.umich.edu) launched a new discovery interface, Library Search (https://search.lib.umich.edu) for discovering the library’s resources, collections, spaces, and expertise. Using multiple technology tools,¹ we built a custom interface that connects to our own Solr² indexes for our catalog and other locally maintained data and connects to the ProQuest Summon³ web-scale discovery index via its Application Programming Interface (API) for our licensed content. We decided to create our own interface and manage our own indexes for multiple reasons. These included: improving our ability to expose our resources and expertise to the campus; freeing up instructional librarians to spend more time on information literacy and less on how to use the tool; improving the experience for all users through an accessible and responsive design that we could have more control over; and gaining deeper understanding into the way the resources we provide are used. In essence, we felt there were more advantages to building our own user interface than using one or more vendor-provided and vendor-managed solutions.

Because we were building something from scratch, we knew that we would need to iteratively conduct user research and take a mixed methods approach to assessment over the course of the application’s design and development. The results of this iterative (and still ongoing) testing consistently showed that all the search types within Library Search (Everything, Catalog, Articles, Databases, Online Journals, Guides and More) worked well according to many of our metrics, including accessibility, system performance, usability, and design. Users were able to search for items, narrow result sets, and access materials across the multiple types of searches.
There have been, however, a number of concerns about Catalog Search (see Figure 1) in particular, and a general anecdotal sense that this important part of the interface was not quite meeting users’ needs. For example, we regularly received comments from users or via librarians that desired items were not appearing at the top of result lists, or they expressed dissatisfaction with catalog results for broader, topic-focused queries.

Figure 1

[Image of a screenshot of the Catalog Search page within Library Search.]

The Catalog is the definitive place for finding materials held by the U-M Library.

Your results will include everything in our physical collection (books, audio, video, maps, musical scores, archival materials, and more), as well as materials available online such as electronic books, streaming audio and video, and online journals.

To find materials closest to you, please choose a library

[Options for selecting libraries: All libraries, U-M Ann Arbor Libraries, Flint Thompson Library, Bentley Historical Library, William L. Clements Library, Mirlyn Classic Catalog, About our other Library Catalogs]

Screenshot of the Catalog Search page within Library Search. Though there are several different search types within Library Search, our survey to gauge user satisfaction was primarily focused on Catalog Search.

In our review of the literature, we found that user research on library tools is frequently focused on improving usability and or accessibility, and less on user satisfaction. For example, Brett, Lierman, and Turner described the University of Houston’s project in 2014 “to continually assess and customize Primo to improve functionality and user experience.” Similarly, a 2018 study at Washington State University tested a number of user interface changes that came with the then-new “new Primo user interface,” including specific interface changes such as “Basic Search tabs were expressed as drop-downs”; “Main
Menu items were located in a separate area from the Sign In and My Account links”; and “Availability statuses were expressed through colored text.”

User research focused on accessibility follows a similar pattern, often connected with the release of a new version of a vendor-provided or library-created interface. For example, EBSCO and Bentley University collaborated to test the accessibility of the EBSCO Discovery Service6 interface with a cohort of visually impaired students, finding that “for the most part, students with visual impairments engaged in research on the Web and within the discovery service in a similar manner to sighted students.”

Like these other libraries, we extensively researched and tested the individual characteristics of our search interface to answer questions such as whether users can identify items, apply filters, find online access links, and take advantage of accessibility affordances. This is a common practice in user experience practices overall: looking for functionality and whether the functionality meets needs. We ourselves also conducted extensive user research into both general usability of on-screen and interactive elements, and with students with various accessibility needs identified through the University of Michigan’s Office of Services to Students with Disabilities (OSSD).8

What was lacking from our own experience, and from what we could see of others’, is a method to test user satisfaction of the total experience without too large an investment of staff time. We wanted to get to the root of the persistent, low-level feedback about user dissatisfaction with relevance of search results so we could better tune the search index. Our ideal solution would not place high demands on user research staff, in contrast to interaction-intensive mechanisms such as described in a South Korean study.9

Therefore, we wanted to create a tool that we could use to first get a baseline measure of overall user satisfaction, and then over time to understand and assess the degree to which our changes improved user satisfaction. We were confident that a simple survey was not going to get at the depth of feedback that we needed to understand the challenges with advanced search results that people were experiencing, so we needed a different solution. With the decision to create a survey that would take a non-traditional approach by asking users to leave and come back to the survey multiple times before completion, we knew that we needed to try this first as a pilot to see if our approach would even work. We were concerned that giving survey-takers an external link might lead to survey dropout, but fortunately this didn't happen in our survey; people were likely very intrinsically motivated to participate. The survey had a 42% response rate and a 90% completion rate. Our pilot enabled us to test our assessment approach with key library staff who we knew relied heavily on using the catalog in their work, to see if the tool could be deployed successfully.

III. Methodology

Our data collection focused on the search experiences of library employees whose work involves using Library Search to assist members of our campus community. Focusing on this group allowed us to survey people who had clear expectations of how Catalog Search should function for library staff and users, and also to ensure that our data collection tool worked well before we used it to collect data from large numbers of faculty members and students on campus. Indeed, the first full round of data collection with faculty and students took place in the winter of 2020; the tool we designed was used successfully with students and faculty, but those results are outside the scope of this paper.

For the study reported on here, the invitation to participate was sent in December 2019 to 96 library employees. As an incentive, participants were given a chance to enter a drawing for one $50 gift card. Participants took part in the study online, via a survey on the Qualtrics10 platform. Forty people provided enough data to be included in some analyses (a 42% response rate); of those, 36 completed the whole
survey. The final sample had decent variability with regard to respondents’ library division and the number of years they had worked in the library.

A unique aspect of our data collection approach was to ask participants to conduct searches, to report on those searches, and to share the URLs associated with their search results. This allowed data from the survey to be interpreted while seeing exactly what participants were seeing as they did their searching. Thus, the first three sections of the survey asked participants to keep the survey tab open in their browsers while conducting each of three specific types of catalog searches, which we called “known item,” “known set,” and “exploratory.” These terms were derived from another recent investigation of our library search interface, and were defined as follows:

- **Known items:** the user wants a specific item that is known to exist. Examples of this kind of query include specific titles, author names, or ISBN numbers.
- **Known set:** the user wants one of a known group of things, any one of which might be equally satisfactory, even if the user does not know precisely what they are looking for. Examples of this kind of search include queries for terms such as *piano concerto by Beethoven* or *introduction to chemistry*.
- **Exploratory search:** the user wants one or more items on a general topic, but may not know enough about the topic to be more specific. Examples of this kind of search include terms such as *video games* or *botany*.

Participants completed the survey (see Appendix A for the survey instrument) to answer questions about those three search experiences. Specifically, participants were asked to report on their satisfaction with the relevance of results, the speed with which results were returned, and the adequacy of various pieces of information contained in item records. When participants encountered unexpected results in their searches, they were given an opportunity to share more about what they expected to see, in relation to what they saw.

Figures 2, 3, and 4 below are screenshots from the survey tool that help survey respondents navigate the process of doing a known item search within Catalog Search, and then return to the survey. Knowing that not all respondents would be familiar or comfortable with tab management within browsers, or with copying and pasting text, we wanted to be explicit about the steps the respondent needed to take. Figure 4 shows the results for a search of “the new jim crow” within Catalog Search. The URL of the search results shown in Figure 5 is what we asked respondents to copy and paste back in the survey.
Figure 2

**IMPORTANT**

In the first three sections of this survey you will be asked to open other tabs in your browser. For your convenience, always keep the tab with the survey open.

(Note: you can return your most recent spot in the survey if you close the survey tab by mistake.)

Figure 3

**Section 1 of 4: Searching for a Known Item**

**STEP 1: INSTRUCTIONS**

Below is a link to the Catalog. Once in the Catalog:

- Please enter the title of an item that you know to be in the Catalog.
- Look at no more than the first two pages of results.
- Then click 'Next' in the survey.

[Click here to open Catalog Search in a new tab.](#)

Figure 3

Screenshot of survey text alerting respondents to the fact that they would be asked to open other tabs in their browser during the survey.

Screenshot of survey text asking respondents to click on a link to Catalog Search, taking them to a new browser tab to do a search and review the search results.
Figure 4

STEP 2: RESULTS URL

Once you have completed your search:

- Copy the URL of the results page.
- Paste it in the box below.

https://search.lib.umich.edu/catalog?query=the+new+jim+crow&library=All+libraries

Screenshot of survey text asking respondents to copy and paste the URL of their search results page into the survey.
A final section of the survey asked people to provide more general ratings and comments related to recent uses of Library Search. These questions were not limited to catalog searching; this could also include focused searches for articles, databases, etc. For those that remembered using Library Search a year prior, a small set of questions also asked people to compare their current satisfaction with Library Search to what they remember feeling a year ago. These final questions, about recent experiences and comparisons to a year ago, were answered by most participants.

**IV. Findings**

**Known Item Searches**

Known item searches are for specific, individual items (e.g., a specific book title). Of the 40 people who completed the known item search, 75% saw the item in the results as expected. A substantial minority (18%) saw the item, but not where or how they expected; these respondents were asked to explain what
they expected to see and what they did see. Small percentages of participants either did not see the expected item at all (3%) or provided another type of response (5%). The majority of those who saw the expected search results were either very (49%) or moderately (43%) satisfied with the position of the known item in the search results.

We asked several additional questions for known item searches; we did not ask these questions for the other search categories, as we felt the responses would not be substantially different and we wanted to keep the survey length as short as possible.

When asked about the speed of search results, most expressed being very (55%) or moderately (40%) satisfied. In terms of ease of determining availability of print or online access to the items found, most were very (49%) or moderately (36%) satisfied, but a notable minority (16%) were dissatisfied. And most people were very (51%) or moderately (35%) satisfied with identifying where physical items were located, with a notable minority (14%) expressing dissatisfaction.

For known item searches—and for the other two search types—participants who saw unexpected search results were asked to share what they expected to see, and what they did see. Comments touched on concerns such as the relevance of results and the way that holdings were displayed. These comments have served as guides for the continued fine-tuning of Catalog Search. Examples of comments are provided for known item searches, and include:

- “I see many editions of the item in an order that doesn't make a ton of sense.”
- “Since the title is long, I did not expect to see so many results. My title is on top but it is disconcerting to see so many irrelevant hits.”
- “I see separate records for different formats (i.e., physical copy and e-book) of the same edition, but I would expect to see one record with different holdings.”

**Known Set Searches**

Known set searches are for collections of items (e.g., plays by Shakespeare, sonatas by Mozart, jazz CDs, etc.), from which the searcher is presumed to be more or less satisfied with any specific item. For known set searches, just over half (58%) of the 36 participants who did this search saw what they expected; a substantial percentage saw something unexpected (25%) or provided some other type of response (17%). Among those who did see results as expected, there was a fairly even split between feeling very (52%) and moderately (48%) satisfied with the position(s) of the known set items in the search results. Most were very (49%) or moderately (34%) satisfied with information included in the records returned in the known set searches.

**Exploratory Searches**

Exploratory searches are subject or topic-focused searches (e.g., solar energy). For exploratory searches, just over half (56%) saw what they expected in the results; many (39%) also reported seeing something unexpected, and 6% provided another type of response. Most were either very (29%) or moderately (51%) satisfied with the relevance of what they saw in the results (20% were dissatisfied). When asked about the information visible in the records returned by exploratory searches, most were either very (42%) or moderately (53%) satisfied.

**General Feedback**

In the final section of the survey, participants were asked about their recent experiences with Library Search (not limited to Catalog Search), and their views on whether Library Search had improved or not compared to a year earlier (for those with memories of Library Search at that time).
Thirty-three participants had used Library Search within the previous two weeks. When asked about overall satisfaction with their recent experiences, most were very (12%) or moderately (58%) satisfied, with a notable 30% expressing dissatisfaction. Similar findings were obtained when asking about satisfaction with the recent relevance of search results, few were very satisfied (12%); most (58%) were moderately satisfied, and 30% expressed dissatisfaction. Finally, 24% of recent respondents were very satisfied with the speed of Library Search, 52% were moderately satisfied, and 23% expressed dissatisfaction.

When asked to compare their current satisfaction with the speed of Library Search with what they remembered from a year prior, most (81%) were somewhat or much more satisfied now. When asked to compare their current satisfaction with the relevance of search results with what they remembered from a year prior, 72% were somewhat or much more satisfied currently. Finally, when asked to compare their current overall satisfaction with Library Search compared to a year ago, 82% were somewhat or much more satisfied.

V. Implications and Next Steps

The approach we took for this study provided us with rich, actionable data, a means to efficiently assess Library Search or other applications again in the future, and a way to better understand different populations on campus.

The survey is an example of how libraries can use an online data collection tool to reach key stakeholders when evaluating satisfaction with a web-based library interaction. We received lots of helpful data from the pilot with librarians and it enabled us to focus on expert users and identify high-priority issues. We could easily modify the survey for those with less expertise and experience in advanced searching techniques.

The general categorization of “known item,” “known set,” and “exploratory” searches, itself based on previous user research conducted in our library into kinds of searching, could easily be extended to other kinds of applications and services that need to better understand the information seeking behavior of users. The general method of the survey allows disintermediated user research to take place, with the efficiency of gaining detailed user feedback about specific interactions without the investment of a commensurate amount of staff time.

Another key advantage of our methodology is that it facilitates the repeated evaluation of Library Search’s interface and query results over time. We hope to conduct this study approximately once a year, and to track satisfaction over time.

The detailed respondent feedback we received was data that our developers could act on right away. We were immediately able to make improvements to the ways metadata is displayed, and we added more information on where items are located in the user interface.

The insight we gained into user needs through this survey helped us prioritize development work for new features of Library Search, although that was not an explicit goal of the survey. The survey helped us identify features that are only available in our legacy Online Public Access Catalog (OPAC) for possible addition to Library Search. Input from this survey helped us identify the most important user functions to recreate during the system migration process.

And finally, by using a survey that collects rich data, we will be able better understand our campus population and their level of satisfaction with Library Search as a whole, or their satisfaction with particular elements of the search interface or search results. Having a proven, easily distributed and
conducted survey tool provides us with increased capacity to conduct user research even with limited staff availability.

Since this current research project completed in February 2019, with improvements to the query parser being made by developers in 2019 and 2020, the next stage of this research has already taken place. Two follow-up surveys based on the work described in this paper—one targeted to library staff and one to campus users—were conducted simultaneously in fall 2020. These surveys were slightly broader, including all the types of searching within Library Search, not just Catalog Search. Most of the satisfaction questions that were asked were parallel to the pilot in that they asked users about their satisfaction with the speed of results and position of items in search results. However, these surveys did not ask users about their overall satisfaction with Library Search, or about their relative satisfaction compared to one year ago, which the pilot had asked them about.

These two following surveys closed in mid-October 2020. Participants included 99 campus users and 54 library staff, including partner libraries. Much more data was collected than from our pilot study, and work is currently being done to prioritize and incorporate this work into other planned work on Library Search, with most of that work being prioritized on Catalog Search. We are, for example, reworking the query parser, the intermediate step of converting the text a user types in the search box into a query understandable by the search index.

Though we hope to use this survey tool on Library Search and or its components on an annual basis to gauge user satisfaction, we might instead only use it after major improvements have been made and recently pushed live, instead of doing it at potentially inopportune times when few changes have been made.

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VI. Author Biographies

Craig Smith
University of Michigan
Assessment Specialist

Craig Smith is the assessment specialist at the University of Michigan Library. Craig received a doctorate in human development and psychology from the Harvard Graduate School of Education and completed postdocs in the Harvard and University of Michigan psychology departments. In 2014 Craig moved into institutional research, studying diversity and equity issues at U-M. He became the assessment specialist in the library in 2018. He coordinates the strategic use of assessment in the library and collaborates with individuals and teams in the library on their assessment work. He offers leadership on study design, data collection, data analysis, and visualization/reporting.

Rachel Vacek
University of Michigan
Head of Design & Discovery

Rachel Vacek is the head of design & discovery at the University of Michigan Library. Her team provides leadership on user experience, digital accessibility, and web development, as well as manages the library’s website and custom discovery interface. Rachel has previously worked at the University of Houston, Vanderbilt University, and Miami University. She regularly speaks about UX, library web and discovery technologies, service design, and library leadership. She was a 2007 ALA Emerging Leader, a 2014 Library Journal Mover & Shaker, and the 2014–2015 LITA President. She can be found on Twitter at @vacekrae.
Kenneth J. Varnum  
University of Michigan  
Senior Program Manager

Ken Varnum is the senior program manager for discovery, delivery, and library analytics at the University of Michigan Library. Ken's research and professional interests include discovery systems, library analytics, and technology in the library setting. He has written or edited six books, the most recent of which, "Beyond Reality: Augmented, Virtual, and Mixed Reality in the Library" and the LITA Guide "New Top Technologies Every Librarian Needs to Know," were published in 2019. He can be found on Twitter at @varnum.

Endnotes

1 The Library Search Technical Overview, https://search.lib.umich.edu/technical-overview, provides the technical details about Library Search.
2 Solr: https://lucene.apache.org/solr/.
8 See https://apps.lib.umich.edu/blogs/tiny-studies/strategies-improve-participation-user-research-and-assessment-activities for a discussion of techniques used at the University of Michigan to collaborate with students with disabilities.
10 Qualtrics: https://www.qualtrics.com/.
Appendix A: Survey Text and Questions

Thanks for helping with this survey about Library Search. Design & Discovery will use this information when working on improvements. The survey should take no more than 10 minutes. Data will not be reported with identifiers (e.g., names, email addresses). The survey does not ask sensitive questions. Anyone who completes the survey can enter a drawing for a chance to win a $50 gift card. If you have any questions or concerns about the survey, please contact Craig Smith (craigsm@umich.edu). Please click 'Next' if you agree to participate.

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IMPORTANT: In the first three sections of this survey, you will be asked to open other tabs in your browser. For your convenience, always keep the tab with the survey open. (Note: you can return your most recent spot in the survey if you close the survey tab by mistake.)

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Section 1 of 4: Searching for a Known Item

STEP 1: INSTRUCTIONS

Below is a link to the Catalog. Once in the Catalog: Please enter the title of an item that you know to be in the Catalog. Look at no more than the first two pages of results. Then click 'Next' in the survey. Click here to open Catalog Search in a new tab.

STEP 2: RESULTS URL

Once you have completed your search: Copy the URL of the results page. Paste it in the box below.

STEP 3: QUESTIONS ABOUT YOUR SEARCH

As you look over the results of your search, please describe what you see:
(I see the item as expected; I see the item, but not where/how I expected; I don't see the item; Other _)

[DISPLAY IF: I see the item, but not where/how I expected] You indicated that the item did not appear where/how you expected. Can you say more about that?

[DISPLAY IF: ITEM SEEN] Please rate your satisfaction with the following:

- Position of desired record in the results
  - very satisfied; moderately satisfied; moderately dissatisfied; very dissatisfied
- Speed of the results appearing
  - very satisfied; moderately satisfied; moderately dissatisfied; very dissatisfied
- Sufficient information in each record to determine whether the item was the one I was looking for
  - very satisfied; moderately satisfied; moderately dissatisfied; very dissatisfied
- Ability to determine availability of print and/or electronic versions of item
  - very satisfied; moderately satisfied; moderately dissatisfied; very dissatisfied; N/A
- Clarity regarding location of print items
  - very satisfied; moderately satisfied; moderately dissatisfied; very dissatisfied; N/A

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Section 2 of 4: Searching for a Known Group of Items

STEP 1: INSTRUCTIONS

Sometimes you might look for a group of items, with the intention of identifying a particular one (for example, a piano concerto by Brahms, or Japanese literature published before 1950).

Once in the Catalog: Conduct a search for a group of items. Look at no more than the first two pages of results. Then click 'Next' in the survey. Please use this link to return to Catalog Search.

STEP 2: RESULTS URL

Once you have completed your search: Copy the URL of the results page. Paste it in the box below.

STEP 3: QUESTIONS ABOUT YOUR SEARCH

As you look at the results of your search, please describe what you see:
(I saw what I expected to see in the results; I saw something unexpected in the results; Other _)

[DISPLAY IF: I saw something unexpected in the results] You indicated that you saw something unexpected. Can you describe what you saw, and what you expected to see?

[DISPLAY IF: I saw what I expected to see in the results] Please rate your satisfaction with the following:

• Position of desired record in the results
  - Very satisfied; Moderately satisfied; Moderately dissatisfied; Very dissatisfied
• Sufficient information in each record to determine whether I had found what I was looking for
  - Very satisfied; Moderately satisfied; Moderately dissatisfied; Very dissatisfied

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Section 3 of 4: Exploratory Search about a Topic

STEP 1: INSTRUCTIONS

Once in the Catalog: Conduct a search to retrieve items on a general topic you are familiar with (e.g., “video games,” “botany,” etc.). Look at no more than the first two pages of results. Then click 'Next' in the survey. Please use this link to return to Catalog Search.

STEP 2: RESULTS URL

Once you have completed your search: Copy the URL of the results page. Paste it in the box below.

STEP 3: QUESTIONS ABOUT YOUR SEARCH

As you look at the results of your search, please describe what you see:
(I saw what I expected to see in the results; I saw something unexpected in the results; Other _)

[DISPLAY IF: I saw something unexpected in the results] You indicated that you saw something unexpected. Can you describe what you saw, and what you expected to see?
Please rate your satisfaction with the following:

- First page results were relevant to topic
  - Very satisfied; Moderately satisfied; Moderately dissatisfied; Very dissatisfied; N/A
- Sufficient information in each record to determine if desired results appeared
  - Very satisfied; Moderately satisfied; Moderately dissatisfied; Very dissatisfied; N/A

Section 4 of 4: Final Questions

Previously, we asked you about Catalog Search. In this section, we will ask you about Library Search more generally.

Aside from the searching you just did for this survey, have you used Library Search within the past two weeks?
(Yes; No)

[DISPLAY IF: Yes] In your recent search(es), how satisfied were you with the following:

- Speed of Library Search
  - Very satisfied; Moderately satisfied; Moderately dissatisfied; Very dissatisfied; Don't remember
- Relevance of results at or near the top of results list
  - Very satisfied; Moderately satisfied; Moderately dissatisfied; Very dissatisfied; Don't remember
- Overall level of satisfaction with Library Search
  - Very satisfied; Moderately satisfied; Moderately dissatisfied; Very dissatisfied; Don't remember

Do you have memories of using Library Search roughly a year ago (Fall 2018)?
(Yes; No)

[DISPLAY IF: Yes] Please rate your current satisfaction with Library Search, compared to how you felt a year ago:

- Speed of Library Search
  - Much more satisfied; Somewhat more satisfied; About the same; Somewhat less satisfied; Much less satisfied; Don't remember
- Relevance of results at or near the top of results list
  - Much more satisfied; Somewhat more satisfied; About the same; Somewhat less satisfied; Much less satisfied; Don't remember
- Overall level of satisfaction with Library Search
  - Much more satisfied; Somewhat more satisfied; About the same; Somewhat less satisfied; Much less satisfied; Don't remember

If there are other things you'd like to share about your experiences with Library Search, please do so here.

What is your primary Library affiliation?
(list of library divisions presented, with ‘prefer not to say’ presented as an option)
How many years have you been employed at the U-M Library?
(Fewer than 2 years; Between 2 and 5 years; Between 5 and 10 years; More than 10 years; Prefer not to say)