

Usability Test: Biennial Student Survey Dashboard

Executive Summary

Duke University Libraries conducted a usability evaluation of its Biennial Student Survey Dashboards to understand how effectively the platform supports user-friendly data exploration. The evaluation identified both strengths and areas for improvement, focusing on layout, navigation, and functionality. Five participants with varied backgrounds and levels of experience with data dashboards provided feedback on their interactions with the platform. Key themes emerged, including initial visual overwhelm, issues with dropdown visibility, and challenges with filtering and interpreting data. However, participants valued the dashboard's interactive features and found it effective for comparative data tasks.

Recommendations

Changes to dropdowns and filters:

1. Make the "Select a Library" dropdown more prominent as the primary starting point.
2. Clarify filter labels to better signal the function of the filter.
3. Ensure options within Sub-Question filter are fully displayed.

Changes to visualizations:

4. Prevent all visualizations from displaying at once after selecting a question grouping.
5. Re-evaluate visualization size and complexity, relative to the amount of space it has in a browser window.
6. Move color legend closer to the visualization.

Hiding/showing components:

7. Offer ways to remove or add components to the display based on user preference.
8. Ensure the dashboard remembers the user preferences throughout the session.
9. Removing a component should trigger a re-size of other components.

Creating an inclusive/responsive design:

10. Increase text size to a minimum of 14px for body text and larger sizes for headings.
11. Adjust dashboard so that components resize to fill available screen space, avoiding excessive whitespace or horizontal scrolling.
12. Components should look balanced on any device resolution.

Background

The **Biennial Student Survey**, conducted by Duke University Libraries, is a key instrument for understanding student satisfaction and identifying areas for improvement in library services. Administered every two years, the survey gathers detailed feedback on students' experiences, covering aspects like resource accessibility, service quality, and overall satisfaction. These results are essential for guiding strategic decisions and enhancing the library's offerings to better serve the Duke community.

To facilitate access to the survey results, the data is presented through an **interactive dashboard** built in Tableau. This dashboard enables stakeholders—including library staff and administrators—to explore trends and satisfaction levels with a high degree of flexibility. Users can filter, compare, and analyze data dynamically, empowering evidence-based decision-making.

However, the usability of such dashboards plays a critical role in their effectiveness. Users must be able to easily navigate the interface, interpret data visualizations, and interact with the platform without confusion or unnecessary effort. Recognizing the importance of user experience, Duke University Libraries conducted a usability evaluation of the dashboard to assess how well it supports user needs.

This evaluation focused on identifying challenges with key features such as dropdowns, filters, and visualizations, as well as understanding user preferences for layout and functionality. By engaging participants with diverse backgrounds and levels of familiarity with dashboards, the study aimed to gather actionable insights to refine the platform's design. The findings will help ensure that the dashboard remains intuitive, accessible, and effective in enabling data-driven insights.

Evaluation goals

The usability study set out to achieve three main goals:

1. Examine how intuitive and user-friendly the survey dashboards are for individuals with varying levels of expertise and familiarity with data dashboards.
2. Pinpoint features that enhance the user experience while uncovering elements that hinder navigation, interpretation, or overall usability.
3. Gather detailed insights into users' experiences with core dashboard components, including layout design, navigation paths, dropdown menus, filtering options, and data visualization.

Methodology

The usability study was conducted remotely and involved five participants with diverse library roles and varying levels of experience using data dashboards. Each session (45–60 minutes) was held via video conferencing on Microsoft Teams, allowing screen sharing for real-time observation.

A think-aloud protocol was employed to capture participants' real-time thoughts, observations, and reactions as they navigated the dashboard. A moderator provided scripted instructions for consistency,

with minimal intervention to allow independent navigation. Follow-up questions after each task captured insights on ease of use and satisfaction, enhancing the qualitative data from post-test ratings.

Participants

Five participants (Table 1), each with a unique library background and data familiarity, took part in the study:

- A South and Southeast Asian studies librarian with moderate dashboard experience
- A collections analysis librarian proficient in data tools (Tableau, Excel, R, Python)
- A conservation department staff member with limited dashboard experience
- A technical services archivist with infrequent dashboard use
- A science librarian with monthly dashboard usage and experience in data interpretation

Participant	Role	Experience Level (Usage Frequency)	Key Needs	Interactivity Preference
Participant 1	South & Southeast Asian Studies Librarian	Moderate (about once a month for qualitative research)	South Asia material requests & ILL stats	Visual clarity, minimal clutter
Participant 2	Collections Analysis Librarian	Extensive (weekly; proficient in Tableau, Excel, R and Python)	Access to detailed data on collections	High interactivity, customizable filters
Participant 3	Conservation Staff (Special Collections)	Limited (once a month)	Clear labelling, simple data parsing for specific questions	Some interactivity, prefers scalable data
Participant 4	Technical Services Archivist	Limited & Dated (hasn't used dashboards in years)	Clear, narrative-based data presentations for easy interpretation	Low interactivity, prefers static reports
Participant 5	Science Librarian (Marine Sciences)	Moderate (monthly; with data interpretation experience)	Clear presentation with controls for adjusting parameters	High interactivity, parameter controls for data trend exploration

Table 1: Summary of Participant Profiles

Tasks and Scenarios

Participants completed five structured tasks aimed at evaluating the usability of key dashboard features while addressing essential user needs. The tasks were structured deliberately to balance user engagement and cognitive load, ensuring participants had a clear and accessible starting point before moving into more complex tasks. For each objective of assessment—Initial Impressions, Navigation Efficiency, and Data Interpretation—one task was selected to be relatively straightforward, while the other was slightly more challenging in terms of interpreting the questions or navigating the dashboard.

However, to maintain a logical flow and avoid overwhelming participants early on, the tasks were presented in order of difficulty rather than strictly by section. This approach ensured that users gained confidence and familiarity with the dashboard through simpler tasks before tackling those requiring more steps or deeper analysis. By gradually increasing complexity, the methodology supported more natural interactions and reduced potential frustration, enabling richer, more reliable insights into user experiences across all aspects of the dashboard.

The assessment objectives, along with their corresponding tasks, are outlined as follows:

1. Initial Impressions
 - a. Task A – Elaborate on Initial Impressions of the dashboard
2. Navigation Efficiency
 - b. Task B – Identify the most popular secondary library
 - Difficulty level: EASY
 - c. Task D – Identify the most expanded service from the Music Library
 - Difficulty level: COMPLEX
3. Data Interpretation
 - d. Task C – Compare library visit percentages
 - Difficulty level: EASY
 - e. Task E – Evaluating ILL services for Graduate vs Undergraduate students
 - Difficulty level: COMPLEX

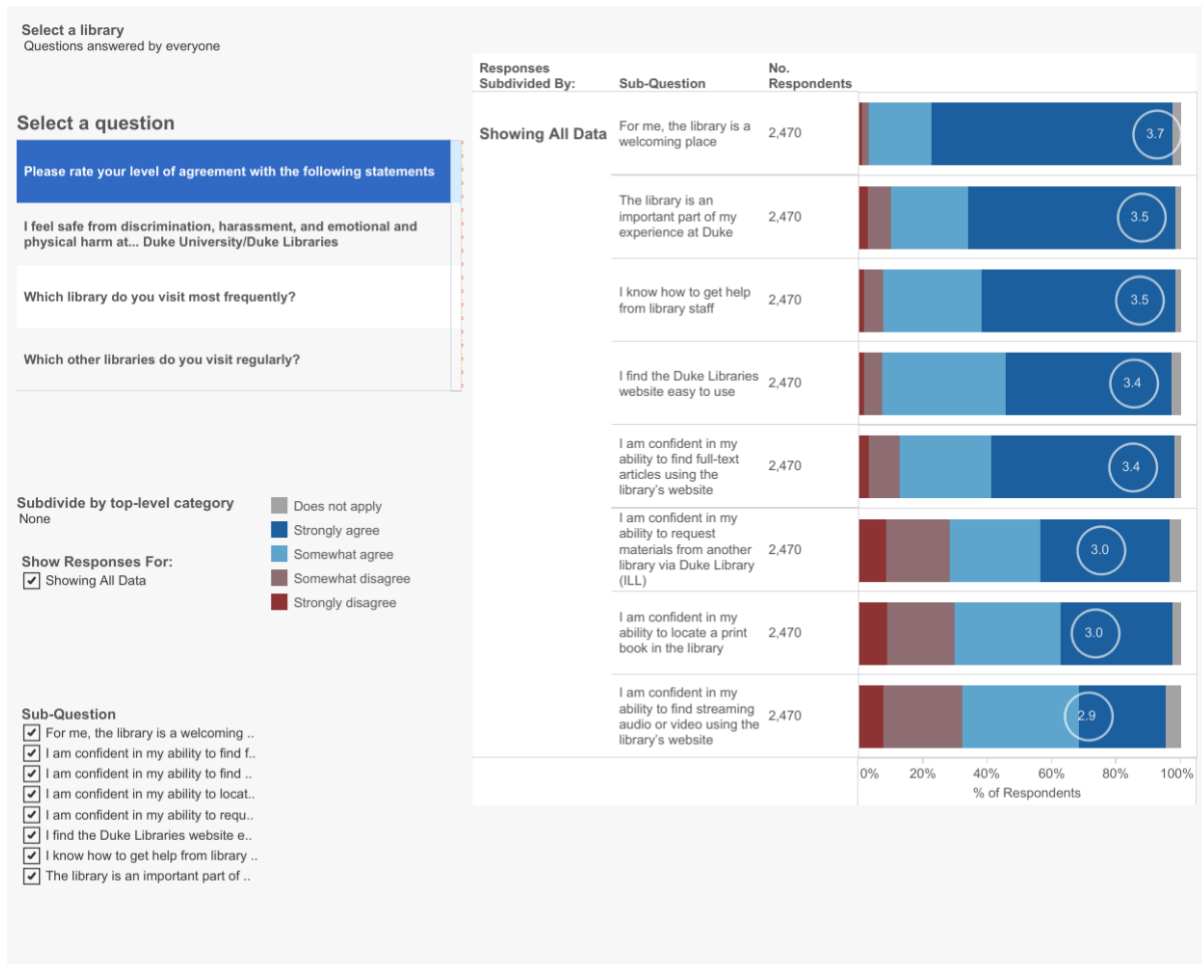
Data Collection

Observations, task completion feedback, and post-test questionnaire responses were gathered to assess usability, document challenges, and pinpoint areas for improvement. This multi-faceted approach provided a detailed analysis of user interactions and responses to various dashboard features.

Tasks Analysis & Results

The observations below are grouped by task, capturing participants' experiences and challenges related to dashboard usability.

Task A: First Impressions of the Dashboard



- **Observations:** Most participants noted that the dashboard initially appeared visually “busy” and somewhat overwhelming, with small text and numerous colored bars. Some struggled to find a clear focal point on the main screen and took time to understand the layout.
- **Strengths:** Participants appreciated the distinction between questions (left) and data visualizations (right).
- **Challenges:** The dense layout and limited text readability initially created confusion about where to start.

Task B: Identifying the Most Popular Secondary Library

Select a library
Questions answered by everyone

Select a question

Please rate your level of agreement with the following statements

I feel safe from discrimination, harassment, and emotional and physical harm at... Duke University/Duke Libraries

Which library do you visit most frequently?

Which other libraries do you visit regularly?

Subdivide by top-level category
None

Show Responses For:
 Showing All Data

Sub-Question

- Divinity Library
- Ford Library at Duke's Fuqua Scho..
- Goodson Law Library
- I only visit one library
- Lilly Library
- Marine Lab Library
- Medical Center Library & Archives
- Music Library
- Perkins, Bostock & Rubenstein Lib..

Responses Subdivided By: No. Respondents Response Choice

Showing All Data 2,204

Response Choice	No. Respondents	Percentage
I only visit one library	1,066	48%
Lilly Library	485	22%
Perkins, Bostock & Rubenstein Libraries	375	17%
Ford Library at Duke's Fuqua School of Business	154	7%
Divinity Library	110	5%
Goodson Law Library	88	4%
Music Library	66	3%
Marine Lab Library	0	0%

- **Observations:** All participants successfully completed this task by identifying Lilly Library as the most popular secondary library. However, some participants expressed uncertainty around using the “Select a Library” dropdown, particularly with the terminology used in certain questions.
- **Strengths:** Participants found this task straightforward once they understood the use of the dropdown menu.
- **Challenges:** Participants noted that the dropdown was not prominent enough and that some question text was too long for easy scanning.

Task C: Comparing Library Visit Percentages

Select a library
Questions answered by everyone

Select a question

Please rate your level of agreement with the following statements

I feel safe from discrimination, harassment, and emotional and physical harm at... Duke University/Duke Libraries

Which library do you visit most frequently?

1 other libraries do you visit regularly?

Subdivide by top-level category
None

Show Responses For:
 Showing All Data

Sub-Question
 Null

Responses Subdivided By: No. Respondents

Showing All Data 2,296

Response Choice	No. Respondents	Percentage
Perkins, Bostock & Rubenstein Libraries	1701	74%
Lilly Library	230	10%
I don't physically visit a library	92	4%
Ford Library at Duke's Fuqua School of Business	52	3%
Divinity Library	46	2%
Goodson Law Library	46	2%
Music Library	46	2%
Marine Lab Library	23	1%

- **Observations:** Participants found this task intuitive and easy, quickly identifying that 74% of students visit PBR libraries most frequently, while 10% visit Lilly Library most frequently.
- **Strengths:** The visual layout effectively supported data comparison, making it simple for participants to interpret and contrast data points.
- **Challenges:** None reported; this task was consistently completed without issues.

Task D: Identifying the Most Helpful Expanded Service for the Music Library

1 Select a library
Music Library

Select a question

How frequently do you visit the Music Library?

Which of the following are important to you?

To what extent do the following meet your needs at the Music Library?

2 Music library staff are considering offering or expanding the following library services. Select the four services that would most improve your library experience.

rate your overall satisfaction with the Music Library

Subdivide by top-level category
None

Show Responses For:
 Showing All Data

Sub-Question

- Ability to have books delivered bet..
- Additional absolute quiet space
- Any other suggestions:
- Any other suggestions: - Text
- Audio/video equipped group study ..
- Better directional and informational..
- Daily or hourly use lockers to store..
- Enhanced outdoor library spaces t..
- Group study spaces with display s..
- More events in the library where st..
- Private rooms to conduct video call..

Responses Subdivided By: No. Respondents

Showing All Data 89

Response Choice	No. Respondents	Percentage
Audio/video equipped group study spaces (e.g., watching a movie, listening to music)	49	55%
Group study spaces with display screens for laptop projection	42	47%
Space for practicing presentations	36	42%
Private rooms to conduct video calls from your laptop	30	36%
Additional absolute quiet space	25	30%
Daily or hourly use lockers to store personal belongings	22	25%
More events in the library where students can relax or have fun (e.g., Freebies par..	22	25%
Enhanced outdoor library spaces to study or meet in groups	19	22%
More events in the library where students can relax or have fun (e.g., miniature ho..	19	22%
Better directional and informational signage for navigating the Libraries	3	3%
Ability to have books delivered between libraries (e.g., from Perkins to Lilly)	1	1%
Any other suggestions:	1	1%

3

Codes Applied to Comments	Comment
Other	Could separate spaces for piano practices and other musical instruments practice.

- **Observations:** This task was completed without major difficulty, though some participants took time to locate the “Select a Library” dropdown. Participant feedback suggested that the dropdown needed to be more visually prominent.
- **Strengths:** Once oriented, participants found the task intuitive, with most correctly identifying audio/video-equipped study spaces as the most helpful expanded service.
- **Challenges:** Participants’ attention was initially drawn to colored graphs and other bold elements, delaying their focus on the dropdown.

Task E: Evaluating ILL Services for Graduate vs. Undergraduate Students

1 Select a library
Lilly Library

2 Select a question
How frequently do you visit Lilly Library?
Which of the following are important to you?
To what extent do the following meet your needs at Lilly Library?

3 Subdivide by top-level category
Undergrad/Grad
Responses For:
 Undergraduate

4 Sub-Question
 Delivery of books or materials from non-Duke libraries (Interlibrary Loan)

5 Responses Subdivided By: Sub-Question No. Respondents

Subdivided By	Sub-Question	No. Respondents	Chart
Undergraduate	Delivery of books or materials from non-Duke libraries (Interlibrary Loan)	151	2.7
Grad	Delivery of books or materials from non-Duke libraries (Interlibrary Loan)	53	2.8

Legend:
 I didn't know the library pro..
 I don't use this
 Completely meets my needs
 Somewhat meets my needs
 Does not meet my needs

- **Observations:** This task posed the greatest challenge for participants across all sessions. Filtering options and the reordering of response options when switching groups created confusion. Participants suggested that a better understanding of the filtering process and subdivisions would help ease navigation.
- **Strengths:** Participants with higher dashboard experience, were eventually able to locate the data points needed, indicating that the system can support complex queries.
- **Challenges:** Response reordering, filter complexity, and lack of expandability for the prompts in Sub-Question checkboxes contributed to user frustration.

Satisfaction Ratings

Following task completion, participants rated statements about their experience with the dashboard on a 1 to 5 scale (1 = Strongly Disagree, 5 = Strongly Agree). These responses provide key insights into usability, satisfaction, and user confidence.

Average Satisfaction Ratings

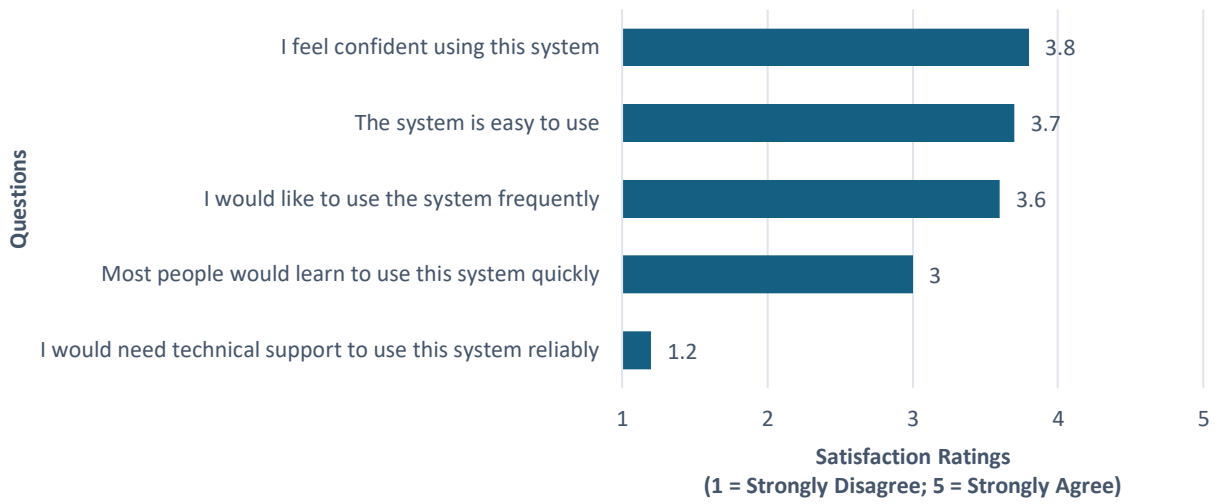


Figure 1: Visualization of Average participant satisfaction ratings

Desire to Use the System Frequently

Most participants rated this question highly (4–5), citing the dashboard’s interactivity and potential for regular use. Users with more experience felt it was a valuable tool, while less experienced participants hesitated slightly, noting the need for familiarization before frequent use.

Ease of Use

Ease of use received consistent scores (4–5), with users praising the clean layout and intuitive design. Experienced users navigated the system effortlessly, while those less familiar with dashboards initially struggled with dropdowns and filters but adapted quickly.

Need for Technical Support

All participants rated this a 1, agreeing that the system is self-explanatory. Clear organization and intuitive features enabled independent use, even for those with limited prior dashboard experience.

Learning Curve

Ratings ranged from 3 to 4, reflecting varying levels of prior experience. Regular dashboard users found the system easy to learn, while others required more time to understand dropdowns and filters.

Confidence in Using the System

Confidence ratings were high (4), as most participants felt capable of using the system after completing tasks. Clear visualizations and logical organization helped build confidence, though initial dropdown challenges slightly tempered ratings for some users.

User Stories

Based on the task analysis and observed user challenges, the following user stories and acceptance criteria were crafted to highlight areas of potential improvement. While not direct recommendations, these serve as guiding principles for refining the dashboard's usability and functionality.

Targeted Dashboard Feature: Dropdowns and Filters

User Story:

"As a dashboard user, I want dropdowns and filters to be intuitive, prominently displayed, and easy to understand so that I can efficiently navigate the dashboard and access relevant data without confusion or extra effort."

Acceptance criteria

- The "Select a Library" dropdown must be clearly identifiable as the primary starting point, using distinct visual styling to differentiate it from other dropdowns.
- Headings for filters, such as "Subdivide by top-level category" and "Sub Questions," must use clear and descriptive language to ensure users immediately understand their function.
- Filter options, such as those under "Sub-Question," must be fully visible without truncation by either expanding the list or reformatting the layout.

Targeted Dashboard Feature: Visualizations

User Story:

"As a dashboard user, I want the visualizations to be displayed in a clear, organized layout so that I can easily interpret the data, compare patterns, and understand relationships without feeling overwhelmed."

Acceptance criteria

- On selecting a library from the dropdown, the dashboard must automatically adjust to display all visualizations side by side in a layout that ensures each visualization is fully visible and not truncated.
- Visualizations must be evenly spaced and scaled appropriately to fit within the available screen space, ensuring users are not overwhelmed by an excessive number of visualizations in a compact area.
- The dashboard must maintain a clean and organized structure, dynamically adjusting the number of visualizations per row based on available screen space to maximize usability and readability.
- For visualizations using stacked bar graphs with multiple colors, legends must be clearly positioned adjacent to the graph, providing immediate context for interpreting the color scheme

Targeted Dashboard Feature: Hide/show less important sections

User Story: "As a dashboard user, I want the ability to hide less important sections, such as 'Codes Applied to Comments,' so that I can reduce clutter and focus on the most relevant data for my analysis."

Acceptance criteria

- Users must be able to toggle the visibility of less important sections (e.g., "Codes Applied to Comments") using a clear and accessible show/hide button.
- The dashboard must remember the user's preference to hide or show sections across interactions until the user changes it.
- When a section is hidden, the remaining visible sections must adjust dynamically to optimize the use of screen space and maintain a clean layout.

Targeted Dashboard Feature: Responsive Design

User Story

"As a dashboard user, I want the interface to be optimized for larger desktop and laptop screens so that I can comfortably view and interact with text, dropdowns, and visualizations without straining my eyes or struggling with readability."

Acceptance criteria

- Text across the dashboard must have a minimum font size of 14px for body text and proportionally larger sizes for headings to ensure readability on larger screen.
- All dashboard elements, including charts, dropdowns, and filters, must scale proportionally to fill available screen space on common desktop resolutions
- The layout must prevent excessive white space and avoid elements being overly condensed, ensuring a balanced and visually pleasing interface on larger screens.
- The dashboard must fit horizontally within the screen width of standard desktop and laptop resolutions, eliminating the need for horizontal scrolling.

Conclusion

The usability evaluation of the Biennial Student Survey Dashboard highlighted both its strengths and areas for improvement. Participants valued the platform's interactivity and found it particularly effective for comparative data tasks. However, challenges were observed in key areas such as dropdown usability, visual clutter, and the complexity of filtering options, especially during tasks requiring detailed data interpretation.

One of the most significant findings was the difficulty participants experienced with the "Select a Library" dropdown and filtering options. These elements were often not prominent enough or visually intuitive, causing delays in navigation. Clearer labeling, improved dropdown visibility, and fully expanded filter options would address these issues and streamline the user experience. Similarly, dense layouts

and small text sizes overwhelmed some participants during initial interactions with the dashboard. Adjusting font sizes, simplifying the layout, and organizing visualizations into a cleaner structure would make the interface more approachable, particularly for novice users.

Clutter reduction was another priority, as participants felt that less critical sections, such as "Codes Applied to Comments," detracted from their focus on primary tasks. Implementing a toggle feature to hide or show such sections dynamically would enhance usability and allow users to concentrate on the most relevant data. Additionally, optimizing the dashboard for larger screens was highlighted as a need, with participants noting issues like excessive white space and text that felt too small. Designing a responsive layout that scales proportionally and eliminates unnecessary scrolling would improve readability and overall usability.

By addressing these challenges, Duke University Libraries can ensure the dashboard is intuitive, accessible, and effective for users across varying levels of expertise.

Appendix A: Biennial Student Survey Dashboard Usability Study test script

Welcome!

Thank you for agreeing to help improve the Biennial Student Survey Dashboards.

My name is _____, and I will be your facilitator today. I'll guide you through the entire session to ensure you're comfortable with the process and will also be taking notes to analyze your feedback later.

Before we get started, I want to let you know that I'll be recording this session, including both the audio and your screen activities, for analysis purposes only. These recordings will not be shared or reused outside of this study.

[Start recording now]

During this session, I will be working from a script to ensure that all participants receive the same instructions.

Session Overview

Let me quickly walk you through what we will be doing today and the goals of this evaluation. The Biennial User Satisfaction Surveys, conducted by Duke University Libraries, gather feedback to help improve library services. These survey results are presented through interactive dashboards, which allow users to explore trends and satisfaction levels, guiding decision-making.

Today, we're focusing on gathering feedback on the platform—what is easy to use, and what could be improved. I'll ask you some questions and have you complete tasks while asking you to think aloud. This means you'll share your thoughts—positive or negative—as you work through each task. I will also be observing how you navigate the website and taking notes on your feedback.

I'll be sharing a link to the dashboard shortly, and you'll use that link for the tasks we'll work through today.

Your job is to be yourself and use the platform as you naturally would. Keep in mind, we are here to test the platform, not you, so there is no “correct” way to go through the tasks. Your honest reactions will help us improve the user experience, and we appreciate your participation!

Consent

Before we proceed, I'd like to remind you that your participation in this study is completely voluntary. You're free to opt out at any time without any penalties.

I've started the recording, and with your permission, it will continue throughout the session. Just to confirm are you also comfortable to share your screen while performing the tasks? I will send you the link to the dashboard and that's all I need to see.

I will now send the link to the consent form in the chat below.

[Send link to Qualtrics consent form]

Please take a moment to review the form, and if you agree to participate, sign it electronically.

Let me know if you have any questions before we proceed.

Pre Test Interview

1. Please briefly describe your role or area of specialization.
2. How comfortable are you with using data dashboards? (Scale: 1 = Not comfortable, 5 = Very comfortable)
3. How often do you use data dashboards?
4. Have you used any data analysis tools before (e.g., Tableau)? If yes, please list them.
5. What is the most important feature in a dashboard for you?
6. Do you prefer interactive dashboards or static reports to explore data? Why?
7. Which web browser will you be using today?

Task A: First Impressions of the Dashboard

For the first task, I'll show you the dashboard home page for 5-10 seconds. After that, I'll ask you a few questions about your first impressions. Let me know when you're ready, and I'll share my screen to display the dashboard.

- What was the most salient thing you noticed during the 5-10 seconds?
- Was there anything confusing or unclear that stood out?
- How did the design make you feel initially (e.g., welcoming, overwhelming)?

For the next tasks, I'll provide you with the link to the dashboard so you can navigate and complete the tasks. Here's the link in the chat

[Send dashboard link in Zoom chat]:

I'll also post the tasks in the chat for your convenience.

Task B: Identify the Most Popular Secondary Library

Your task is to identify the most popular secondary library. Take your time and begin when ready.

- How easy was this task to complete?
- If you could change something to make this process easier, what would it be?
- Are there any difficulties you would like to tell me about?

Task C: Compare Library Visit Percentages

Your task is to compare the percentage of students who most frequently visit Perkins, Bostock and Rubenstein (PBR) Libraries with those who most frequently visit Lilly Library. Take your time and begin when ready.

- How easy was this task to complete?
- If you could change something to make this process easier, what would it be?
- Are there any difficulties you would like to tell me about?

Task D: Identify the Most Helpful Expanded Service for the Music Library

Your task is to identify the most helpful expanded service for the Music Library. Take your time and begin when ready.

- How easy was this task to complete?
- If you could change something to make this process easier, what would it be?
- Are there any difficulties you would like to tell me about?

Task E: Evaluate ILL Services for Graduate vs. Undergraduate Students

Your task is to determine how well ILL services meet the needs of graduate versus undergraduate students who primarily use Lilly Library.

- How easy was this task to complete?
- If you could change something to make this process easier, what would it be?
- Are there any difficulties you would like to tell me about?

Post-Test Questionnaire

Please answer how strongly you agree or disagree with the following statements:

(Scale: 1 = Strongly Disagree, 5 = Strongly Agree)

1. I would like to use this system frequently.
2. The system was easy to use.
3. I would need technical support to use this system reliably.
4. Most people would learn to use this system quickly.
5. I feel confident using this system.

Conclusion

Thank you so much for your time and valuable feedback today! Your insights will be incredibly helpful in improving the Biennial Student Survey Dashboards. If you have any additional thoughts or suggestions after the session, feel free to reach out to me.

Before we wrap up, is there anything else you'd like to share about your experience today?

Once again, thank you for your participation, and have a great day!

[Stop the recording]