Effective communication of library data through web visualization

NC STATE University Libraries

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Purpose

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Purpose

Can we improve access to and communication of the measures of our activities and services?

The NC State University Libraries serves over 45,000 students, staff and faculty, with more than 2.5 million total visits per year. Data collected on the use of the Libraries collections, spaces, and services as well as the activities that support these endeavors provides the basis for measuring our performance.

We identified the possible benefits of opening the access to our performance measures data through thoughtfully designed visualizations accessible on the Libraries website. The two primary benefits being:

1. Improving library administration's ability to monitor and communicate our activities and services with institutional and external stakeholders more effectively
2. Improving the Libraries ability to demonstrate its value to various relevant audiences within the institution while also providing peer institutions access to comparative measures.

Approach

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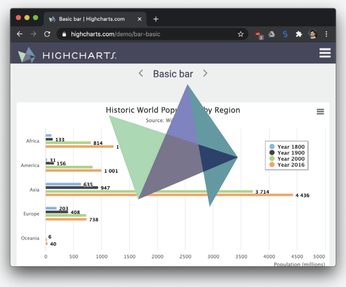
Approach

Preparing, designing, connecting, and visualizing our performance measures on the web.

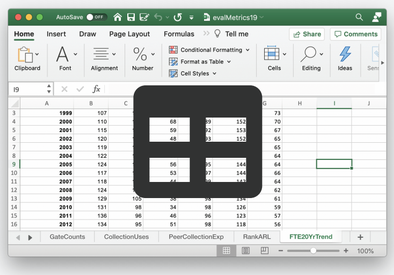
Creating this collection of visualizations was a collaborative effort involving the work of several units across the library, including Organizational Strategy, Data & Visualization Services, User Experience, Administration, and External Relations. Staff from each unit provided guidance and support during one or more phases of the development and implementation process described below.

Prepare



1. **We explored various visualization tools** ranging from desktop applications to JavaScript visualization libraries to identify a tool with an appropriate balance of aesthetic output, customizable design features, and ease of use.

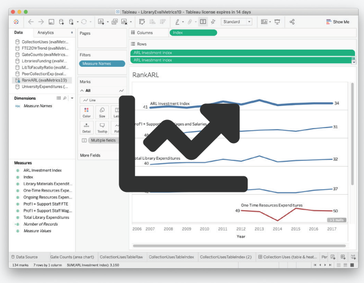
We settled on **the JavaScript library Highcharts** as it provided a web-first framework for creating standard charts with customizable aesthetics using purely web technologies (HTML/CSS/JavaScript).

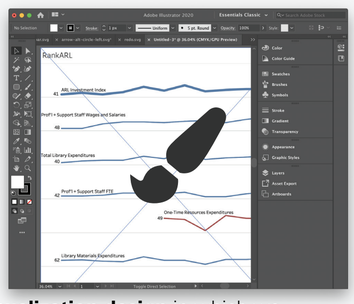


2. **We conducted a survey of our performance measures**, collecting metrics that were relevant to the specified audiences and could be effectively represented through visualization.

Twenty metrics from a collection of forty-five were found to meet this criteria.

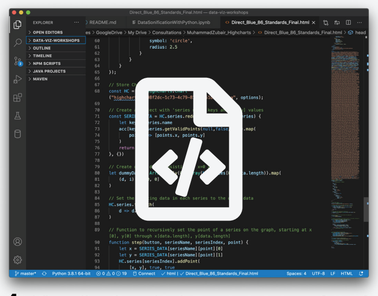
Design



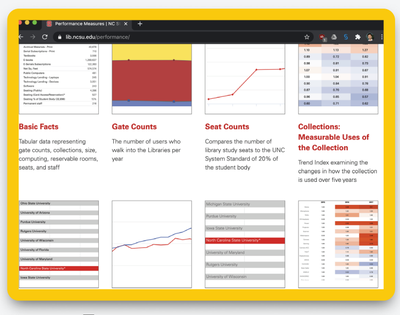


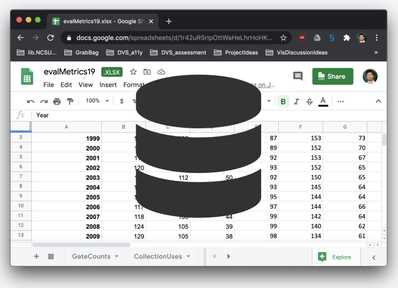
3. We then began a process of **iterative visualization design** in which we analyzed and explored the data and quickly prototyped visualizations for critique. After identifying an **appropriate visualization method** each design was edited to ensure it **matched university brand guidelines**.

Connect and Visualize



4. Visualization designs were **translated to web-based visualizations** using web development technologies that incorporated the Highcharts JavaScript Library.





5. We developed a **data management process linking the Highcharts visualizations presented on our web pages with a Google Sheets back-end** allowing for simplified data source updates without the need for development expertise.

Findings

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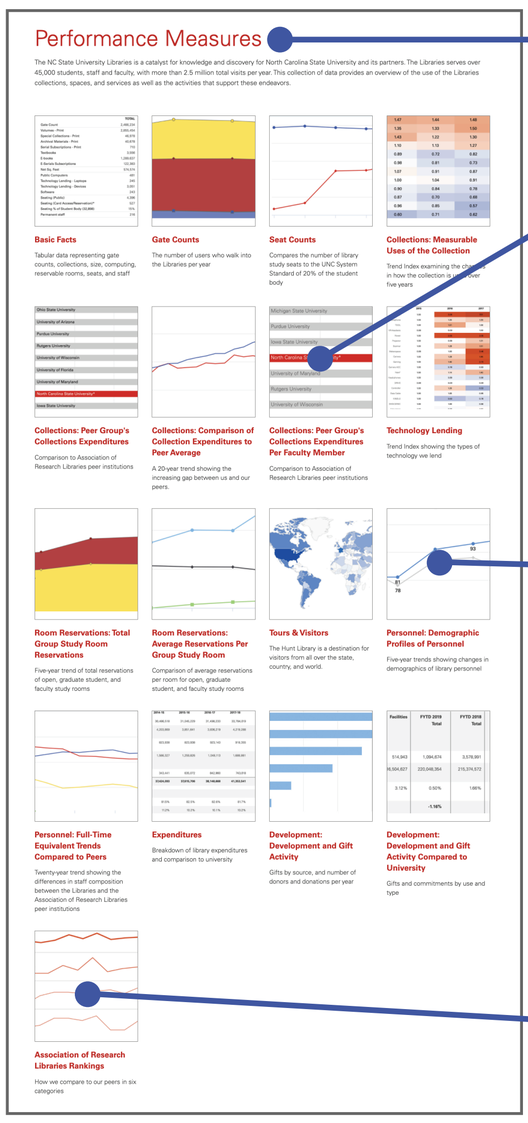
Findings

What did we learn?

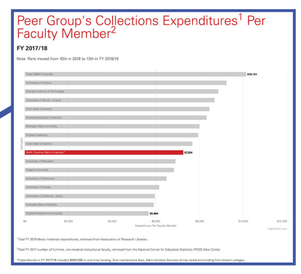
Incorporating a thorough overview and exploratory visualization process prior to publishing the visualizations helped reduce any unnecessary information that may have confused or obscured our message while ensuring that each visualization thoughtfully encoded each measure's features and met our institutional design standards. We did encounter some complexities requiring advanced web development expertise to implement custom styles to match our brand guidelines.

The published performance measures have proven discoverable and useful. Data from Google Analytics indicates 3,615 page views over the dates September 1, 2019 to October 24, 2020. Within our institution, Libraries administration has indicated the usefulness of the resource for periodic assessment of our services and for communicating with partners. We have also confirmed the use of relevant performance measures in Libraries staff project work.

Linking the web visualizations with a Google Sheets back-end allows for simplified data source updates but did require additional programing development using the scripting language PHP to initially connect and format.

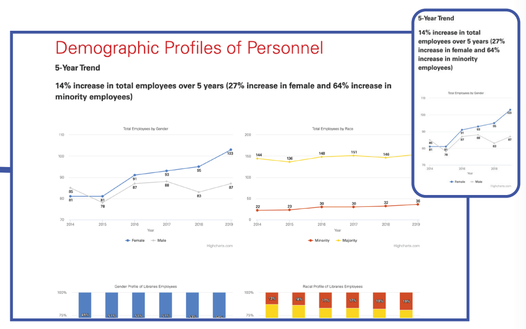


3,615 Number of page views, Sept. 1, 2019 – Oct. 24, 2020

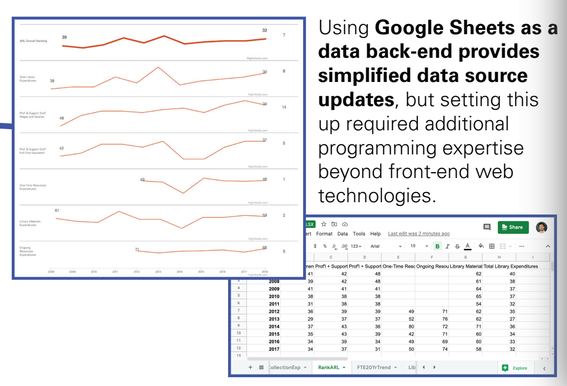


Incorporating **visualization design best practices**, such as highlighting with color and including descriptive text, **promotes easier interpretation** of the data and our message.

Adhering to NC State brand guidelines, such as brand colors, did require advanced web development methods.



Incorporating **responsive web design methods**, ensures that our content displays appropriately across various screen sizes. This example shows the display of one performance measure at the display resolution of a 15" MacBook Pro and an iPhone 8 Plus.



Using **Google Sheets as a data back-end provides simplified data source updates**, but setting this up required additional programming expertise beyond front-end web technologies.

A full page screenshot of the landing page for our performance measures visualizations **arranged in a responsive grid for clean presentation**.

Note that three visualizations have been removed to improve the clarity of our message since submitting this proposal.

Value

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Value

Valuable outcomes and broader implications

We have identified the following outcomes that are of value to our library and the larger library community:

- Developing web visualizations of our performance measures has provided the Libraries with a new mode for communicating our activities and services to a broad audience.
- The collection of performance measures web pages allow us to reach library and institutional administration and partners as well as external institutions through easier access and through clear visual communication methods.
- Publishing our performance measures increases our transparency to libraries staff, institutional partners, and peers.
- Incorporating analytical, design, and visualization best practices in the development of the performance measures web portal ensures that the presentation of our data is representative of our standards and values.

While our process was intensive and involved the resources of several staff members, we hope this project provides an example for other institutions when considering communication of library data to relevant audiences.

Our performance measures visualizations are accessible at www.lib.ncsu.edu/performance