Worth a Thousand Words: Using Visualizations to Examine Collections Usage

Doug Way
Steve Meyer
Worth a Thousand Words
Using Visualizations to Examine Collection Usage

Doug Way
AUL for Collections & Research Services
UW-Madison Libraries
doug.way@wisc.edu

Steve Meyer
Data Strategist
UW-Madison Libraries
stephen.meyer@wisc.edu
Two Lenses
Why

• Visualizations
  • Describe
  • Analyze and Decide

• Tableau or D3
  • Facilitate work with large data sets
  • Create Simple Tools

http://go.wisc.edu/CHS16
http://www.flickr.com/photos/horiavarlan/4273168957/
Why

- Visualizations
  - Describe
  - Analyze and Decide

- Tableau or D3
  - Facilitate work with large data sets
  - Create Simple Tools
Describe

Using visualizations to simplify and enhance explanations.
Usage Trends
Usage Trends at a Library

Annual Loan & Internal Use Counts

- Large GLS
- Large non-GLS
- GLS SSH
- GLS STEM
- Non-GLS Departmental
- Memorial
- Steenbock
- College
- Shelving
- Law
- Ebling
- MERIT
- Historical
- Music
- Art
- Business
- Social Science
- Social Work
- Geography
- Astronomy
- Chemistry
- Geology
- Math
- Physics
- Wendt
- AISP
- Journalism
- LSS
- SLIS
- Vet Med
- Chican@ & Latin@
- LGBT
- Morgridge
- Schwerdtfeger
- Water

In fiscal year 2015, Memorial Library had 157,071 Circulations with Renewals, a 58% decrease compared to 2006.

Loans

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Loans</td>
<td>400,000</td>
<td>380,000</td>
<td>360,000</td>
<td>340,000</td>
<td>320,000</td>
<td>300,000</td>
<td>280,000</td>
<td>260,000</td>
<td>240,000</td>
<td>220,000</td>
</tr>
</tbody>
</table>

Internal Uses

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Uses</td>
<td>450,000</td>
<td>430,000</td>
<td>410,000</td>
<td>390,000</td>
<td>370,000</td>
<td>350,000</td>
<td>330,000</td>
<td>310,000</td>
<td>290,000</td>
<td>270,000</td>
</tr>
</tbody>
</table>
Usage Trends by Item Type

Circulation by Material Type

In FY 2015, loans for Books were down 50.6% compared to 2006.
Usage Trends by Patron Type

Circulation by Patron Groups

- Undergraduate
- Graduate
- Faculty/Staff
- Community
- UW System

Circulation by Patron Group

![Graph showing circulation trends by patron type from 2006 to 2015.](image)
Usage Trends for Ebooks

E-Book Usage by Package

2015: 986,737 Chapter Views

- EBrary: 609,563
- Springer: 134,113
- Elsevier Science Direct: 84,820
- Books-24x7: 46,945
- ACLS: 43,150
- Wiley: 41,783
- Safari: 14,559
- Project Muse: 11,804
Analyze & Decide
Identifying problems and opportunities and making decisions based on data.
Should I renew this journal?
What happens to the use of print when I move to an online subscription?
What non-English-language materials are we borrowing via ILL?
Is this vendor working well with my web-scale discovery platform?
Is this vendor working well with my web-scale discovery platform? (NO)

EBSCO

Full Text Downloads

Download Data as CSV
Data vs the Anecdote
No one likes ebooks.
E-Book Usage by Package

2015: 986,737 Chapter Views

- **EBrary**: 609,563
- **Springer**: 134,113
- **Elsevier Science Direct**: 84,820
- **Books-24x7**: 46,945
- **ACLS**: 43,150
- **Wiley**: 41,783
- **Safari**: 14,559
- **Project Muse**: 11,804

Chapters Views

2007 - 2015
Starting with Questions
Who is your audience?

- External Stakeholders
- Library Staff
- Administrators (both in and out of the library)
“Simple enough for an administrator...”

- To understand
- To explain
- Embrace simplicity
- Accept a lack of nuance
What do you want to know?
What do you want to know? For us:

1. Annual circulation and internal use by library
2. Circulation Ratio (% of collection that's circulated)
3. How many times each volume was used
Over time we added additional questions.

1. What’s our cumulative ebook usage?
2. Is our ejournal usage going up?
3. How much are individual journals being used?
raison d'être

/ˌrāzôn 'detrə/

noun

the most important reason or purpose for someone or something's existence.
• Consolidation
• Collection use
   In-house & Circulation
40+ “libraries”
Trueswell’s 80/20 vs. OCLC’s 80/6

The most fascinating result of the study was a test of the “80/20” rule. Librarians have long espoused the belief that 80% of a library’s circulation is driven by approximately 20% of the collection. The analysis of a year’s statewide circulation statistics would indicate that **80% of the circulation is driven by just 6% of the collection.**

Contemporary dataviz fundamentals

• Enable comparison
• Encourage user interactivity
Annual Loan & Internal Use Counts

In fiscal year 2010, Steenbock Library had 43,032 Circulations with Renewals, a 14% increase compared to 2006.
In fiscal year 2015, Ebling Library had 7,224 Circulations with Renewals, a 72% decrease compared to 2006.

In fiscal year 2015, Music Library had 17,164 Circulations with Renewals, a 69% decrease compared to 2006.
Circ + Acq
Correlated Behaviors?
40+ “libraries”
- Large GLS
  - Memorial
  - Steenbock
  - College
  - Shelving

- Large non-GLS
  - Law
  - Ebling
  - MERIT
  - Historical

- GLS SSH
  - Music
  - Art
  - Business
  - Social Science
  - Social Work
  - Geography

- GLS STEM
  - Astronomy
  - Chemistry
  - Geology
  - Math
  - Physics
  - Wendt

- Non-GLS Departmental
  - AISP
  - Journalism
  - LSS
  - SLIS
  - Vet Med

- Chican@ & Latin@
  - LGBT
  - Morgridge
  - Schwerdtfeger
  - Water
The most fascinating result of the study was a test of the “80/20” rule. Librarians have long espoused the belief that 80% of a library’s circulation is driven by approximately 20% of the collection. The analysis of a year’s statewide circulation statistics would indicate that 80% of the circulation is driven by just 6% of the collection.

<table>
<thead>
<tr>
<th>% Volumes</th>
<th>% Loans</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5%</td>
<td>38.1%</td>
</tr>
<tr>
<td>3.0%</td>
<td>49.7%</td>
</tr>
<tr>
<td>4.6%</td>
<td>57.8%</td>
</tr>
<tr>
<td>6.1%</td>
<td>63.8%</td>
</tr>
<tr>
<td>7.6%</td>
<td>68.7%</td>
</tr>
<tr>
<td>9.1%</td>
<td>72.7%</td>
</tr>
<tr>
<td>10.7%</td>
<td>76.7%</td>
</tr>
<tr>
<td>12.2%</td>
<td>80.0%</td>
</tr>
<tr>
<td>13.7%</td>
<td>82.1%</td>
</tr>
<tr>
<td>15.2%</td>
<td>84.1%</td>
</tr>
<tr>
<td>16.8%</td>
<td>86.1%</td>
</tr>
<tr>
<td>18.3%</td>
<td>88.1%</td>
</tr>
<tr>
<td>19.8%</td>
<td>90.1%</td>
</tr>
<tr>
<td>21.3%</td>
<td>92.1%</td>
</tr>
<tr>
<td>22.9%</td>
<td>94.1%</td>
</tr>
<tr>
<td>24.4%</td>
<td>96.1%</td>
</tr>
<tr>
<td>25.9%</td>
<td>98.1%</td>
</tr>
<tr>
<td>27.3%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
Usage Levels

Over the 10 Year Period, How Many Volume Circulated...

- Never
- Once
- 2-5 times
- 6-10 times
- 11-20 times
- 21-50 times
- 51-100 times
- 101-300 times
- > 300 times
Categories
Natural Order
Statistical Bins
Distribution
Circulation Distribution
Memorial Library: SSH Research Collection
Circulation Distribution
Steenbock Library: Bio/Ag Sciences Research Collection + Undergraduate Reserves
Circs per Volume Pattern: Libraries WITH Reserves Services

Circs per Volume Pattern: Libraries WITHOUT Reserves Services
Identifying Outliers

Many reserves items...

However:

Circulation behaviors exhibit characteristics more aligned to a research library.
“The unique resource that these forecasters were contributing was their eyesight. It is a valuable tool for forecasters in any discipline—

**a visual inspection of a graphic**

showing the interaction between two variables

**is often a quicker and more reliable way to detect outliers**

in your data than a statistical test.”

Nate Silver, *The Signal and the Noise*. Chapter 4.
Circulation by Patron Groups

Circulation by Patron Group

Percent Changes in Circulation for Patron Groups
E-Book Usage by Package

2014: 464,045 Chapter Views

- EBrary: 68,860
- Springer: 87,413
- Elsevier Science Direct: 78,189
- Books-24x7: 62,148
- ACLS: 57,869
- Wiley: 94,885
- Safari: 14,681

About the Data

Chapter views are based on COUNTER (Counting Online Usage of Networked Electronic Resources) statistics for the UW-Madison Libraries e-book package subscriptions.
Implementation Details

Tools, data sources, techniques

...oh my.
Data Scale

Raw Data
• 6.6 Million Item Records
• 5 Million Circ Transactions

Approximately 1.27 Gigabytes of data

Period of Study: Fiscal Years 2006-2015
Initial Exploration


Stock price: DATA (NYSE) $48.09 -0.93 (-1.90%)
Oct 21, 1:45 PM EDT - Disclaimer
Customer service: 1 (206) 633-3400
CEO: Adam Selipsky
Headquarters: Seattle, WA
Founded: January 2003
CFO: Tom Walker
Founders: Pat Hanrahan, Christian Chabot, Chris Stolte

Source: Tableau info card in Google
https://www.google.com/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=tableau

Final Version

D3.js is a JavaScript library for manipulating documents based on data. D3 helps you bring data to life using HTML, SVG, and CSS. D3's emphasis on web standards gives you the full capabilities of modern browsers without tying yourself to a proprietary framework, combining powerful visualization components and a data-driven approach to DOM manipulation.

Source: d3.js homepage
https://d3js.org/
Lessons Learned
Place a Premium on Clarity
Value Simplicity
Fancy == Risk
High Impact Information Literacy Contact
Academic departments with at least 100 undergraduate enrollments encountering information literacy instruction per semester

Academic Calendar Heat Map

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTHROPOLOGY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ART DEPARTMENT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ART HISTORY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOLOGY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOLOGY CO.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEMISTRY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMMUNICATIONS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COUNSELING</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CURRICULUM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGLISH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGLISH AS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGR PROFESSIONALS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GENERAL BUSINESS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOGRAPHY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOSCIENCE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HISTORY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTERDIS DISCIPLINE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>JOURN AND MEDIA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIFE SCIENCE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MARKETING</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MECHANICAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NURSING</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POLITICAL SCIENCE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REHAB PSYCHOLOGIST</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOCIOLOGY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Source: Basic Charts @ d3.js Examples
https://github.com/d3/d3/wiki/Gallery#basic-charts
Statistical Competencies
E-Usage for Nature

May 2014: 14,719 total downloads

EBSCOhost 0028-0836: 66
nature.com 0028-0836: 14,368, 1476-4687: 201
ProQuest 0028-0836: 84

Correlation: 0.432
E-Usage for Nature

June 2012: 36,589 total downloads (Reported: 36,589)
EBSCOhost 0028-0836: 26
nature.com 0028-0836: 36,297, 1476-4687: 223
ProQuest 0028-0836: 43

Correlation: 0.357

Count by  ● Month  ○ Year

Normalize Outliers
Statistical Methods to the Rescue

- Identify/Deskew Outlier Effect
- Clarify Trends
Looking Toward the Future

• Developing interactive tools library-staff can use to facilitate decision-making.

• Starting with questions:
  • Is the stuff I’m buying getting used?
  • How are our approvals working?
  • What should I be buying?
• Developing interactive tools library-staff can use to facilitate decision-making.

• Goals
  • Make it easy to identify outliers
  • Make it easy to compare
  • Make it easy to identify trends
  • Make it easy enough for an administrator to use
Questions?

the end

Stephen Meyer

Doug Way
Image Credits

- Foundations, by Lindsay Holmwood. CC BY-SA
  https://www.flickr.com/photos/auxesis/4086842183

- Bible, by bartb_pt. CC BY-NC-ND
  https://www.flickr.com/photos/bartb_pt/2338601656

- Rabbits, by Moiggi Interactive. CC BY-NC
  https://www.flickr.com/photos/127107506@N02/15289707681

- lions, tigers, and bears - oh my! by snarledskein. CC BY-SA
  https://www.flickr.com/photos/snarledskein/4747583508

- to the rescue, by Manon Paradis. CC BY-NC-ND
  https://www.flickr.com/photos/manons/847867651