

# Data Visualization for Decision Making

RIPL Webinar Series

March 13, 2019

2:00-3:00 Eastern / 11:00-12:00 Pacific



Katina Jones  
Mid-Continent Public Library  
Missouri



Lindsay Hanson  
Sno-Isle Libraries  
Washington

## Data Visualization for Decision Making

KATINA JONES, STATISTICAL RESEARCH ANALYST  
MID-CONTINENT PUBLIC LIBRARY

LINDSAY HANSON, DATA ANALYSIS LIBRARIAN  
SNO-ISLE LIBRARIES

## Our Intentions

Improve understanding of the value of data in libraries for decision making

Strategize techniques to turn raw data into actionable information

Share lessons learned and ideas for how data visualization can help your organization

## Who are we?



Katina Jones,  
Statistical Research Analyst  
Mid-Continent Public Library

Manages strategic plan metrics and evaluation of grant programs

Compiles monthly and annual library and community data reports

Presents quarterly to Library Board and monthly to library management

## Who are we?



Lindsay Hanson,  
Data Analysis Librarian  
Sno-Isle Libraries

Manages metrics and evaluation for Public Services


Survey & research design

Provides analyses and visualizations for service managers

# Why “data visualization for decision-making?”

---

- Inform a one-time or repeat decision
- Can explore organizational efficiency, leading to policy innovation
- Not necessarily intended for public consumption



[https://xk.medita.com/gif/meditadn.com/images/gif/why\\_data\\_decision\\_062205021\\_2306427.jpg?w=1024&h=1024&id=1200](https://xk.medita.com/gif/meditadn.com/images/gif/why_data_decision_062205021_2306427.jpg?w=1024&h=1024&id=1200)

# Examples from Mid-Continent Public Library

---

## Utilizing Data Already Available to You

- Visualizing data with Excel – trends and year-over-year
- How should data containing patron barcodes be used?

## Collecting Actionable Data with Surveys

- Asking the right questions
- Cross-tabulating results

# Using Excel: Trend Data

Month	FY 2016-2017	FY 2017-2018	FY 2018-2019
July	822,246	813,794	817,764
August	781,117	770,505	765,005
September	758,117	744,144	738,117
October	728,117	712,117	705,117
November	708,117	692,117	685,117
December	688,117	672,117	665,117
January	788,117	772,117	765,117
February	768,117	752,117	745,117
March	748,117	732,117	725,117
April	728,117	712,117	705,117
May	708,117	692,117	685,117
June	688,117	672,117	665,117

Best used with one data point, comparing months and years.

Aids in visualizing the ebb and flow of monthly circulation.

Aids understanding of how changes in programs or services affect the data.

# Using Excel: Rolling 13 Months

**Circulation of Digital Materials (2018-2019)  
(Rolling 13 Months)**

Month	AudioBooks	eBooks	Videos	Audiogames	Plays
February	12,000	21,000	18,000	15,000	10%
March	13,000	22,000	19,000	16,000	11%
April	14,000	23,000	20,000	17,000	12%
May	15,000	24,000	21,000	18,000	13%
June	16,000	25,000	22,000	19,000	14%
July	17,000	26,000	23,000	20,000	15%
August	18,000	27,000	24,000	21,000	16%
September	19,000	28,000	25,000	22,000	17%
October	20,000	29,000	26,000	23,000	18%
November	21,000	30,000	27,000	24,000	19%
December	22,000	31,000	28,000	25,000	20%
January	23,000	32,000	29,000	26,000	21%
February	24,000	33,000	30,000	27,000	22%

Year-over-year comparison, plus what happened in between.

Good for comparing like data points (e.g., virtual materials).

Has a left and right axis so all data can be seen in one chart.

# Using Excel: Year Over Year Change

---

February 2019

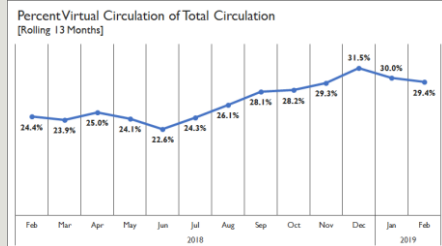
Mid-Continent Public Library  
Physical and Virtual Circulation in Context

	February 2018	February 2019	Numeric Change	Percent Change
Total Circulation	687,857	706,737	8,880	1.3%
Total Physical Circulation	527,522	490,783	-38,739	-5.4%
Total Virtual Circulation	170,335	207,954	37,619	22.1%

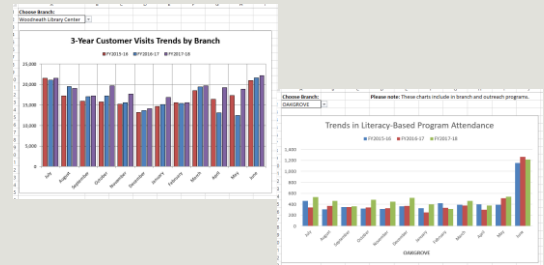
  

Books	385,703	368,355	-17,348	-4.5%
eBooks	103,263	126,800	23,537	22.8%
eMagazines	4,110	3,093	-1,017	-24.7%
Audiobook CDs	19,237	15,922	-3,315	-17.2%
eAudiobooks	52,889	76,846	23,957	45.3%
DVD/Blu-ray	104,755	100,284	-4,471	-4.3%
Streaming Video	781	623	-158	-20.2%
Music CDs	17,821	14,220	-3,601	-20.2%
Downloaded Music	9,292	6,772	-2,520	-27.1%
Library-By-Mail Kindles and Lap Desks	6	2	-4	-66.7%

## Using Excel: Rolling 13 Months



## Using Excel: Branch Specific Trends



## Using Data with Patron Barcodes

Pivot Tables are your friend!

Names need not be involved.

Aids in understanding the age old question:

- Is the decrease in circulation because we have fewer customers or are customers checking out fewer items?

Request vendors provide usage data with barcodes.

## Collecting Actionable Data with Surveys

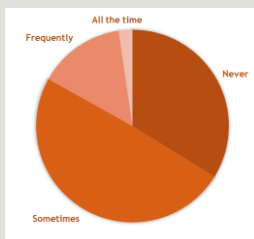
Ask the right questions:

- Obtaining actionable data requires asking questions on which action can be taken.
- Asking "easy" questions will give you talking points for speeches and press releases, but not actionable data.

Ask questions that can be cross-tabulated:

- Yes, we need those demographic questions...
- Yes we need to ask them which branch they use...

## Cross-Tabulating Survey Data



If the Library's hours of operation were extended, how often do you think you would take advantage of those extra hours?

	Never or Sometimes	Frequently or All the time
TOTAL	83.2%	16.8%
Age 25 or younger	66.8%	33.2%
Hour or longer Visitors	69.3%	30.7%
Frequent Visitors	78.8%	21.2%
New Cardholders	79.9%	20.1%

## Examples from Sno-Isle Libraries

Operational Report

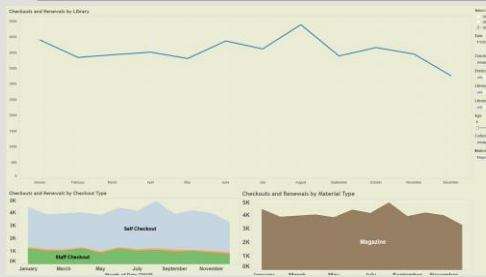
Programming Support and Evaluation

Service Plan Metrics Visualization

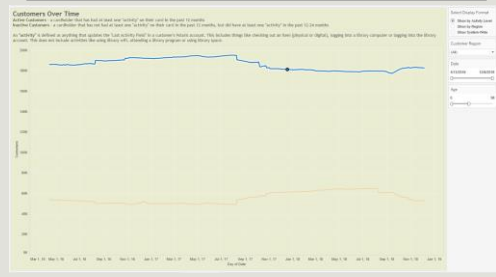
Analytics on Demand Report

eBook Survey

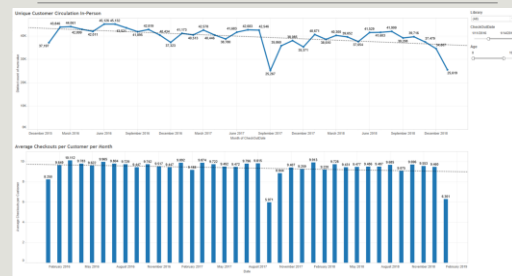
## Examples from Sno-Isle



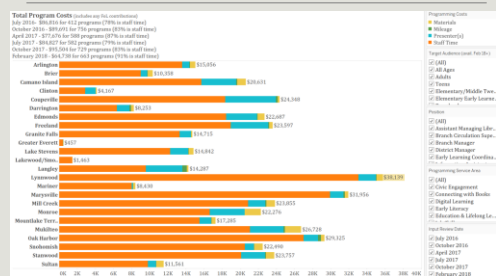
## Examples from Sno-Isle



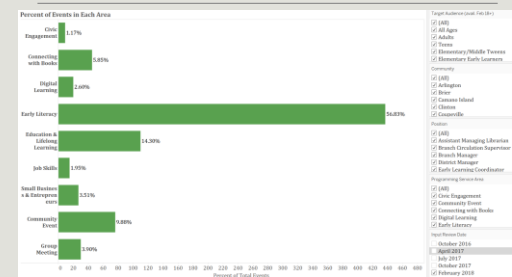
## Examples from Sno-Isle



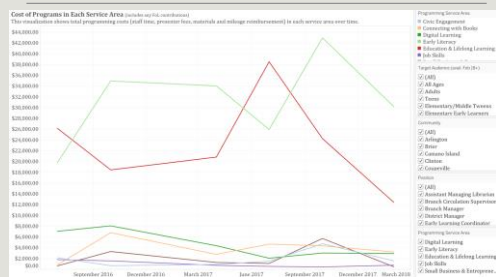
## Examples from Sno-Isle



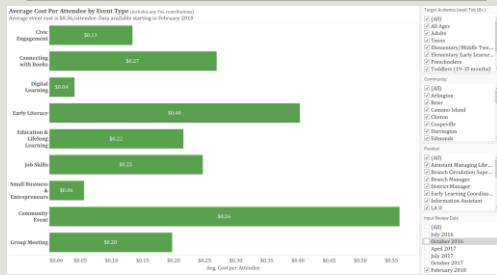
## Examples from Sno-Isle



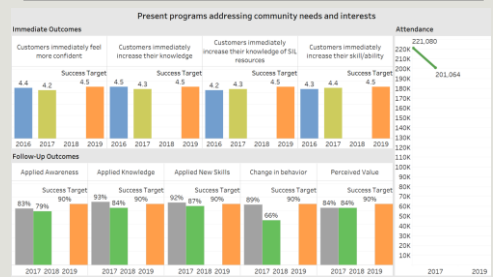
## Examples from Sno-Isle



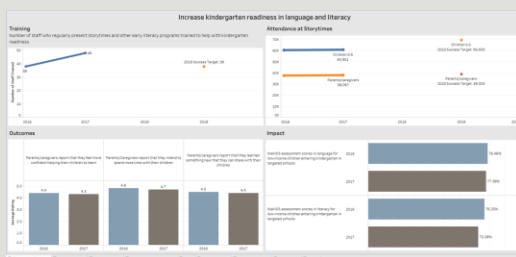
## Examples from Sno-Isle



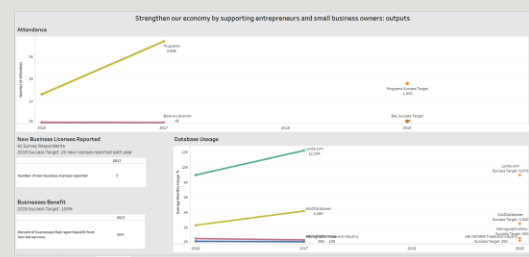
## Examples from Sno-Isle



## Examples from Sno-Isle



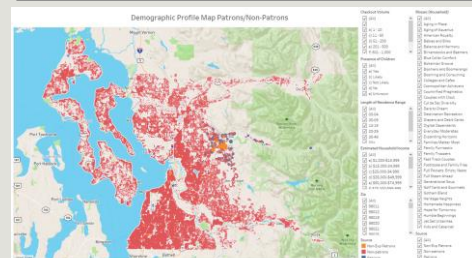
## Examples from Sno-Isle



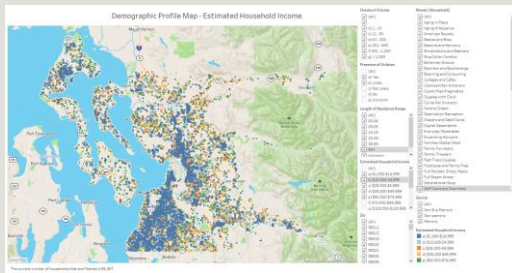
## Examples from Sno-Isle



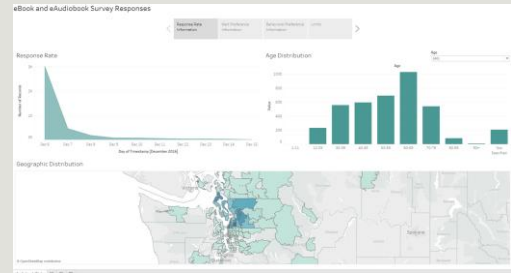
## Examples from Sno-Isle



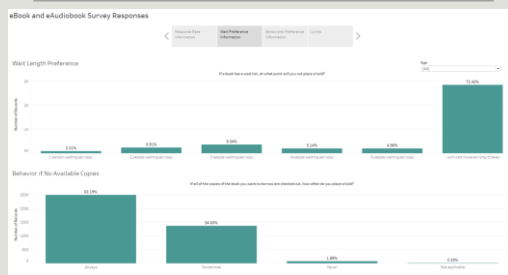
## Examples from Sno-Isle



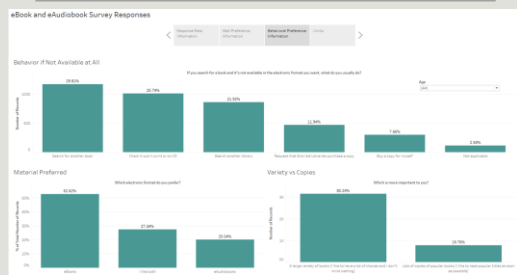
## Examples from Sno-Isle



## Examples from Sno-Isle



## Examples from Sno-Isle



## Tips: Start with good data!

Anticipate future reporting needs

Think longitudinally – gather data that can be compared over time

Work with other data owners (IT, Systems Librarian, etc.)

Make a data dictionary! Define your data.

## Tips: Know your data!

How are the data collected?

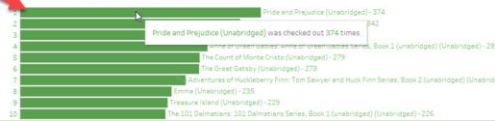
What is missing from the data?

What columns are present in your data?

Consult with the domain expert

## What happens if you don't know your data...

Seattle Public Library Audiobook Checkouts, Sept 2005 - Feb 2017  
138 months, 54,460 unique titles, 1,020,805 total checkouts

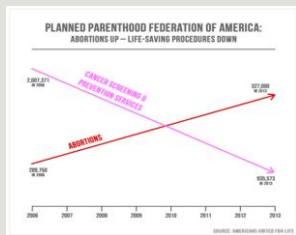


<https://public.tableau.com/profile/ken.jones/viz/home/SeattleAudiobooks/SeattleAudiobooks>

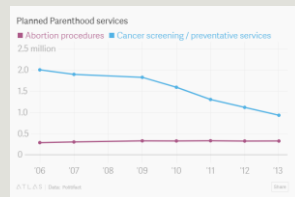
## Domain knowledge helps identify data issues



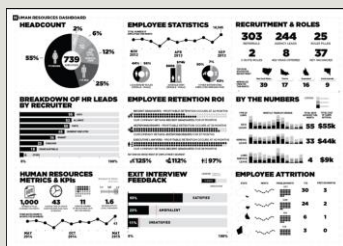
## Tips: With data viz powers comes great responsibility!



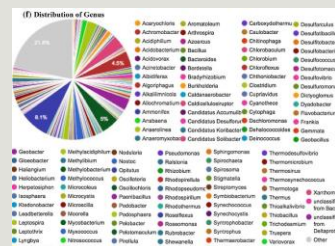
## Tips: With data viz powers comes great responsibility!



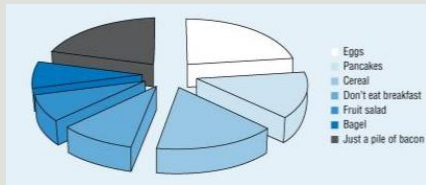
## Pass: Print Test



## Fail: Print Test



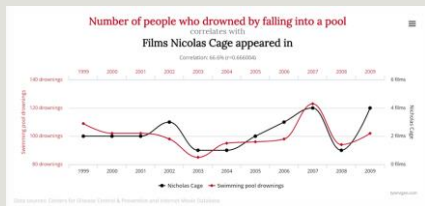
## Say No to 3D



## Don't Confuse Correlation for Causation



## Don't Confuse Correlation for Causation



## Lessons Learned

Always ask - "What decision are you trying to make?"

Decision-making is more challenging without organizational metrics

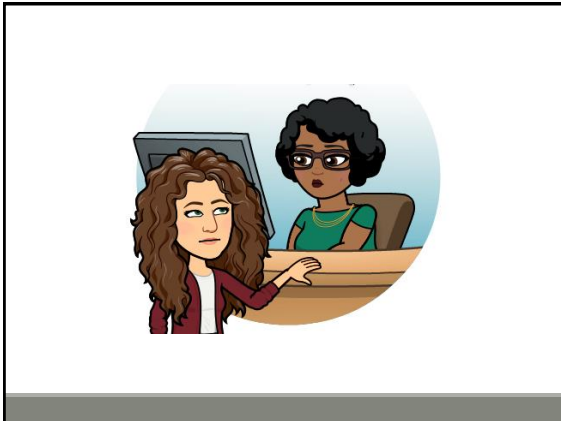
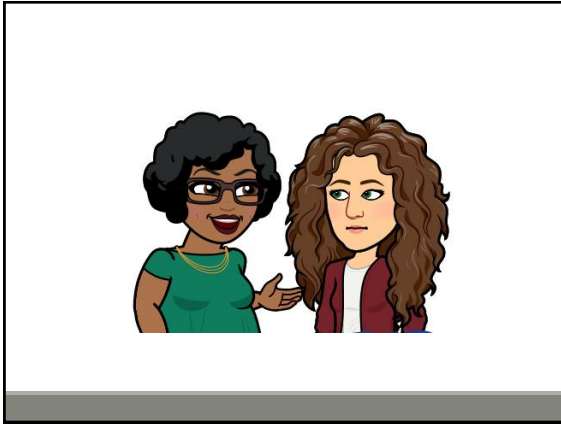
Data "owners"/domain experts need to inform viz

Beauty = Believability

## What is good data visualization customer service?







**Data Visualization Request Form**

Requestor: **Lindsay @ Grain Valley**

Data Source(s) (if known): **Savannah, Delivery Services data, other output data**

Purpose of Visualization:

☒ Inform a decision

    o What are the priority questions you want to answer?

**For how much increased traffic do we need to plan?**

☐ Communication tool

Will it need updating with new data in the future?

☐ Yes

    How often?

☒ No -- but will need to be replicated for other branches

☐ Not sure

Who is the audience for the visualization? **Branch and department managers, CXD**

Data literacy level? (Select all that apply)

☐ Rarely uses data

☐ Uses data occasionally

☒ Interacts with reports on a regular basis, but doesn't use new data very often

☐ Uses and analyzes raw data frequently

Would you like an accompanying narrative with your visualization?

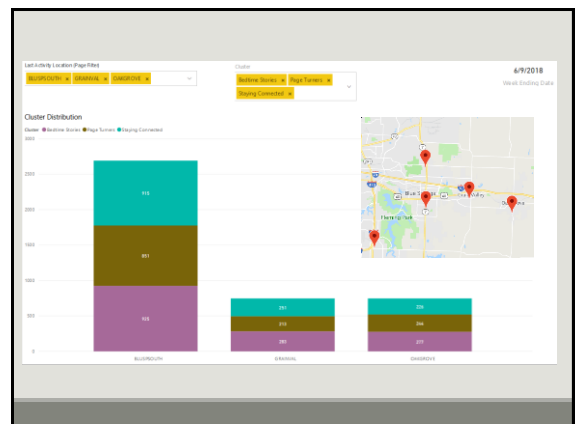
☒ Yes ☐ No ☐ Not sure

Does it need to be printable?

☐ Yes ☒ No

Do you have any other requirements?

**How quickly can I get the data?!**





# Thank You!

Webinar evaluation:  
[https://s.lrs.org/data\\_decision](https://s.lrs.org/data_decision)

