SKILL BUILDING FOR EFFECTIVE USE OF MULTIDIMENSIONAL MEASUREMENTS IN COLLECTION ASSESSMENT

ALCTS Exchange –
Pop-out-of-the-Box Session

Presented by

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SESSION OBJECTIVES

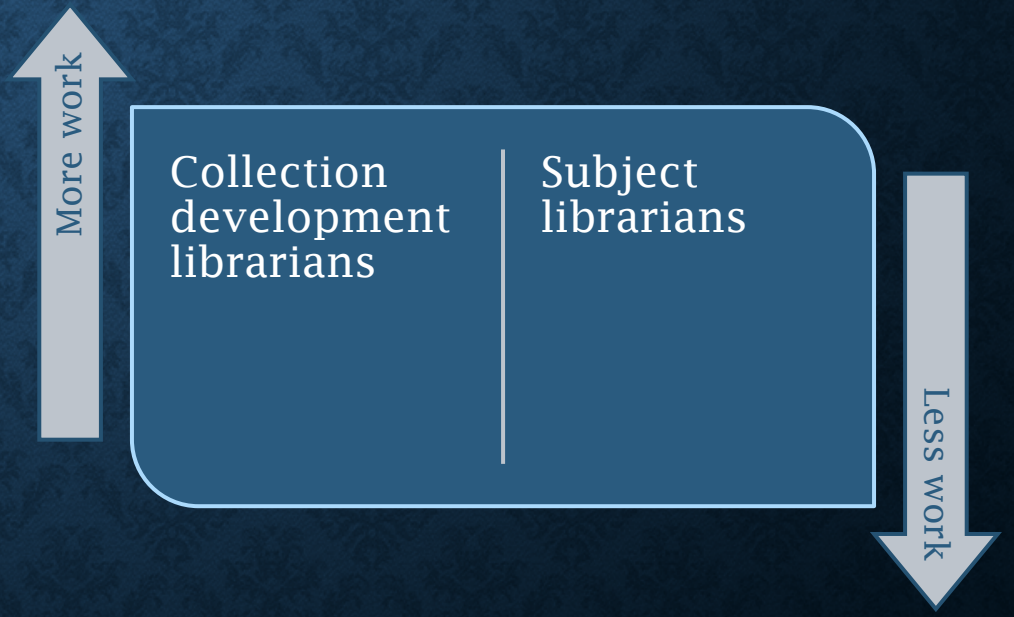
- Understand the limitations of conventional one-dimensional collection analysis measures
- Learn how to calculate key collection measurement ratios
- Identify collection discrepancies and areas of opportunity using ratios

THE ROLE OF ANALYSIS IN COLLECTION ASSESSMENTS

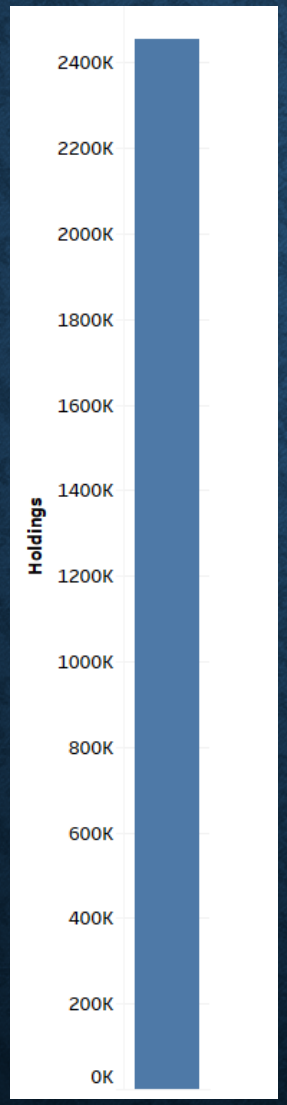
Opportunity cost

- "The true cost of an item acquired for a library's collections is the opportunity cost of the items, which is to say, the value to the library's clients of what was not acquired because the acquired item was chosen instead" (Carrigan, 1996, p. 274)

Demand-driven acquisitions



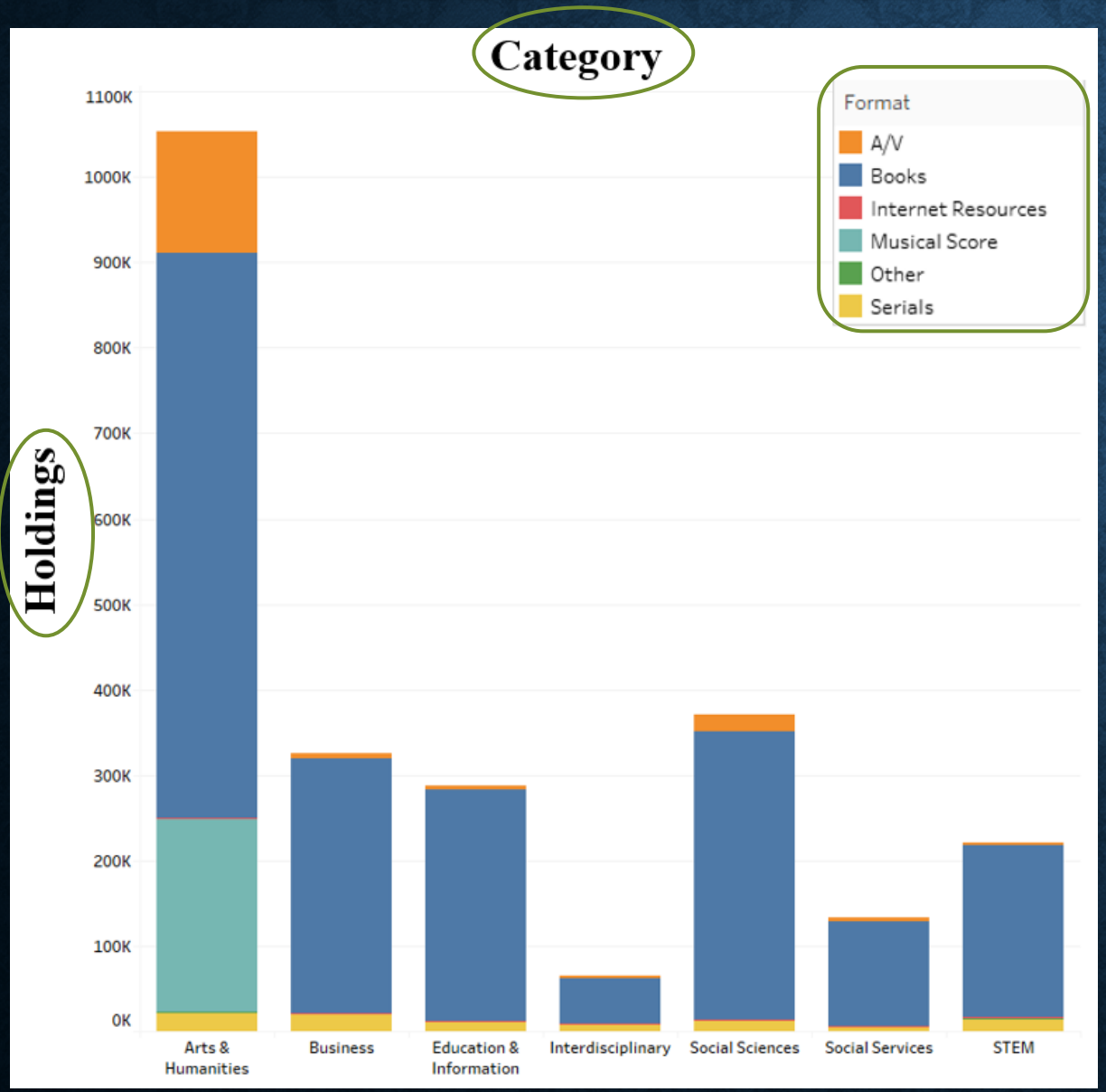
ONE DIMENSIONAL MEASUREMENTS



- Advantages
  - Simple generation
  - Easy sorting
  - One number

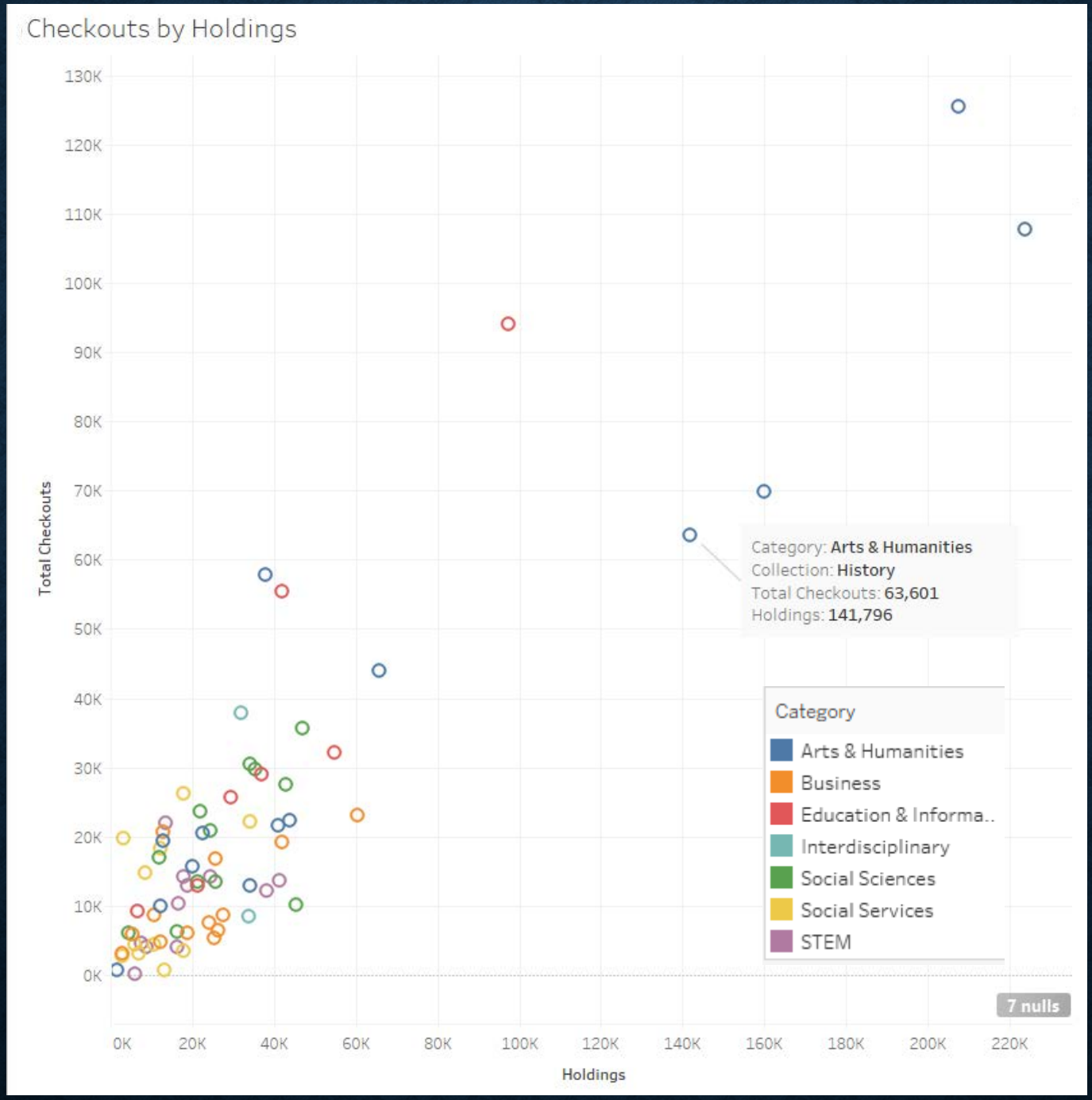
- Limitations
  - By themselves are meaningless
  - Lack of context
  - Lacks a comparison

MULTIDIMENSIONAL MEASUREMENTS



- What are they?
  - One measure plotted against one ***or more*** measures

A		B
Holdings		Subject
Checkouts		Patron Type
Purchases		Format
Loans		Year


Checkouts by Holdings
130K
120K
110K
100K
90K
80K
70K
60K
50K
40K
30K
20K
10K
0K
Total Checkouts
0K
20K
40K
60K
80K
100K
120K
140K
160K
180K
200K
220K
Holdings
Category: Arts & Humanities
Collection: History
Total Checkouts: 63,601
Holdings: 141,796
Category
Arts & Humanities
Business
Education & Informa..
Interdisciplinary
Social Sciences
Social Services
STEM
7 nulls

RATIOS – THE UNTOLD STORY

- What are ratios?
  - Efficient measures of effectiveness
  - Quantitative relation between two values
    - May *or may not* be of the same set.
    - May *or may not* be of the same unit of measure.

RATIOS – THE UNTOLD STORY

A ratio is the quantitative comparison of a *dependent* factor against an *independent* factor

$$\frac{\text{Dependent factor}}{\text{Independent factor}}$$

Dependent factor – numerator

Can be thought of as "that which you don't know"

Independent factor – denominator

Can be thought of as "action based"

EXPRESSION OF RATIOS

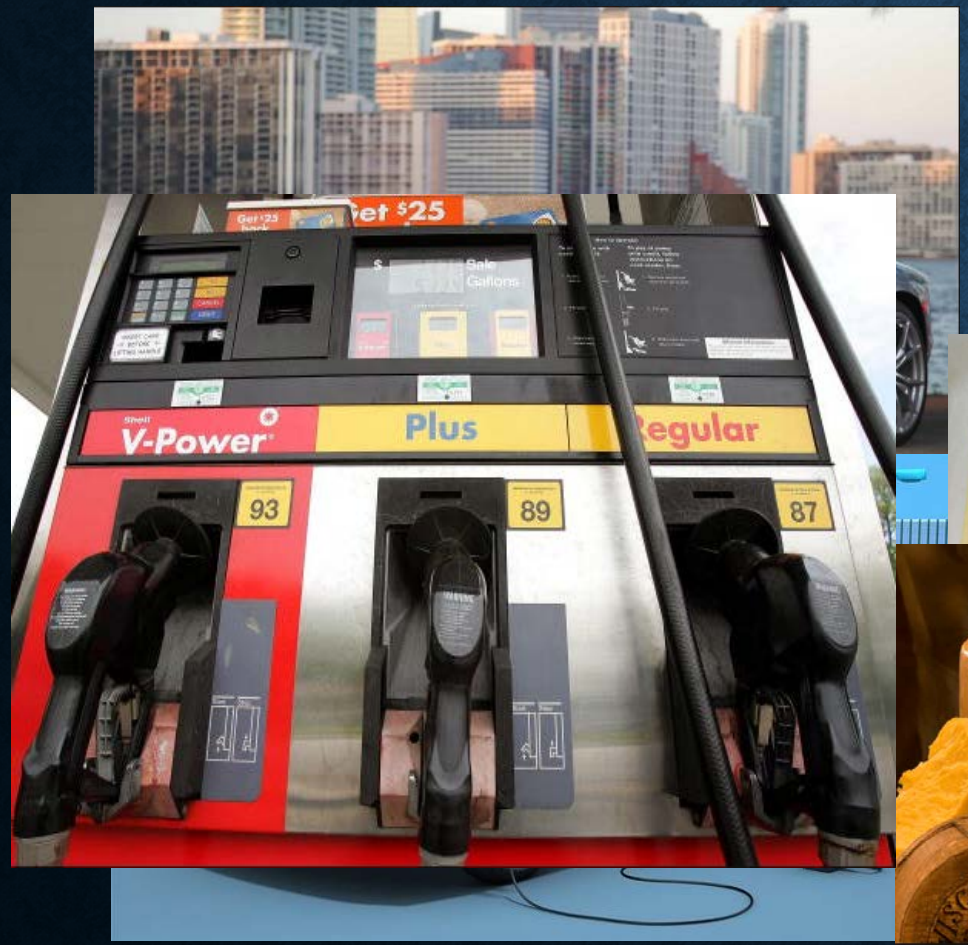
Common forms of expression:

- Fraction: 4/5
- Decimal: 0.8
- Percentage: 80%
  - Percentage is a special type of ratio.
  - Where the numerator is a ***subset*** of the denominator.

GENERAL LIFE EXAMPLES

Knowingly or not…ratios are used every day

- Miles per gallon (MPG)
- Cost per ounce/pound
- Price per gallon

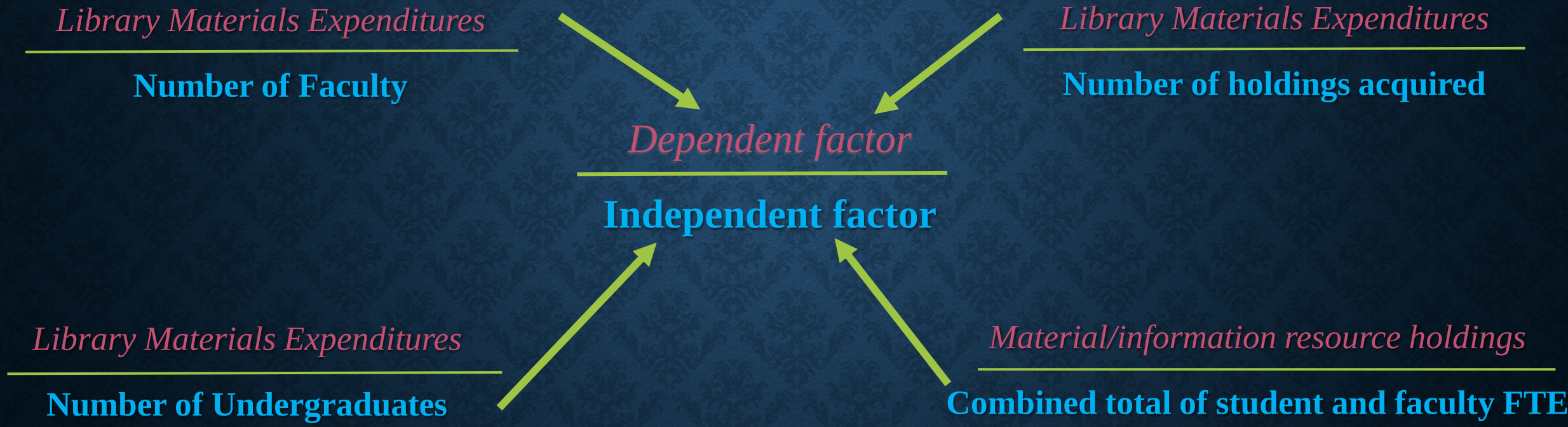


CALCULATION OF RATIOS – POLL #1 & #2

- Calculate Miles per Gallon
  - Miles Traveled: 367
  - Gallons Needed to Refuel: 12

- Calculate Cost per Use
  - Cost of New Book: $500
  - Number of Uses in 12 month period: 12

GENERAL LIBRARY EXAMPLES OF RATIOS



What message are you trying to share with your audience?

PERCENTAGES AS RATIOS

Percentages are a specific kind of ratio calculations

- Numerator must be ***subset*** of the denominator
- Other ratios do not require this e.g. MGP, cost per use etc.

Components needed to calculate percentage of holdings

Music holdings

Economics holdings

PERCENTAGE EXERCISES – POLL #3 & #4

Collection specific total ÷ Total = %

- Calculate Percentage of Music Enrollment

  Total Enrollment: 418,201

  Music Enrollment: 17,216

17,216 ÷ 418,201 = 4.12%

- Calculate Percentage of Music Circulation

  Total Circulation: 2,479,678

  Music Circulation: 207,649

207,649 ÷ 2,479,678 = 8.37%

APPLICATION OF RATIOS IN LIBRARY ASSESSMENT

- To demonstrate value:
  - Efficient use of resources
  - Effectiveness in meeting client needs
  - Value to the institution
- Culture of assessment via research as a method to meet user needs
- Assist in determining the ‘quality’ of a collection

STORYTELLING WITH RATIOS…

Each type of ratio tells a story. It is up to you to determine the story that you wish to be told.

What questions are you asking of the collection?

- What are the real or anticipated needs?
- In what ways are the collections being used?
- In what ways do we meet the needs of our faculty/students/stakeholders?
- How well do we meet those needs?

Ratios that could help answer these questions

- Percentage of enrollment of a college.
- Percentage of checkouts by format.
- Percentage of checkouts by patron group.
- Ratio of borrowings to holdings.

RATIOS OF RATIOS

- Taking this to the next level
- Compound ratios
  - *4* dimensions into *1*

Checkouts

601

796

485

Holdings

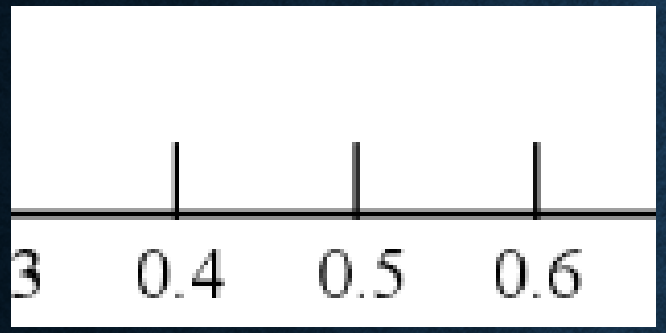
DEMONSTRATION OF COMPOUND RATIOS

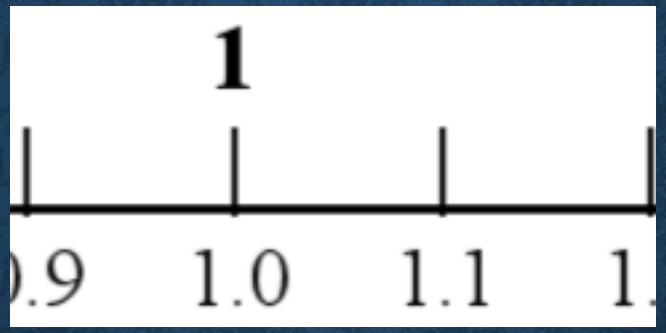
- Comparisons of ratios
  - % of checkouts by % of holdings
    - $\frac{\text{5\% of checkouts}}{\text{3\% of holdings}} = 1.67$
  - % of checkouts by % of enrollment
    - $\frac{\text{5\% of checkouts}}{\text{7\% of enrollment}} = 0.71$

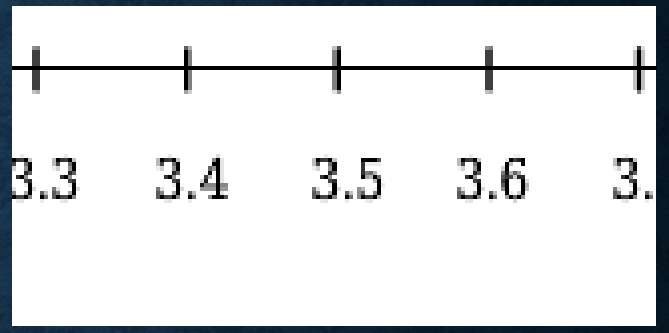
REDUCING 4 MEASURES INTO 1

- Reducing 4 measures to 1:
  - Ratio of checkouts to holdings:
    1. # of checkouts in subject
    2. Total # of checkouts
    3. # of holdings
    4. Total # of holdings
- Provides context and comparison
- By itself *can* have meaning…

WHAT THESE RATIOS MEAN







Zero to One

Numerator < Denominator

% Holdings < % Enrollment

Around One

About the same or equal

The percentages are close

Greater than One

Numerator > Denominator

% Holdings > % Enrollment

ANALYZING COLLECTIONS BY SUBJECT

- Collections are organized by subject.
  - Classification
  - Subject heading
  - Fund
- Analysis mirrors organization
- UNT Libraries:
  - OCLC Conspectus subject divisions by LoC Classification
- Limitations
  - Interdisciplinarity
  - Different ways to organize: DDC, LCC, LCSH, subject categories
  - Mutually-exclusive or overlapping?

SUBJECT-BASED COLLECTION RATIOS

Use Factor (UF)

- *Disparity between circulation & holdings - Bonn (1974)*

$$\frac{\%\text{ of Circulation in a subject}}{\%\text{ of Holdings in same subject}}$$

Ratio of Borrowings to Holdings (RBH)

- *Included borrowing - Aguilar (1986)*

$$\frac{\%\text{ of ILL Requests in a subject}}{\%\text{ of Holdings in same subject}}$$

Holdings Factor (HF)

- *Holdings compared to enrollment*

$$\frac{\%\text{ of Holdings in a subject}}{\%\text{ of Enrollment in same subject}}$$

Expected Use

Category	Collection	% of Checkouts	% of Enrollme..	% of Holdings	% of ILL Reque..	Holdings Factor	Use Factor	RBH
Arts & Humanities	Interdisciplinary Arts	7.66%	0.26%	10.18%	5.87%	38.85	0.75	0.58
	Philosophy & Religion S..	1.59%	0.33%	1.92%	2.52%	5.92	0.82	1.31
	History	4.52%	1.56%	6.41%	7.29%	4.12	0.71	1.14
	English	4.97%	2.12%	7.22%	4.84%	3.41	0.69	0.67
	World Languages, Liter..	1.54%	0.66%	1.86%	1.60%	2.80	0.83	0.86
	Music	8.92%	4.12%	9.45%	4.48%	2.29	0.94	0.47
	Art Education/Art Histo..	4.12%	0.92%	2.00%	2.49%	2.17	2.06	1.25
	Studio Art	3.12%	1.98%	3.02%	3.44%	1.53	1.03	1.14
	Theatre	0.70%	0.48%	0.53%	0.58%	1.10	1.33	1.09
	Design	1.11%	2.01%	0.91%	0.74%	0.45	1.23	0.81
	Dance	0.05%	0.22%	0.08%	0.13%	0.34	0.71	1.77
	News Journalism	1.46%	3.04%	1.02%	0.84%	0.34	1.43	0.82
	Media Arts	1.38%	2.91%	0.59%	0.51%	0.20	2.35	0.87

UNDERSTANDING COLLECTIONS RATIOS

Ratio	Very Low	Around one	Very High
Holdings Factor	Holdings much less than expected need	"Balanced" – at least, based on enrollment	Holdings much greater than expected need
Use Factor	Use much lower than expected.	Use about expected	Use much greater than expected
Ratio of Borrowings to Holdings	ILL requests much fewer than expected	ILL requests similar to holdings	Much more ILL requests than expected

APPLYING COLLECTION RATIOS

Holdings Factor (HF) =
% of Holdings / % of Enrollment

$$\frac{\text{History Holdings of } 6.41\%}{\text{Total Enrollment of } 1.56\%} = 4.1$$

- Estimation is 6:1.5 about 4:1 or about 4
- The facts: low enrollment, high holdings, ratio of more than 1
- What conclusions can be drawn from this data?
- Potential remedies for this imbalance?

WHAT HAPPENS IF…TOP NUMBER INCREASES? – POLL #5

Scenario 1: Holdings Factor (HF)

$$\frac{\%\text{ of Holdings in a subject}}{\%\text{ of Enrollment in same subject}}$$

Original holdings: $\frac{4.50}{1.93}$ or $4.50:1.93 = 2.33$

Numerator  by 2 and denominator remains constant. Ratio impact?

Increased holdings: $\frac{6.50}{1.93}$ $6.50:1.93 = 3.37$

Take home message:
If numerator > denominator, ratio >1.
When the numerator increases, the ratio will increase.

WHAT HAPPENS IF…BOTTOM NUMBER INCREASES? – POLL #6

Scenario 2: Use Factor (UF)

% of Circulation in a subject / % of Holdings in same subject

Original ratio: $\frac{1.19}{1.17}$ or 1.19:1.17 = 1.02

Denominator ↑ by 2 but the numerator remains constant. Ratio impact?

Revised ratio: $\frac{1.19}{3.17}$ or 1.19:3.17 = 0.38

Take home message:
If numerator < denominator, ratio <1.
When the denominator increases, the ratio will decrease.

REVIEW

"The worth of a library cannot be measured by the quantity of its resources alone. The quality of those resources, proven by use, is the ultimate worth of a library" (Ochola, 2002, p. 12)

Ratios can help with analysis by…

- Condensing measures
- Providing context
- Establishing benchmarks

3 Key Collections Ratios

Use Factor	$\frac{\%\ \text{Circs}}{\%\ \text{Holdings}}$
RBH	$\frac{\%\ \text{ILL Requests}}{\%\ \text{Holdings}}$
Holdings Factor	$\frac{\%\ \text{Holdings}}{\%\ \text{Enrollment}}$

QUESTIONS?

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