From “Skip The Numbers” To “Great Stuff”: A Data Education Project
BEYOND THE NUMBERS, FEDERAL RESERVE BANK OF ST. LOUIS, 11/8/2018, 4:15 - 5:15pm

Kristin Fontichiaro
U. of Michigan School of Information

Wendy Stephens
Jacksonville St. University

Today we’ll talk about ...

→ The impetus, structure, and deliverables of our project
→ The learnings reported by our “experts”
→ Current findings and implications for your practice

Hello!

Who are you?
Hello!

We’re Kristin Fontichiaro and Wendy Stephens.
Supporting Librarians in Adding Data Literacy Skills to Information Literacy Instruction

Made possible in part by the Institute of Museum and Library Services RE-00-15-0113-15
Core Personnel
Kristin Fontichiaro, PI, UMich School of Information (UMSI)
Jo Angela Oehrli, Co-PI, UMich Library
Amy Lennex, Project Manager
Tyler Hoff, Project Assistant, UMIS
Kelly Hovinga, Project Assistant, UMSI
Martha Stuit, Project Assistant, UMSI

Curriculum Experts
Debbie Abilock, NoodleTools
Susan D. Ballard, National Center for Digital Equity
Tasha Bergson-Michelson, Castilleja School
Jennifer Colby, Huron High School
Jole Seroff, Castilleja School
Susan Smith, Harker School
Wendy Steadman Stephens, Jacksonville State University
Connie Williams, ret. from Petaluma High School

Data Experts
Jacob Carlson, UMich Library
Lynette Hoelter, ICPSR
Justin Joque, UMich Library

Special Contributors/Guest Presenters
Tuva Bergson-Michelson, Lick-Wilmerding School
Catherine d’Ignazio, Emerson College
Charissa Jefferson, Cal. State Northridge
Diego Mendez-Carbajo, Illinois Wesleyan
Katrina Stierholz, FRED/Federal Reserve Bank of St. Louis
Justin Schell, UMich Library
Tierney Steelberg, Guilford College
Samantha Viotty, formerly Emerson College, currently Obama Foundation
Andrew Whitehead, Assn. of Religion Data Archives / Clemson University
DATA LITERACY
The ability to “read” and “write with” data
Project Overview
Turn and Talk:
What do you tell your students/learners about how to read a scholarly article?
Turn and Talk:
What do you tell your students/learners about how to read a scholarly article?

Share out ...
1. “I just tell them to read the text and skip the numbers.”
2. Bad Infographics.
3. Belief that 2016 would mirror 2012 election, with campaigns rich with data and stats and with microtargeting of voters. Were high schoolers ready to be voters?
4. Emergence of Big Data and automated, non-human, algorithmic decision-making
5. Growing focus on research data management / data repositories / data information literacy at U-M Library
With that in mind, let’s look back at our survey results
Data/stats comprehension
Data in arguments
Data visualization

Big Data /
Citizen Science
Ethical data use
Personal data management
<table>
<thead>
<tr>
<th>We planned</th>
<th>We ended up with</th>
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<tbody>
<tr>
<td>2 virtual conferences</td>
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<tr>
<td>One short “rules of thumb” book</td>
<td>2 books, totalling nearly 700 pages</td>
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<tr>
<td>Project evaluation</td>
<td>Project evaluation (in process)</td>
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<td>(8-book series for middle-grade readers)</td>
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4T Virtual Conference on Data Literacy

- Two-day event for each of 3 years
- Free & online
- 2016 & 2017 focused on one of 3 corresponding annual themes
- 2018 open topics (co-sponsor ICPSR)
- Technically focused on high school librarians and educators, but ~ 2/3 of population over 3 years were not in this group
Introduction to Statistical Literacy / Lynette Hoelter
Statistical Storytelling: The Language of Data / Tasha Bergson-Michelson
Using Data in the Research Process / Jole Seroff
Real world data fluency: How to use raw data / Wendy Steadman Stephens
Manipulating data in spreadsheets / Martha Stuit
Making Sense of Data Visualization / Justin Joque
Data presentation: Showcasing your data with charts and graphs / Tierney Steelberg
Deconstructing data visualizations: What every teen should know / Susan Smith
Designing your infographic: Getting to design / Connie Williams
Using data visualizations in the content area / Jennifer Colby
Teaching Data Contexts: An Instructional Lens / Debbie Abilock
Diving Lessons: Taking the Data Literacy Plunge Through Action Research / Susan D. Ballard
Part I:
"PD in a box.” Discussion questions and activities based on archived sessions from 2016 & 2017 4T Virtual Conference on Data Literacy

Part II:
45+ Case Studies drawn from current events:
- Cambridge Analytica, FitBit, predictive policing, racist policies and data, citizen science projects, ethical data use, use of security cameras in special ed. Classrooms, K-12 student data privacy, Amazon Echo Look, etc.

dataliteracy.si.umich.edu/books/
2. What the curriculum team learned
Thinking about **numeracy**
Variables and ambiguities
Interrogating the data
“47 percent pay no taxes”

“Majority think nuclear power safest”

“Twenty percent support it”

Cut-and-paste without context
Making responsible use of data
Data fluency

- Thinking computationally
- Finding existing data sets
- Traveling backward from news’ accounts and soundbites
- Are the parameters explicit?
- Making responsible use of data
Trends
Labels
Values
If the World Were a Village
SECOND EDITION
A Book about the World’s People

Written by David J. Smith
Illustrated by Shelagh Armstrong

SCHOLASTIC
Of the 100 people in the global village:
- 61 are from Asia
- 13 are from Africa
- 12 are from Europe
- 8 are from South and Central America
- 5 are from Canada and the U.S.
- 1 is from Oceania
Population Distribution

<table>
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<tr>
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<th>Percent</th>
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<tr>
<td>Asia</td>
<td>80</td>
</tr>
<tr>
<td>Africa</td>
<td>10</td>
</tr>
<tr>
<td>Europe</td>
<td>10</td>
</tr>
<tr>
<td>South and Central America</td>
<td>5</td>
</tr>
<tr>
<td>Canada and the U.S.</td>
<td>2</td>
</tr>
<tr>
<td>Oceania</td>
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3. What we’ve learned so far from a project perspective
A little data lit goes a long way.
Gun deaths in Florida

Number of murders committed using firearms

2005 Florida enacted its ‘Stand Your Ground’ law

Source: Florida Department of Law Enforcement
C. Chan 16/02/2014

Almost everybody is concerned about data literacy.
1. Asking **questions** (for science) and defining **problems** (for engineering).

2. Developing and using models.

3. Planning and carrying out investigations.

4. Analyzing and interpreting data.

**SCIENTIFIC AND ENGINEERING PRACTICES**

5. Using **mathematics** and computational thinking.

6. Constructing **explanations** (science) & designing **solutions** (for engineering).

7. Engaging in argument from evidence.

8. Obtaining, evaluating, and communicating information.
Almost anyone can benefit from data literacy.
“The Data Geek series supports the new curriculum standards that focus on understanding, interpreting, and gathering data. Information in each book is designed to help readers explore all kinds of data and data sources in order to objectively understand data in the 21st century. Readers are encouraged to think critically about the ways data is used in their lives and in the media … Grades 4-7.”

https://cherrylakepublishing.com/shop/show/50829
Statistical benchmarks offer a foundation for meaningful comparison.

See also: “compared to what?” and, “Is that big number?”
Data literacy is a prerequisite to larger areas of study like data science, data crunching, or lab-based research.
Entering a data literacy conversation via faculty/student perceptions of pain points is effective.
Variation: framing data lit around existing curriculum.
All of today’s session were very interesting (and maybe a little scary). My school already puts a lot of time and resources into teaching our kiddos about being safe on the internet, but I don’t think we specifically address how data about them is being accumulated. After today, I feel like that’s an inexcusable oversight.

Great stuff. Can’t WAIT to hear from Tuvya tomorrow!
Master of Applied Data Science

Coming in Fall 2019

Takeaways:

1. The need for quality data literacy education is everywhere (e.g., K-12, university departments, not-for-profits), and a little goes a long way.

2. Look for “pain points” with faculty that you can solve with data literacy education (e.g., data viz).

3. Recognize that before a student or librarian can tackle datasets or scholarly articles, they may need guidance in data lit principles (can our deliverables help?).

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