Developing Data Literacy Lessons

Diego Mendez-Carbajo, Illinois Wesleyan University
Charissa Jefferson, California State University-Northridge
Katrina Stierholz, Federal Reserve Bank of St. Louis

Beyond the Numbers
November 8, 2018
Agenda for the session

• Data literacy—evidence for the need

• Library Instruction: Need for data literacy support

• ACRL Information Literacy Framework & Data Literacy

• Our approach:
  − Use FRED as the tool for our data literacy project
  − Provide an outline of a specific process and format for writing lessons
  − Offer librarians opportunities to participate in the work
Data Literacy

• What is it?

• Part of a broader effort
  - Numeracy
  - Quantitative literacy
  - Statistical literacy
  - Information literacy
Percentage of 16-19 year-olds with low literacy and numeracy (below level 2)

Note: Adults who obtained their highest qualification outside the host country; those with foreign qualifications and 1st generation migrants, who obtained their highest qualification prior to entering the host country, are excluded.

If the chance of getting a disease is 10 percent, how many people out of 1,000 would be expected to get the disease?

80% got this question correct
If 5 people all have the winning number in the lottery and the prize is 2 million dollars, how much will each of them get?

Roughly half got this question correct
Let’s say you have 200 dollars in a savings account. The account earns 10 percent interest per year. How much would you have in the account at the end of two years?

18% got this question correct
A quick survey of the current state

• Charissa Jefferson surveyed librarians

• 2 questions:
  – Are you teaching with data?
  – Are you interested in learning about teaching with data

• Survey sent to Professional Listservs
  – Community College, university, instruction, data, and business librarians

• Received 142 responses
Teaching with Data

Do you teach with data?

Answered: 142  Skipped: 0

<table>
<thead>
<tr>
<th>ANSWER CHOICES</th>
<th>RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>59.86%</td>
</tr>
<tr>
<td>No</td>
<td>40.34%</td>
</tr>
</tbody>
</table>

Total Respondents: 142
Learning about Teaching with Data

Are you interested in learning about teaching with data?

Answered: 139   Skipped: 3

<table>
<thead>
<tr>
<th>ANSWER CHOICES</th>
<th>RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>95.68%</td>
</tr>
<tr>
<td>No</td>
<td>4.32%</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
</tr>
</tbody>
</table>
Possible Conclusions

• Some librarians are teaching with data, but nearly all who responded were interested in learning about how to teach with data
  – Perhaps the tools and resources are needed such as
    • Readymade lesson plans
    • Toolkits with interactive content
    • Workshops for professional development on teaching with data
How can we contribute?

• Focus on economic data (stick to our knitting) and use FRED

• Draft sample lessons
  – Base lessons on the ACRL Information Literacy framework
  – Use the model taught by Mary Suiter and Bonnie Mezaros (to be discussed in a few slides)

• Solicit help from librarians to develop more instructional support
About FRED

• **FRED** is the St. Louis Fed’s online tool for economic data
  • Over 500,000 time series in economics, finance, and well-being
  • Data are at state, local, US national, and international level
  • 87 different sources—one stop shop

• Offers visualization tools

• Spend your time teaching about data, not how to use the tool
Economic Education @ The St. Louis Fed

- Well-used and highly respected resources
- K-14 focus
- Over 1 million student enrollments in online courses every year
- Staff also produce written lessons for face-to-face instruction: 1 million downloads a year
- Mary Suiter & Bonnie Mezaros—provide curriculum writing workshop
ACRL’s Framework for Information Literacy in Higher Education

• Adopted in 2016; replaced a set of competencies adopted fifteen years prior

• Designed for academic librarians & used extensively

• High level concepts to develop information literacy skills

• Widespread interest and support for it—recent publication of a 6 volume set of lessons; each frame had a volume
  
  – But out of that, only one lesson using data
Information Literacy Framework, 2015

- Assessing the credibility of data and its source
- Authority is constructed and contextual
- Data visualizations are tools for creating information
- Searching as strategic exploration
- Information creation as a process
- Scholarship is a conversation
- Information has value
- Research as inquiry
- Data may be public domain or commercial; it informs policy
- Development of new data to answer new questions (new data are added as new issues arise)
- The use and reuse of data to understand a research questions and related content
First lesson: Minimum Wage & Inflation

Graph of the Federal Hourly Wage in nominal and real values. This graph is created by students during the “Keeping It Real” lesson.

Lesson at: https://www.stlouisfed.org/education/keeping-it-real
• Backward Design: Set goals first and then design educational curriculum choose activities or content to teach. Backward design begins with goals, then assessments, and finally lesson plans.
Model lesson plan core elements

• **Standards and Benchmarks:** *ACRL Framework for Information Literacy for Higher Education*

• **Objectives:** What will the students learn?

• **Essential Question:** Overarching question that students should be able to answer at the end of the lesson.

• **Procedure:** The lesson

• **Assessment:** Did they learn what we taught and apply it in a new situation?
Workshop timeline

Before workshop: Focused on specific standards, frames and benchmarks

Day 1: Developed Essential Question(s), Assessments, and Concepts
Day 2: Wrote draft of lesson
Day 3: Revised lesson after initial feedback from Trainers

After workshop: Received peer-review and feedback from practitioners
Our second lesson: Patents & Intellectual Property

- IL Frame: Information has Value
- Uses Google Patents and GeoFRED
- First one developed using model lesson plan
- Mapping the data
United States Constitution: 
Article 1, Section 8, Clause 8

“The Congress shall have Power ... To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries;”
Hands-on activities

• **Handout 1** (*omitted today*)
  - URLs for patents accessible online
  - Asks recognition and analysis questions

• **Handout 2** (*get one or work with a partner*)
  - Data-map building instructions
  - Asks recognition and analysis questions
How can you learn more?

• Explore data lessons
  – Katrina’s favorites
    www.stlouisfed.org/education/favorites/katrina
  – The effects of inflation (mapped to IL Frames)
    www.stlouisfed.org/education/keeping-it-real
  – Patents and innovation (mapped to IL Frames)
    www.stlouisfed.org/education/distribution-of-innovation

• Come to a 3-day workshop in late 2019 and 2020!
Recap

• Data literacy is important for navigating life choices (and many don’t have it)

• ACRL Information Literacy Framework is useful when developing data literacy material

• We are starting to develop data literacy activities and lessons and would like your feedback & help
  – Come to a workshop, learn the method, and add to this important body of work!