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CHAPTER 23*

Thinking through Visualizations

Critical Data Literacy Using Remittances

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Introduction

Technologies and their data-gathering affordances now mean that data has become an inescapable part of the information landscape. Yet access to data training and resources is not distributed equally: some college students are taught to access and manipulate a wide range of proprietary datasets, while others (especially at for-profits or community colleges) have limited access to public data only. Librarians may be asked to teach students how to locate and understand data, albeit with a similarly limited set of freely available resources and little to no formal training in data instruction and literacy.

To make this inequality worse, educators and students alike frequently approach data as an absolute, a single ahistorical artifact that speaks from a decontextualized place of authority and is alone in providing "real answers" to social questions. This is especially true for numeric data and the disciplines that rely on it. A challenge for any librarian in this area is intimidation, as well as data mystification. "Data" is seen as having special power in Western academic settings, and as something that can be interpreted only by experts

in a given field. Although librarians work to enable access to information of all types, there is a growing divide between "data librarians" and "non-data librarians" in academic libraries today. This lesson plan seeks to challenge not only the privileged status of data in academic and library discourse, but also the idea that data in itself "has the answers," aside from our understanding of its context and origin, and in addition to the ways in which we choose to interpret and deploy it.[1]

We aim to situate and critically interrogate the increasingly privileged role of data within library and information literacy outreach on college and university campuses. Following a brief discussion of data in a college context, we provide a lesson plan that adapts critical information literacy and critical data librarianship to draw entirely on open data. Flowing from the practitioner's reflection on their own position vis-à-vis quantitative methodologies, the institution's access to data, and student skills and expectations, we ask librarian and students together to consider a series of interrelated questions and activities.

For this exercise, we use World Bank data on remittances to the Philippines.[2] The choice of the World Bank is deliberate for several reasons. First and foremost, the underlying source data are readily and freely available online and include most nations. Secondly, it forms the basis of secondary analyses and visualizations in academic disciplines and mainstream journalism. Although the data source is the World Bank, students will work with these secondary visualizations in order to develop awareness of how data can be used to make specific arguments, both verbal and visual. Comparing and contrasting different visualizations and interpretations based on the same data undermines the notion that any specific visualization and interpretation is complete or true.

Although it may not happen during the class period itself, students may eventually bring this critical awareness to bear on data itself, seeing it as fundamentally incomplete but also potentially useful. This crucial point can be heightened by the addition of qualitative resources on remittances to the Philippines that do not take as their starting point World Bank data but rather rely on qualitative sources, such as ethnography, oral history, and historical evidence. As the activity progresses, students and teacher form an emergent understanding of data as authority, their own agency in decision making and arguing from data, and the heuristics which undergird categories such as "developing," "indicators," and "economies."

This lesson plan is focused on the topic of remittances to the Philippines, but it could be adapted to any topic for which World Bank data is available and that is written about by both journalists and scholars. Given the ubiquity and openness of World Bank data, it is easier than it may seem to locate a different topic for this lesson plan. A bibliography of both scholarly and popular resources that use World Bank data on remittances to the Philippines follows the lesson plan; the teaching librarian should review and choose which sourc-

es most fit their interests and goals. An excellent starting place and overview, however, is the *Guardian*'s "Where Does the Money Go? Remittances around the World Visualised."[3]

The class as described here has been taught as a one-shot instruction session but can be incorporated into a freestanding or program-integrated information literacy course. We envision a primarily lower-level (100/200) course intended to fulfill requirements in the social sciences, with both majors and non-majors in attendance. While we believe that students in all disciplines benefit from data literacy, this lesson will have the greatest impact in the context of a class where statistical and numerical data are regularly encountered. Examples of applicable disciplines might include economics, sociology, public policy, political science, public and global health, and area studies.

The class is founded on core principles of critical and reflexive pedagogy, which are in turn embedded in the activities and build on one another. Specifically, the lesson begins from a place of uncertainty rather than dictating absolutes. Students work together to uncover the ways in which secondary sources draw on and selectively represent data gathered elsewhere and share their approaches collaboratively. Finally, data itself is contextually situated by looking at a number of alternatives to its authority.

Learning Outcomes

As a result of this lesson, students will be able to

- Recognize and explain how data is used by, and in, an information source
- Work backwards from a secondary source that relies on data in order to identify or locate the underlying data
- Articulate the advantages and disadvantages of using data and non-data sources of information on the topic
- Describe the role that data plays in secondary sources
- Become comfortable with questioning data and empowered to use it

Materials

Required

- Projector
- Online or printed worksheet (see sample questions in the appendix 23A)
- Multiple resources that use similar source data (one per group, see bibliography)

Preferred

- Online access for teacher and students
- LibGuide with links to visualizations
- Personal student computers or tablets for viewing and completing work
- Shared form for students to input work
- Online platform to share worksheet with students

Preparation

The teacher should take time to get familiar with their data source as well as with several analyses based on it. They should understand the main data points used, underlying methods, and the links between source data and the resulting publications. An understanding of statistical sampling and visualization methods will also be beneficial.[4]

Session Instructions

1. *Begin with a series of questions ("What is data?").* Sparking a class discussion around data, in relation to larger goals, can help students to engage in the material. The librarian can borrow from the existing literature on information literacy and ask the same types of questions about data: What is data? Who makes data? Who counts things and why? How do we know that data is reliable? Why do we use data? What happens when two sources have different data? What are ethical or unethical uses of data?[5]
2. *Show short video on visualizations (optional).* There are a number of short videos about data and visualization that could provide context and engage students before they go into their topical assignments. These could also be sent to students to watch prior to the class.[6]
3. *Describe class outcomes; pair or group students as needed.* Reviewing the learning outcomes above provides students with a structure and understanding of the expected assignments. Before beginning assignments, now would be an appropriate time to break students into smaller groups for further work.
4. *Distribute handouts or worksheets for group work.* For our data topic on migrant remittances, we developed a list of ten questions that could be asked of students to explore in group work. See appendix 23A for these questions.
5. *Student group work.* Students are encouraged to explore World Bank or Census data on the chosen topic, as well as secondary literature, and to

compare this with other native, qualitative, or narrative data sources that might complexify the quantitative picture.[7]

6. *Students report back to class; discussion.* After examining a dataset and associated readings and answering the questions in the handout, students will come together and report back to the class on what their group has learned.

7. *Assessment via in-class writing activity.* There will be further opportunity for students and librarians to reflect on data and its use through an in-class writing activity, as described below. This can also function as an informal assessment to ensure that students are tracking with the intended learning outcomes.

8. *Final questions and wrap-up.* This would be a good time to return to some of the questions that students struggled with in the introduction to the session. Students may now be able to better articulate their understanding of the competing claims made by different data sources. They may also work together to describe how data should be examined critically. This can be followed by class or teacher reflections on the topic, as outlined below.

Assessment

Student reports to the class can serve as one channel for informal and formative assessment. Another method of assessing student learning is to ask students to engage in brief, in-class writing. Students could spend time answering the following questions:

- If you were writing a paper about remittances from the Philippines, how would you use the World Bank data?
- Would you refer to the data visualizations we've looked at? Why or why not?
- What else do you wish was included in the World Bank data and visualization?

The library instructor can use these reflections to assess how well the students understand the links between data sources and visualizations. They may also share the student write-ups with the faculty instructor for further follow-up.

Reflections

In our experience, students frequently choose a research topic first and then want to quickly find data related to that topic. Because this lesson plan does not focus on finding data, except through secondary sources, a variation

would be to focus on ways of locating data and to move from there into a critical analysis.

One challenge is that students may not know where to begin when analyzing World Bank data and how it is used in other publications. Because of this, it may be helpful to list questions that students can use to start off their analyses. Sample questions (see appendix 23A) may be used in a class worksheet.

Another challenge particular to small-group work is that groups may not always address the issues that the library instructor had hoped they would cover. We suggest you deal with this by writing a list of key concepts and ideas and using them to supplement or structure the small-group reports. Students may have their own interesting and valid interpretations that you had not considered, which can be added to your list as the group reports back to the whole class.

Final Questions

How can we begin to critically reflect on our own social positions and authority in relation to data? How can we contest its authority within a classroom? In what other ways can we both challenge and use the dominance of "data" in our research and in librarianship?

Appendix 23A: Sample Questions for a Class Worksheet on [Data Topic]

1. Where did this data come from?
2. How was it collected?
3. What other agencies collect data on this topic?
4. What demographic categories are included in this data (e.g., age, gender, occupation)?
5. What useful categories are missing?
6. What is the time period under consideration?
7. What does the visualization suggest about the data?
8. What are the main trends it shows?
9. How does it explain or not explain those trends?
10. Can you think of ways this data might be used in real life?

Notes

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2. "Data: Philippines," World Development Indicators, World Bank, accessed December 19, 2015, http://data.worldbank.org/country/philippines; World Bank, "Personal Remittances, Received (% of GDP)," World Development Indicators, World Bank, accessed December 19, 2015, http://data.worldbank.org/indicator/BX.TRF.PWKR.DT.GD.ZS.
3. Simon Rogers, "Where Does the Money Go? Remittances around the World Visualised," *Datablog*, *Guardian*, February 5, 2013, http://www.theguardian.com/news/datablog/2013/feb/05/remittances-around-world-visualised.
4. Resources for Instructors," ICPSR, accessed December 19, 2015, http://www.icpsr.umich.edu/icpsrweb/instructors/index.jsp.
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7. Richard H. Adams Jr., Hein de Haas, Richard Jones, and Una Osili, eds. *Migrant Remittances and Development: Research* Perspectives, 2nd ed., Web anthology (Brook-

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