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Data in Context: How Data Fit into the Scholarly Conversation

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Data in Context
How Data Fit into the Scholarly Conversation

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NUTRITION INFORMATION
This activity uses peer-reviewed research articles to introduce students to the concept of scholarly conversation, with a focus on how data are collected, analyzed, and presented in research.

TARGET AUDIENCE AND NUMBER SERVED
- Undergraduate or graduate students, any level
- 3–30 students

LEARNING OUTCOMES
The learning outcomes for this activity tie into the following frames from ACRL's *Framework for Information Literacy for Higher Education*:
- Scholarship as Conversation
  - Recognize that local faculty and researchers are both authors of a research study and part of a scholarly community.
  - Interpret and evaluate whether and how effectively the format of the data visualizations in a research study supports the stated research objectives.
- Research as Inquiry
  - Interpret and critically evaluate the use of data sources in the context of original research, considering research design factors such as qualitative vs. quantitative, experimental vs. compiled, etc.
  - Communicate data-based insights of the research study, considering such factors as reproducibility, etc.
- Information [and Data] Creation as a Process
  - Differentiate between different types of data sources as represented by data visualizations in the scholarly literature of a discipline (e.g., experimental data sets, compiled data sets, etc.).
  - Interpret and evaluate data visualizations in a research study in the context of best data presentation practices.

COOKING TIME
- Librarian preparation time: 1–4 hours to identify research articles appropriate to the discipline and authored by researchers or faculty who are part of the campus or local research community.
- Student work time:
  - Reading/pre-assignment: 60 minutes
  - Synchronous discussion: 45–90 minutes (virtual or in person)

DIETARY GUIDELINES
Faculty working in data-intensive disciplines expect students to have a range of data-related skills when they begin graduate programs.[1] In addition, faculty across disciplines are incorporating data literacy competencies into undergraduate courses to help students prepare for a data-driven workforce.[2] Data literacy competencies such as interpreting or evaluating data often require an understanding of the broader context of the data sources, including how and why the data were collected. Thus these data literacy competencies are suited to be embedded within library instruction that focuses on the frames Scholarship as Conversation, Research as Inquiry, and Information Creation as a Process. Prado and Marzal situate data literacy competencies along a continuum that includes information literacy.[3] This framework serves as a practical and flexible road map for librarians to successfully incorporate data literacy into their information literacy instruction.

INGREDIENTS
- 3–6 full-text, original research articles on topics that fall within the scope of the course.
- Pre-assignment questions (see Data Literacy Teaching Toolkit website for example).
- 10-minute presentation introducing how data, and the research articles reporting these data, fit into the research process (see figures 1a and 1b for an example of the research process).
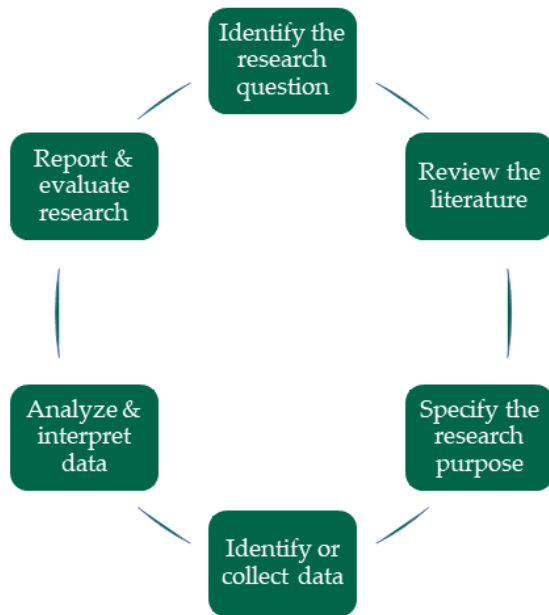
FIGURE 1A
Diagram showing the recursive nature of a research project, which often begins with a research question and ends with a new research question. This "tidy" example of a research cycle is applicable across a range of disciplines.

- 3–30 students divided into groups of 2–3 students based on the article they read.

PREPARATION
- Consult with instructor regarding the scope of the assignment and discussion, and select 3–6 research articles based on these criteria:
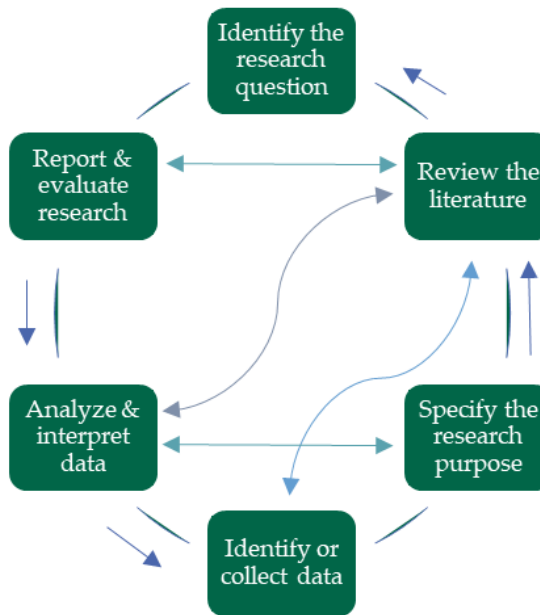 – subject matter pertinent to the course

FIGURE 1B
Diagram showing the "messy reality" of the research cycle, which often requires revisiting the literature at multiple points during the process. It can be helpful for students to visualize the messiness of the research process, which isn't as tidy or linear as depicted in figure 1a.

  – authored by researchers/faculty who are part of the local research community
  – published in peer-reviewed journals (1 or more open-access examples)
  – demonstrate varied examples of research design, data collection, compilation, sources, visualizations
- Customize the pre-assignment worksheet as needed to accommodate the level and learning objectives of the

session. The Data Literacy Teaching Toolkit hosted by the University of South Florida Libraries[4] contains an example pre-assignment worksheet (https://lib.stpetersburg.usf.edu/ld.php?content_id=59861334) that includes a checklist of best data presentation practices for tables and graphs adapted from Duquia and colleagues[5] and a series of questions about the research study and how the data support the research objectives.
- Provide the full-text articles and pre-assignment worksheet to the instructor, who then directs each student to choose an article to read and complete the related assignment. The students bring their responses to a synchronous virtual or in-person session for discussion.

INSTRUCTIONS
- Begin the session with a brief presentation about how peer-reviewed articles and the corresponding data reported within the articles fit into the research process. Review the worksheet that students used to complete the pre-assignment. This worksheet provides the structure for the discussion of each assigned article.
- Gather the students into groups organized by article, and ask them to spend 5 minutes discussing the article and comparing their individual responses to the worksheet questions. Then have them choose a spokesperson from their group to lead discussion of their article.
- Ask the students to reconvene as a

single group. A spokesperson from each group leads the class discussion about their article, providing an overview of the research objective and aspects of the data sources, methods, visualizations, and how well the data support the research findings. The students describe at least one figure with regard to best data presentation practices. Students consider the effectiveness of the data presentation and how they might present the data.

- As the discussion proceeds, highlight various points of interest that reinforce information and data literacy concepts such as provenance of data; the relationships between articles, if any; the broader context of the research; and relationship to the local research community. Careful selection of varied examples creates opportunities to compare and contrast disciplinary approaches, research design and methods, data sources, and aspects of data visualization.
- Depending on course goals and time constraints, conclude with time for students to work independently on classroom computers, using the article to (1) find related articles, (2) shape a research topic, or (3) identify opportunities for internships, independent study, or research mentors.
- At the conclusion of the workshop, share information about how to make appointments for individual research consultations with librarians.

REVIEWS/ASSESSMENT STRATEGY

- *Formative:* As the discussion proceeds, the librarian can assess student comfort levels with academic literature in the relevant topic and fill gaps, offer to provide supplemental material to the instructor, etc.
- *Summative:* Student responses on the worksheets can be reviewed; customized feedback or grades based on a rubric can be provided.

CHEF'S NOTES

- When cooking for the first time in a college workshop or a freshman honors seminar, the discussion may focus on getting to know faculty as part of a research community. The presentation introduces the concept of original research based on data collection and differentiates between faculty as teachers and faculty as authors with research agendas. The discussion also encourages students to seek out faculty whose research aligns with the student's interests for the purpose of research mentorship or employment as research assistants.
- To spice up a senior or graduate seminar, the overview presentation may address the audience as authors of research studies, focusing more deeply on research design methods, the data sources and visualizations, and research reproducibility. You could also highlight the ways in which bibliographies reflect the overarching history of the various subdisciplines. For example, you could

contrast microbiological or genetic studies that primarily use very recent literature due to the advent of technological advances with behavioral studies on observation of fauna like sharks, which may cite studies authored by Charles Darwin.

ADDITIONAL RESOURCES

Burress, Theresa, and Emily Mann. "Data Literacy Teaching Toolkit." Nelson Poynter Memorial Library, University of South Florida St. Petersburg, 2019. https://lib.stpetersburg.usf.edu/dataliteracy.

Burress, Theresa, Emily Mann, Susan Montgomery, and Rachel Walton. "Data Literacy in Undergraduate Education: Faculty Perspectives and Pedagogical Approaches." In *Data Literacy in Academic Libraries: Teaching Critical Thinking with Numbers*, edited by Julia Bauder, 1-22. Chicago: American Library Association, 2021.

Carlson, Jake R, Michael Fosmire, Chris Miller, and Megan R. Sapp Nelson. "Determining Data Information Literacy Needs: A Study of Students and Research Faculty," preprint. Libraries Faculty and Staff Scholarship and Research, Purdue University e-Pubs, paper 23. 2011. https://docs.lib.purdue.edu/lib_fs-docs/23.

Carlson, Jake, and Lisa R. Johnston, eds. *Data Information Literacy: Librarians, Data, and the Education of a New Generation of Researchers*. West Lafayette, IN: Purdue University Press, 2015. http://www.datainfolit.org/dilguide/.

Duquia, Rodrigo Pereira, João Luiz Bastos,

Renan Rangel Bonamigo, David Alejandro González-Chica, and Jeovany Martínez-Mesa. "Presenting Data in Tables and Charts." *Anais Brasileiros de Dermatologia* 89, no. 2 (April 2014): 280–85. https://doi.org/10.1590/abd1806-4841.20143388.

Prado, Javier Calzada, and Miguel Ángel Marzal. "Incorporating Data Literacy into Information Literacy Programs: Core Competencies and Contents." *Libri* 63, no. 2 (2013): 123–34. https://doi.org/10.1515/libri-2013-0010.

NOTES

1. Jake Carlson and Lisa R. Johnston, eds., *Data Information Literacy* (West Lafayette, IN: Purdue University Press, 2015), http://www.datainfolit.org/dilguide/.
2. Theresa Burress, Emily Mann, Susan Montgomery, and Rachel Walton, "Data Literacy in Undergraduate Education: Faculty Perspectives and Pedagogical Approaches," in *Data Literacy in Academic Libraries: Teaching Critical Thinking with Numbers*, ed. Julia Bauder (Chicago: American Library Association, 2021), 1-22.
3. Javier Calzada Prado and Miguel Ángel Marzal, "Incorporating Data Literacy into Information Literacy Programs: Core Competencies and Contents," *Libri* 63, no. 2 (2013): 123–34, https://doi.org/10.1515/libri-2013-0010.
4. Theresa Burress and Emily Mann, "Data Literacy Teaching Toolkit," Nelson Poynter Memorial Library, University of South Florida St. Petersburg, 2019, https://lib.stpetersburg.usf.edu/dataliteracy.
5. Rodrigo Pereira Duquia, João Luiz Bastos, Renan Rangel Bonamigo, David Alejandro González-Chica, and Jeovany Martínez-Mesa, "Presenting Data in Tables and Charts," *Anais Brasileiros de Dermatologia* 89, no. 2 (April 2014): 280–85, https://doi.org/10.1590/abd1806-4841.20143388