Data Management and Broader Impacts: A Holistic Approach

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Abstract
The National Science Foundation's (NSF) Broader Impacts Criterion asks scientists to frame their research beyond “science for science's sake.” Examining data and data management through a Broader Impacts lens highlights the benefits of good data management, data management plans (DMPs), and strengthens the argument for better Data Information Literacy (DIL) in the sciences.

Keywords
Scholarly communication, research data, broader impacts, data information literacy

Disciplines
Library and Information Science | Scholarly Communication

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The Holistic Approach

Infrastructure for Science
Research methodologies, tools & data science

Standardization & Tools
• Develop a data standard for fields, or types, of research.
• Develop a database or schema to unify data from different research projects
• Develop new data analysis or visualization tools.

Broadened Participation
Recruit and include under-represented groups

Women are Invisible in Data Science
• Recruit and mentor more women in data-intensive research.
• Prioritize placing women in industry, intern, and assistantships.
• Work with under-represented minority groups on campuses to increase DIL skills.

K-12 Outreach & Training
Get kids and teachers excited about science

Data Information Literacy Can Start at a Young Age
• Create lesson plans for K-12 students based on rich data subsets from your research.
• Offer workshops for educators on DL and data use in the classroom.
• Collaborate with local schools to gather data.

Training & Education
Monitor and train students in higher education

Demand for Data Scientists & DILiterate Researchers is Growing
• Act as a role model consciously integrating DL best practices into your research.
• Educate students on the why, not just the how, to build DIL skills.
• Create and share teaching modules using rich data from your research.
• Collaborate with Information Science programs by providing rich, unedited, datasets.

Public Outreach & Broader Dissemination
Share, discuss, and explain research with non-academic audiences

Make Data Accessible
• Publish data with a URL and in a repository to ensure longevity and accessibility.
• Provide data documentation and reuse policies to increase re-usability.
• Create online tools for data exploration, visualization, and analysis.
• Publish data in open formats to increase accessibility.

Societal Benefits
Can inform policy, be used by industry, or solve real-world problems

Advance Science & Industry
• Work with local governments to make data more accessible to those it impacts.
• Add data to existing government databases/shares with government agencies.
• Share data with policy advisory or advocacy groups.
• Contribute to new research and industries by sharing data (e.g. big data).

Partner & Reciprocate
Connect with those who could benefit from research

Put Data to Work
• Ensure that study participants and at-risk groups have access to the highest impact.
• Work with users to create the research tools they need to have the highest impact.
• Increase data access to underrepresented and at-risk groups.
• Work with academic or industry partners to create new tools and applications for your data.

The Value of Infrastructure
Sharing data infrastructure tools (such as local standards) has the potential to greatly increase data interoperability and reuse.

Potential Benefits of a Holistic Approach

Better Understanding of Data Management Plans
Placing data into a larger context should help researchers understand why DMPs are necessary, the purpose of a DMP, and what content should be include to meet requirements.

Data for the Public Good
Scientists who are reluctant to develop and deploy better data management and sharing practices may be persuaded to spend the extra time and effort once they realize that they can incorporate data into their BI statements.

Better Integration of Data Information Literacy
A BI approach to data should encourage science-society to further embrace better data management practices and data information literacy skills.

Works Cited


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For more information on Broader Impacts please visit the following websites:


