Open data science and responsible research

Wednesday 15 October 2025 14:11 (11 minutes)

From open data to open methods

Observation, interpretation, and communication are key elements of research. Whereas open science has traditionally emphasized open data and publications, the openness of research methods has received less attention. Methodology –the derivation of results and conclusions from the data –is as critical to the understanding and trust on scientific outcomes. The higher education and research community has, for a long time, recognised the transparent communication of methods as an essential part of research and dissemination. While digitalization has revolutionized open access to research, the rapidly expanding volume and complexity of digital resources has emphasized the need to reassess the overall requirements on good research practice. Whereas researchers have traditionally reported their methods as part of academic publications, the diversification of research, changes in technology and society, and the need to increase the impact of research through, for example, the adoption and reuse of methods, have set new challenges and opportunities towards responsible research practice. Methods are increasingly recognized as independent research outputs and disseminated through various channels, such as methods sections and supplementary materials, distinct data or methods publications, public protocols, code and material availability statements, open repositories, or in micropublications. Ensuring the early and long-term availability and preservation of methods may require new solutions to complement the more traditional forms of research dissemination. While the boundaries between research data and methods can be fuzzy, assessing the openness of research methods on its own right forms a necessary element of responsible data science.

Data science and responsible research

While openness has been recognized as a key element of research quality and impact, it has to be balanced by other aspects of responsible research. Researchers constantly face the tension between demands to support openness of research on the one hand, and respecting the necessary ethical and legal boundaries on sensitive information on the other hand. Even when data itself is sensitive and cannot be shared, making the methodology - or the interpretation of data - more transparent is often possible. The openness of research methods therefore becomes an essential element of maintaining scientific integrity. Open sharing of methods support the transparency and standardization of research also more broadly, facilitating scalable collaboration beyond national and institutional borders. Research organisations, funders, publishers, and infrastructure providers have an important role in supporting the early and broad dissemination of the research process, tools, and intermediate research outputs. Remarkable differences exist between fields, however, and the adoption of new practices and change in research culture is a gradual process that can greatly benefit from the translation of best practices between traditionally distinct research fields.

National policy work on open science

Whereas the lack of commonly accepted standards has slowed down progress, a more open research culture can be actively promoted by developing national and international guidelines. National policy work on open research data and methods in Finland has called for an active dialogue among the international research community towards defining the global standards and norms of openness of research methods. This talk provides an overview on the recent national policy work on open access to research data, methods and infrastructures as developed by the Finnish research community. The policies cover key themes of research quality and impact, support and infrastructures, and regulatory considerations. These overarching themes include specific recommendations on implementation for researchers, research organizations, research funders, publishers and other stakeholders. The talk will conclude by highlighting some of the practical challenges in advancing the transformation towards more open and reproducible research, and discuss the broader societal implications on the norms of evidence-based decision making.

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Session Classification: Presentations Session 8: Policy and Practice of Data in Research; Data, Society, Ethics and Politics

Track Classification: SciDataCon Persistent Themes: Policy and Practice of Data in Research