Research Libraries: Key Partners in Implementing UNESCO's Open Science Recommendation

Canadian Association of Research Libraries
November 23, 2021

On November 23, 2021, the UNESCO Recommendation on Open Science was formally adopted at the full UNESCO General Conference after it was unanimously adopted by the UNESCO Science Commission on 16 November 2021. The Recommendation provides a critically valuable framework for the adoption of open science policies and practices in countries around the world.

The Canadian Association of Research Libraries (CARL), whose membership includes the 29 largest Canadian university libraries as well as Library and Archives Canada and the National Research Council's National Science Library, agrees with UNESCO that greater access to scholarly processes and outputs improves the effectiveness and productivity of scientific systems by reducing duplication costs, allowing more research from the same data, and increasing the social impact of science and opportunities for wider circulation of scientific findings.

The COVID-19 pandemic has placed open science high on the agenda of many governments by providing a concrete and highly pertinent illustration of the positive impact that open science can have in addressing some of our most pressing problems. We have witnessed the unprecedented open sharing of COVID-19 papers, protocols, and data, which has been essential in contributing to the rapid development of vaccines and treatments. These practices and policies should now be extended to all publicly funded research, so that every domain and the broader society can derive the benefits of open science.

Open science (also referred to as open scholarship) is a broad term encompassing all research domains and refers to "various movements aiming to remove the barriers for sharing any kind of output, resources, methods or tools, at any stage of the research process."[1] The UNESCO Recommendation on Open Science is a milestone in the advancement of open science because they are centered around the principles of bibliodiversity and equity. CARL views the principles underpinning the Recommendation as the foundation to an equitable and sustainable society, as they reflect the long-standing values of research libraries, whose missions have always been committed to the idea that "openness will best facilitate knowledge creation in our diverse scholarly community."[2] CARL applauds the emphasis on inclusion and respecting diversity of cultures and knowledge systems around the world, while also promoting inclusion and exchange of scholarly knowledge from traditionally underrepresented or excluded groups (such

[1] https://www.fosteropenscience.eu/node/1420

[2] From the University of Toronto's mission statement: https://onesearch.library.utoronto.ca/mission-statement-and-values

as women, minorities, Indigenous scholars, scholars from less-advantaged countries and low-resource languages). We agree that a fair and equitable operationalization of open science is necessary if we are to leave no one behind in this transition. Improving the transparency, scrutiny, critique and reproducibility of research is also a critically important aspect of the Recommendation, especially in a time where disinformation has become rampant.

The role of research libraries in open science

Research libraries have been at the forefront of open science since its inception. They play a pivotal role in the creation, management, discovery, and reuse of scholarship and have been expanding their financial contributions towards open science over time. They are well positioned to directly contribute to advancing many of the areas of action outlined in the Recommendation, in particular:

- Promoting a common understanding of open science, associated benefits and challenges, as well as diverse paths to open science;
- Investing in open science infrastructures and services;
- Investing in human resources, training, education, digital literacy, and capacity building for open science;
- Fostering a culture of open science and aligning incentives for open science;
- Promoting innovative approaches for open science at different stages of the scientific process;
- Promoting international and multi-stakeholder cooperation in the context of open science and with a view to reducing digital, technological, and knowledge gaps.

A prominent role for research libraries in the area of open science will be critical for the success of its widespread and inclusive implementation. Libraries offer an increasingly broad and deep portfolio of services for open science, which include expertise, infrastructure management, and investments. These services support the needs of local researchers on campus, while also linking to national, regional and international initiatives, ensuring there is global interoperability, alignment, and adoption of good practices. They provide an essential link between open science infrastructures and local research communities.

As noted in the Recommendation, widespread collaboration is a key element for the successful implementation of open science. Many library initiatives in this area involve working closely with other stakeholders in Canada (such as with funders, government departments, research and education networks, regional and national library associations, and high performance computing organizations) and with a range of international organizations (through initiatives such as COAR, IARLA, OpenAIRE, SCOSS, and open source software communities, e.g. DSpace, Open Journal Systems). These collaborations are multi-faceted and involve integration of

services, co-development of software, collective funding, interoperability, shared governance, and so on. CARL strongly concurs with UNESCO that, for open science to thrive, collective efforts across the ecosystem involving a range of partners is necessary.

Below we provide a few of the many examples of the types of contributions Canadian research libraries are making to advance and support open science.

1. Expertise and capacity building

Open science requires a significant change in the way research is undertaken and disseminated. This change creates an additional burden for researchers who may need to acquire new skills and expertise. Libraries have been active in developing new services that help provide hands-on support, training, and advice for researchers.

Examples

Research data management support: Over the last several years, Canadian research libraries have been increasing their support for research data management (RDM), with most now offering a range of services. For example, Queen's University Library Research Data Management (RDM) services provide assistance with data curation, metadata adoptions, advice about meeting funder or institutional requirements. A Network of Experts at Canadian libraries was also formed by CARL under the auspices of a national initiative, which develops resources, and provides expert advice and practical help.

Licensing and copyright consultation: Research libraries in Canada also regularly offer advice and assistance to researchers who are navigating copyright and licensing issues as they seek to share their outputs more widely. The Copyright Office at the University of Saskatchewan Library, for example, provides on demand consultation and will develop sessions that are customized to suit the specific needs of the unit in order to help faculty understand and comply with the university's copyright policy and federal copyright legislation.

Advice and support for open science: Additionally, research libraries in Canada offer help with a wide range of other issues related to open science. The Scholarly Communication@UBC service, for example, offers an expert team to support UBC faculty and students through workshops, guides and one-to-one consultations on issues such as research metrics, open education and research, author rights, academic profiles, and publishing services.

2. Managing open science infrastructures and services

Many Canadian libraries host open infrastructures such as repositories, journals, and other open science tools that collect, disseminate and preserve a diverse range of research outputs and educational materials. As these types of infrastructures become standard, we are also seeing a trend towards shared platforms as a way of sharing costs and expertise across institutions.

Examples

Institutional repositories: An institutional repository, which collects and provides access to the research outputs of an institution (articles, theses and dissertations and other products), has become a standard service offering for research libraries. The Corpus[UL] institutional repository at the Université Laval, for example, preserves and enables easy and open access to scientific literature. By using the repository, researchers can make their publications openly available to the broader community and the world and comply with the Canadian research funders' open access policy.

Shared data repository: Canadian university libraries have also been collecting research data in their local repositories, and more recently are supporting and using a shared data repository platform, increasing Canada's national capacity for RDM. Scholars Portal Dataverse is a publicly accessible data repository platform shared by Canadian university libraries, which is open to affiliated researchers to deposit and share research data easily with anyone in the world. Dataverse is free for researchers to use, is built with open-source software, and the costs are shared between a nationally funded organization (Digital Research Alliance of Canada) and the participating libraries. This shared data platform allows Canadian institutions to create their own institutional instance and is now used by 60 Canadian university libraries.

Journal publishing services: Many research libraries also provide hosting services for journals, often using the Open Journal Systems software, which was developed in Canada by the Public Knowledge Project based in Simon Fraser University. The Centre for Digital Scholarship (CDS) at University of New Brunswick Libraries, for example, has been providing digital publication services for regional, national, and international academic partners for over 20 years. The CDS services include the creation of new digital publications, hosting digital versions of established print publications, large-scale back-run digitization projects, and a state-of-the-art online peer review and management system.

Other tools: Canadian research libraries and their regional associations also manage a variety of other tools across the data lifecycle in order to support the discovery, management, and preservation of content. The DMP Assistant, for example, is a national, online, bilingual data management planning tool hosted by the University of Alberta Library to assist researchers in preparing data management plans (DMPs). The tool is freely available to all researchers, and develops a DMP through a series of key data management questions, supported by best-practice guidance and examples. DMPs are one of the foundations of good research data management (RDM), an international best practice, and increasingly required by institutions and funders. Another example is the Canada Research Aggegator, which is hosted by McMaster University Library and harvests metadata from Canadian institutional repositories. Canada Research brings together metadata from Canadian repositories who are not able to adopt the OpenAIRE metadata guidelines so they can be made available through the OpenAIRE international discovery service and the Canadian OpenAIRE Portal.

3. Collective investments in infrastructures and services

Research libraries in Canada have been increasing their collective investments in open infrastructures and services, often in collaboration with other national and regional stakeholders. Many open science services and platforms are financially vulnerable due to a number of factors, including being dependent on time-limited project funding, and the need to compete for funds with large commercial publishers. These investments are increasingly being done collectively, with a variety of partners (also often going beyond the libraries) and through a variety of mechanisms. Investing collectively allows pooling resources to ensure greater sustainability for priority services and avoiding redundancies across institutions. Through these shared investment opportunities, libraries are also creating frameworks for assessing services and infrastructures based on the principles of openness, equity, bibliodiversity, and good governance.

Examples

Consortial funding for Canadian journals: Canadian Research Knowledge Network (CRKN) is a national library consortium that represents 81 libraries across Canada. CRKN members have entered into a partnership with Érudit to support the Coalition Publica initiative, which is developing a non-commercial, open source national infrastructure for digital scholarly publishing, dissemination, and research in Canada—combining Open Journal Systems and the erudit.org platform—as well as undertaking research to investigate the Canadian scholarly publishing ecosystem. The funding for this platform was initially provided by a few university libraries and has been expanded through this consortial approach, spreading the costs and increasing the sustainability of the service.

National adoption of persistent identifiers (PIDs): ORCID-CA and DataCite Canada are national consortia that were established to support the Canadian adoption of author IDs (ORCID) and Digital Object Identifiers - DOIs for digital objects (DataCite), as well as create and host communities of practice to support the Canadian research community in using and implementing PIDs into local institutional systems. These consortia are sustained through institutional memberships that include Canadian universities, government agencies, research centres/networks, not-for-profit publishers, and with financial support from the national organization, Digital Research Alliance of Canada.

Collective investments in international open infrastructures: The Canadian Association of Research Libraries (CARL) and the Canadian Research Knowledge Network (CRKN) are collaborating to facilitate Canadian support of international open infrastructure through the Global Sustainability Coalition for Open Science Services (SCOSS). Under this initiative, Canadian institutions contribute funding toward selected key international services in the open scholarship ecosystem. SCOSS brings together a community of experts to evaluate critical open science services that lack sustainable financing, and then encourages institutions worldwide to financially support the services that it recommends.

Conclusion

CARL's commitment to an open, sustainable, and innovative scholarly communication system that is governed and managed by the scholarly community is strongly aligned with the UNESCO Recommendation on Open Science. This evolving landscape is a complex mix of local, regional, national, and international content, infrastructures, and services - maintained and used by a variety of partners. Sustaining this ecosystem and maintaining the right balance will require contributions from all stakeholders. Research libraries, who espouse the values of openness and equity, and have the expertise and capacity to advance open science, play a critical role.