open access TO
open science

j. k. vijayakumar Ph.D
Open access
Open Science
role of libraries
discussion
Open Access

“Open access (OA) can be defined as the practice of providing on-line access to scientific information that is free of charge to the user and that is reusable. In the context of R&D, open access to 'scientific information' refers to two main categories:

• Peer-reviewed scientific publications (primarily research articles published in academic journals)

• Scientific research data: data underlying publications and/or other data (such as curated but unpublished datasets or raw data)”

[European Commission Website]

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Open Access

- Most publishers own the rights to the articles—not the authors.
- Anyone who wants to read the articles pays a fee to access them.
- No part of the article can be reused by researchers, students, or taxpayers without permission from the publisher, often at the cost of an additional fee.
- Through OA, providing immediate and unrestricted access to the latest research, we can accelerate discovery and create a more equitable system of knowledge that is open to all.

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© PLOS why open access matters

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Impacts of Open Access

- More exposure for your work
- Practitioners can apply your findings
- Higher citation rates
- The public can access your findings
- Your research can influence policy
- Taxpayers get value for money
- Researchers in developing countries can see your work

Self-archive (eg: pre-print server)

Embargo archive (eg: repository)

Pay to publish (APC)

Submitted version
Author's original Pre-print

Peer review
Edit
Accepted by publisher
Copy-editing and typesetting
Published version Version of record

Versions

Accepted version Post-print AAM

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### Table 10: Open access article shares reported by selected studies (see text for details and qualifications)

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Gold (total)</strong></td>
<td>14.4%</td>
<td>-</td>
<td>19%</td>
<td>16.7%</td>
<td>23%</td>
<td>11.6%</td>
</tr>
<tr>
<td><strong>Gold OA</strong></td>
<td>14.4%</td>
<td>-</td>
<td>15%</td>
<td>11.2%</td>
<td>-</td>
<td>10.1%</td>
</tr>
<tr>
<td><strong>Hybrid OA</strong></td>
<td>-</td>
<td>-</td>
<td>4%</td>
<td>5.5%</td>
<td>-</td>
<td>1.5%</td>
</tr>
<tr>
<td><strong>Delayed OA</strong></td>
<td>-</td>
<td>-</td>
<td>3%</td>
<td>-</td>
<td>-</td>
<td>1.1%</td>
</tr>
<tr>
<td><strong>Bronze OA</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>10.8%</td>
<td>-</td>
<td>12.6%</td>
</tr>
<tr>
<td><strong>Green OA</strong></td>
<td>13.9%</td>
<td>-</td>
<td>-</td>
<td>10.4%</td>
<td>31%</td>
<td>10.5%</td>
</tr>
<tr>
<td><strong>Other OA (total)</strong></td>
<td>-</td>
<td>-</td>
<td>11%</td>
<td>-</td>
<td>-</td>
<td>20%</td>
</tr>
<tr>
<td><strong>All OA</strong></td>
<td>28.3%</td>
<td>29%</td>
<td>33%</td>
<td>37.8%</td>
<td>55%</td>
<td>55.8%</td>
</tr>
</tbody>
</table>

© 2018 STM: International Association of Scientific, Technical and Medical Publishers

Fifth Edition published October 2018

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**Figure 1: Prevalence of journal article publishing via Gold, Green* and traditional (non-OA, subscription only) routes after 24 months, for UK and World, 2012-2016\(^{31}\)**

© 2018 Tickell A, Universities UK Open Access Coordination Group

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**Lack of significant progress in the OA movement**

*Open Access is (exceptionally) strong as a principle*
- cf. the many resolutions, policies, guidelines etc.

*...but still fairly weak as a practice*
- very low deposit rate in IRs
- 85% of research is still behind paywalls
- subscription system as prosperous as ever

© Colleen Campbell, Max Planck Digital Library
Transformative Models (recent OA trend)

- **MEMBERSHIP AGREEMENTS**
  - authors from the member institution(s) receive discounted open access charges.

- **DEPOSIT ACCOUNTS/PREPAID ACCOUNTS**
  - prepay or deposit an agreed upon amount to the publisher to cover all anticipated APCs for a given time period, usually a year.

- **READ AND PUBLISH and PUBLISH AND READ**
  - pay an agreed upon amount for “read” access to subscription-based journals (the subscription fee portion of the agreement) and receive “publish” benefits which means all eligible and accepted manuscripts from the respective institution’s researchers are published open access immediately.

- **Subscribe to Open S2O**
  - Existing subscription investment will convert valuable journals to OA, with no extra funds needed. if all subscribing libraries participate, publishers can make all previous volumes of the Subscribe to Open journals freely available (Annual Reviews).

- **SCOAP³**
  - Partnership of over three thousand libraries, key funding agencies and research centers in 44 countries and 3 intergovernmental organisations. Working with leading publishers, SCOAP³ has converted key journals in the field of High-Energy Physics to Open Access at no cost for authors.
## Combination of 3 routes to reach 100% Open Access

<table>
<thead>
<tr>
<th>Route 1</th>
<th>Route 2</th>
<th>Route 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What</strong></td>
<td>Open Access publishing venues (Gold journals or platforms) Immediate Open Access</td>
<td>University repository route Delayed (up to 24 months) Open Access</td>
</tr>
<tr>
<td><strong>How</strong></td>
<td>Institutional Membership/OA Agreement. CC By License</td>
<td>Authors deposit Author’s Accepted Manuscript (AAM) openly available in a repository. Copyright and reuse restrictions</td>
</tr>
<tr>
<td><strong>What Libraries can do</strong></td>
<td>APCs can be negotiated down. Centralized invoice management etc.</td>
<td>Establish Open Access policy and repository. Integrate with other platforms, add value.</td>
</tr>
</tbody>
</table>

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Preprint Servers

Growing Number of Preprint Platforms

- Number of preprint platforms started since the 1990s from "The Second Wave of Preprint Servers: How Can Publishers Keep Afloat?" at https://www.preprints.com/journals

Posting to arXiv Increasingly Common in More Fields

arXiv submission rate statistics


Emergence of bioRxiv as Main Site for Life Sciences Preprints


Information revolution

- Scientists are sharing more information using preprints than they did during any previous outbreak. The number of published papers is exploding as well.

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Open Science

Open Science represents a **new approach to the scientific process** based on cooperative work and new ways of diffusing knowledge by using digital technologies and new collaborative tools.

- Digitisation in Science & Research
- (almost) all actions along the research life cycle create data points
- value creation chain becomes visible (and therefore also threats / barriers to it)

[European Commission, 2016b:33]
Scholarly Record

Scholarly record: Content & perspective

Date   $ bn
2012-01-01 16289.6
2012-04-01 16419.2
2012-07-01 16603.7
2012-10-01 16677.3
2013-01-01 16772.7
2013-04-01 16907.9
2013-07-01 17175.9

**Faculty:** what establishes credentials

**Researchers:** what is necessary to validate & build on current literature

**Publishers:** what is “published”

Libraries services always connected to the collections: (scholarly records/published literature)

Library: what is selected and preserved

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@Brian Lavoie, 2014
Evolving Scholarly Record

- Method
- Evidence
- Discussion

Outcomes

- Discussion
- Revision
- Re-use

Open Research

Research Literature
- Increasing Volume of Content
- Increasing Diversity and Complexity of Content
- Increasing Distribution of Custodial Responsibility
- Broader Awareness of System-wide Context
- Many more

*The content of the scholarly record* by OCLC Research, from The Evolving Scholarly Record (doi:10.25333/C3763Y), CC BY 4.0
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Open Science in Research Cycle

**Figure 1.** Promoting openness at different stages of the research process (Open Science and Research Initiative, 2014)**
Library Support in Research Cycle

- Preparation
- Gathering
- Measuring
- Access to Resources
- Literature Search Skills
- Reference Management
- Embedded Librarians
- Research
- Research Impact Profiles & Visibility
- Research Evaluation
- Institutional Repository
- Archiving & Preservation
- Open Knowledge
- Registration of records
- Research Writing
- Open Access Publishing
- Research Data Publishing
- Scholarly Communication
- Funding Proposals
- Citation Profiling
- Research Data Management plans
- IPR & Copyright advices
- Research Data Management tools
- Open Science framework
- Data Analysis & Visualization
- Digital Scholarship Centers

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Research Lifecycle through "Open Science by Default" Workflow

Grigorov et. al (2016)
Components of Open Science

FOSTER Open Science Training Courses
https://www.fosteropenscience.eu/toolkit

FOSTER Handbook

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Grigorov et al. (2016)
Research data management (RDM) is assuming an increasingly prominent place in scholarly communication, funder requirements, codes of academic practice, university research strategy, and even national policy.

- Raw/initially processed data produced at a research facility such as an observatory
- ‘Research ready’ processed data which has been fully calibrated, combined and cleaned/annotated
- Published output dataset – following detailed analysis of research ready datasets
- Published catalogue type representation of published output dataset

© OCLC RDM report

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Open research software, or open-source research software, refers to the use and development of software for analysis, simulation, visualization, etc. where the full source code is available. In addition, according to the Open Source Definition, open-source software must be distributed in source and/or compiled form (with the source code available in the latter case), and must be shared under a license that allows modification, derivation, and redistribution.
Open Peer Review OPR

Open peer review is an umbrella term for a number of overlapping ways that peer review models can be adapted in line with the aims of Open Science.

- Open identities
- Open reports
- Open participation
- Open interaction
- Open pre-review manuscripts
- Open final-version commenting
- Open platforms

- Transparency
- Speed
- Reliability
- Consistency
- Context
- Motivation

Publishers provide peer-reviewers training
Peer review part of research profiles
Include in our awareness sessions
Preprint servers: example

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Open Peer Review Example

Connecting the pieces: Using ORCIDs to improve research impact and repositories [version 1; peer review: 2 approved]

Mohamed Baessa\textsuperscript{1}, Thibaut Lery\textsuperscript{2}, Daryl Grenz\textsuperscript{3}, J. K. Vijayakumar\textsuperscript{1}

This article is included in the Science Policy Research gateway.

ORCID

This article is included in the Proceedings of the 2015 ORCID-Casrai Joint Conference collection.

Abstract

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Open Notebook Science

Open-notebook science is the practice of making the entire primary record of a research project publicly available online as it is recorded. This involves placing the personal, or laboratory, notebook of the researcher online along with all raw and processed data, and any associated material, as this material is generated.

© Wikipedia

https://doi.org/10.1371/journal.pbio.3000120
https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3000120
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@UNESCO

https://guides.lib.vt.edu/oer/opentextbooks

https://guides.library.illinois.edu/oer
"Academic social media" sites are targeted toward researchers and academics, but the same cautions exist here as on Twitter, Facebook, and other more social sites. Be aware of your audience, privacy settings, and your digital reach.
Increase visibility and impact of research activity

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Open Science Skills for Librarians & Researchers

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**OPEN SCIENCE OFFICER (FULLTIME)**

**UNIVERSITY OF TWENTE. HIGH TECH HUMAN TOUCH**

**JOB DESCRIPTION**

The Faculty ITC of the University of Twente is committed to make Open Science a standard practice of the scientific process. Open Science makes the research process more transparent and collaborative. Research results will become more accessible too because publications, data and code will be open for anyone to see – or made as FAIR as possible if privacy or other circumstances prevent us from openly sharing them. The shift towards Open Science will have a strong impact on the core activities of the faculty, namely, capacity building, education and, of course, research. This new position will primarily focus on research but will consider and evaluate the implications of adopting Open Science for the other two core activities of the faculty. The transition towards Open Science will mean adopting and adapting new digital technologies that will support collaborative approaches, scientific reproducibility, and a wider and stronger commitment to knowledge diffusion. Hence, the ideal candidate will have a good mix of technological know-how and social skills to realize this change of research culture on a large scale, leaving no one behind.

- Provide scientific and technical support to the research work done at ITC and contribute to the preparation and dissemination of our scientific outputs.
- Lead the development of a faculty-wide Open Science platform that focuses on transparency, integrity and efficiency and that makes our research outputs more FAIR (findable, accessible, interoperable and reusable).
- Propose, evaluate and (co-)implement various Open Science research tools and solutions that support the daily needs of ITC’s researchers.
- Create guidelines and (e-learning) educational material that support the transition towards Open Science.
- Further develop the policy, infrastructure and culture of data stewardship, open access, data sharing and responsible research, and general scientific practice.
- Explore the relationship between Open and Citizen Science, particularly in relation...
And their role is that of **enablers**: “Libraries have adapted their role and are now active in the preservation, curation, publication and dissemination of digital scientific materials, in the form of publications, data and other research-related content. Libraries and repositories constitute the physical infrastructure that allows scientists to share use and reuse the outcome of their work, and they have been essential in the creation of the Open Science movement” © OECD, 2015.

- **Advocating and raising awareness**: promotion of the benefits of Open Science should take place in parallel with the development of tools and services, the incentives and recognition mechanisms that support excellence in Open Science. Libraries can advocate within institutions to develop open access policies and roadmaps. This will benefit not only researchers, but also other stakeholders at institutional level and international level, and even the whole society, promoting Open Science and engaging with citizens.

- **Giving support to the infrastructures**: to share articles or data, including repositories; keeping with their involvement and responsibilities in the development and governance of repositories of publications and data, in regards to appraisal, selection, description and metadata application, curation and preservation; information retrieval; monitoring data reuse, citation and impact, etc.

- **Contributing to the development of research data management (RDM) policies and strategies at their home institutions and carrying RDM themselves**;

- **Training and supporting researchers**: to open their research workflows, sharing and reusing the research outputs produced by others. Besides the necessary research infrastructure, researchers need support at a practical level throughout the whole research cycle. Librarians can offer guidance, training and services in: the provision of information during the exploratory stage of research; funding opportunities and requirements; bibliography and data management; applying metadata; identification of open research methods and tools for analysis; outputs sharing and publication; data citation, licensing and other intellectual property issues; preparing data for deposit and long-term preservation of data, among others. For these purposes, librarians need to know their community research practices in regards to information use, production, and sharing, and the platforms, tools and services that they use.
“the majority of scientists support open science, a minority actually fully participate in it. Although the trends toward open science are increasing, strategies need to be found to stimulate the necessary negotiation within the scientific community and a new willingness to experiment with scientific communication to shape the future criteria of science”
thank you Open access Open Science role of libraries discussion @jkvijayakumar