Research Libraries' Support Services for Open Access & Open Science

J.K. Vijayakumar (Vijay) Ph.D
KAUST Library Director

MANLIBNET ONLINE International LDP 2020

Research Libraries
Research Support

The Context

Association of Research Libraries (ARL) Impact Frame Work (2018-19)

ARL's Research Library Impact Framework offers an agenda for the substantive exploration of library services and operations as well as alignment with institutional missions and goals across four critical areas:

- Research and Scholarly Life Cycle
- Teaching, Learning, and Student Success
- Collections
- Physical Space

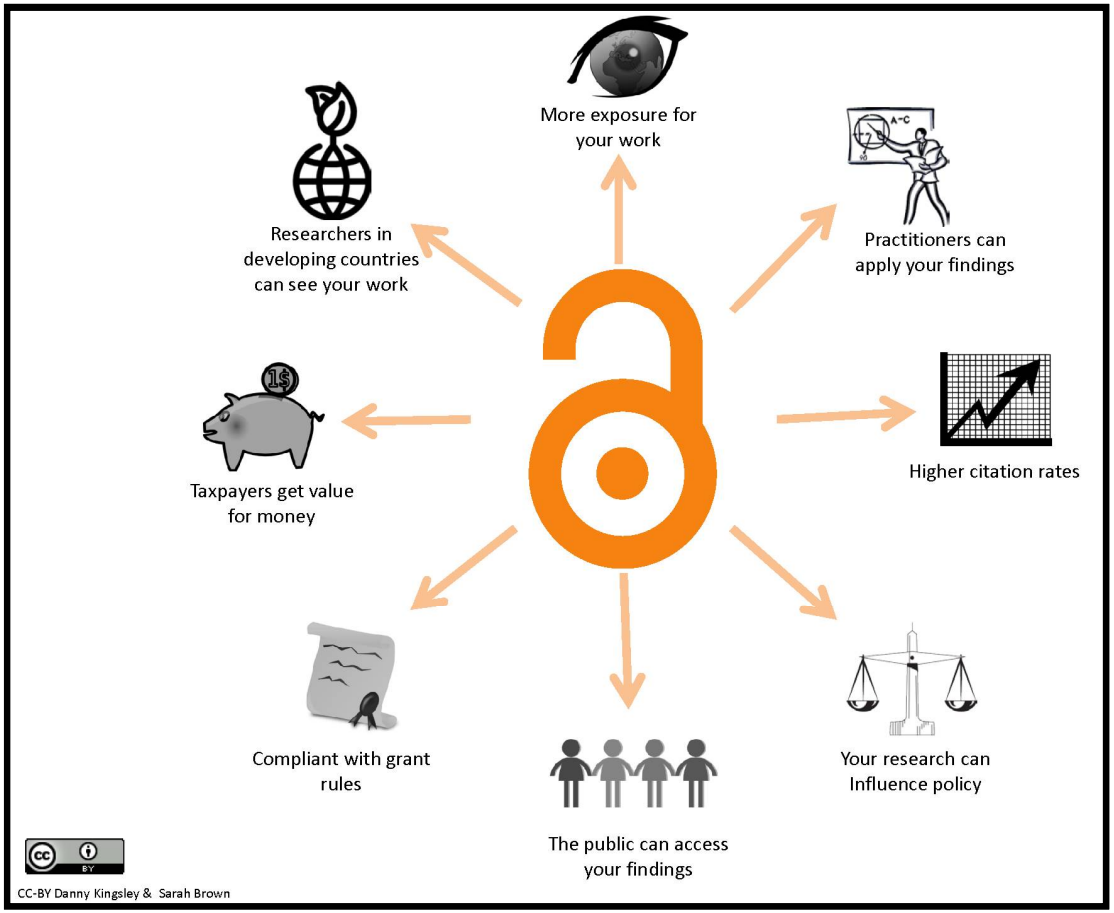
(How) does the library help to increase **research productivity and impact**?
(How) do **library spaces** facilitate innovative research, creative thinking, and problem-solving?
(How) does the library contribute to equitable student outcomes and an **inclusive learning environment**?
(How) do the **library's special collections** specifically support and promote teaching, learning, and research?
(How) do the **library's collections** play a role in attracting and retaining top researchers and faculty to the institution?

https://www.arl.org/category/our-priorities/data-analytics/research-library-impact-framework/

Research Libraries
Research Support

Open Access

Impacts of Open Access



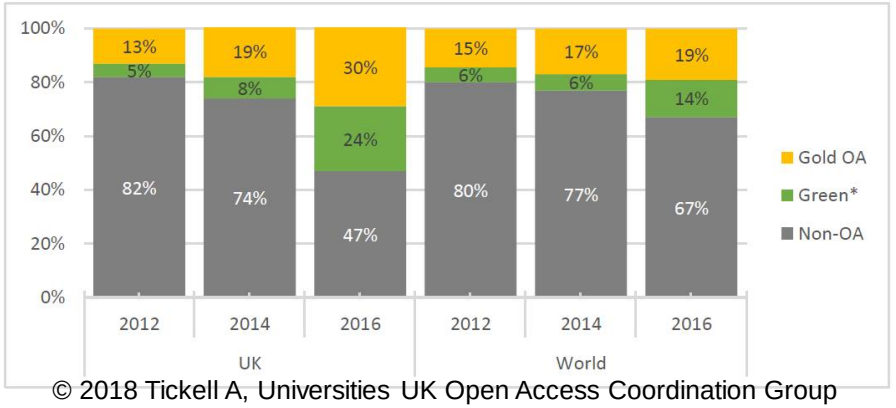
Versions

Open Access Article share

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

	EC Open Science Monitor[198]	*Bosman and Kramer (2017)*	*Universities UK (2017)*	*Piwowar et al (2018)*	*Science-Metrix (2018)*	*Martín-Martín et al (2018b)*
Primary data source(s)	Scopus + DOAJ, ROAD, CrossRef, PubMed Central, OpenAIRE	Web of Science + Unpaywall	Scopus + Google	Web of Science + Unpaywall	Web of Science + 1Findr	Web of Science + Google Scholar
Publication year considered	2016	2016	2016	2015	2014	2014
Gold (total)	14.4%	-	19%	16.7%	23%	11.6%
Gold OA	14.4%	-	15%	11.2%	-	10.1%
Hybrid OA	-	-	4%	5.5%	-	1.5%
Delayed OA	-	-	3%	-	-	1.1%
Bronze OA	-	-	-	10.8%	-	12.6%
Green OA	13.9%	-	-	10.4%	31%	10.5%
"Other OA" (total)	-	-	11%	-		20%
All OA	**28.3%**	**29%**	**33%**	**37.8%**	**55%**	**55.8%**

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]



Lack of significant progress in the OA movement

*Open Access is (exceptionally) strong as a **principle***

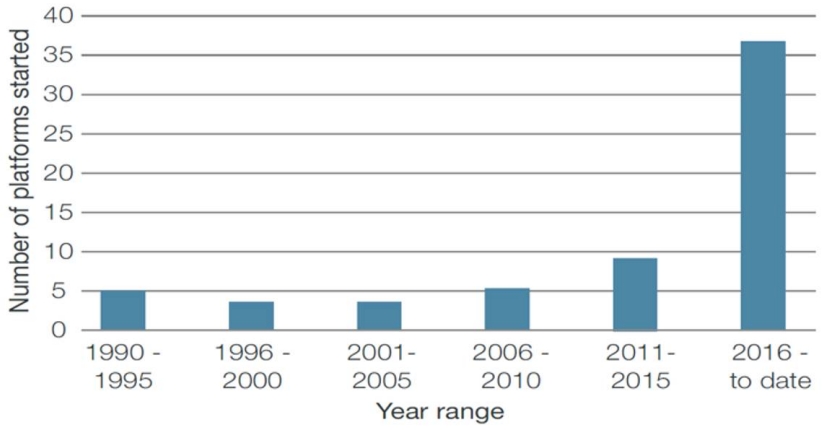
- cf. the many resolutions, policies, guidelines etc.

*…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

Preprint Servers

Growing Number of Preprint Platforms

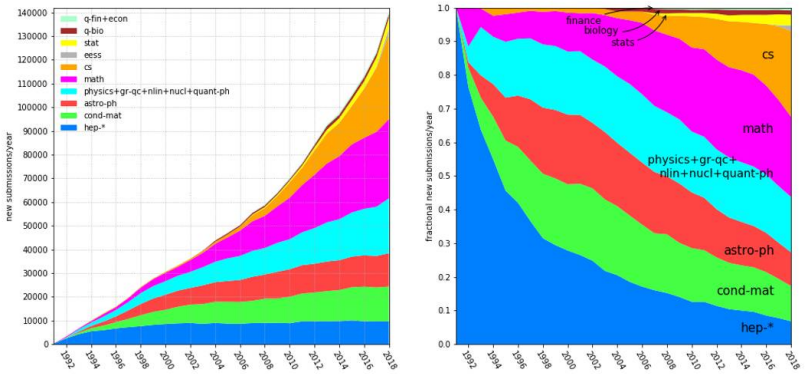


"Number of preprint platforms started since the 1990s" from: "The Second Wave of Preprint Servers: How Can Publishers Keep Afloat?" at https://scholarlykitchen.sspnet.org/2019/10/16/the-second-wave-of-preprint-servers-how-can-publishers-keep-afloat/?informz=1 , based on information from: https://researchpreprints.com/preprintlist/

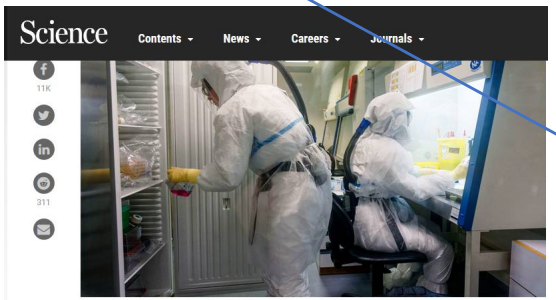
Posting to arXiv Increasingly Common in More Fields

arXiv submission rate statistics

Data for 1991 through 2018, updated 1 January 2019.



"arXiv submission rate statistics" revision 0.2.7. Last modified 2019-02-13. Available at: https://arxiv.org/help/stats/2018_by_area/index



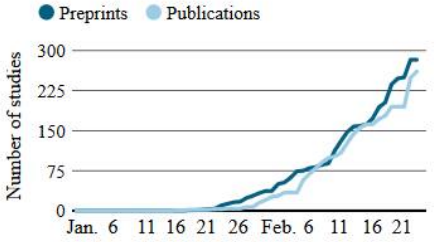
Researchers at the Pasteur Institute in Lille, France, at work on the new coronavirus on 20 February. SYLVAIN LEFEVRE/GETTY IMAGES

'A completely new culture of doing research.' Coronavirus outbreak changes how scientists communicate

By Kai Kupferschmidt | Feb. 26, 2020 , 2:05 PM

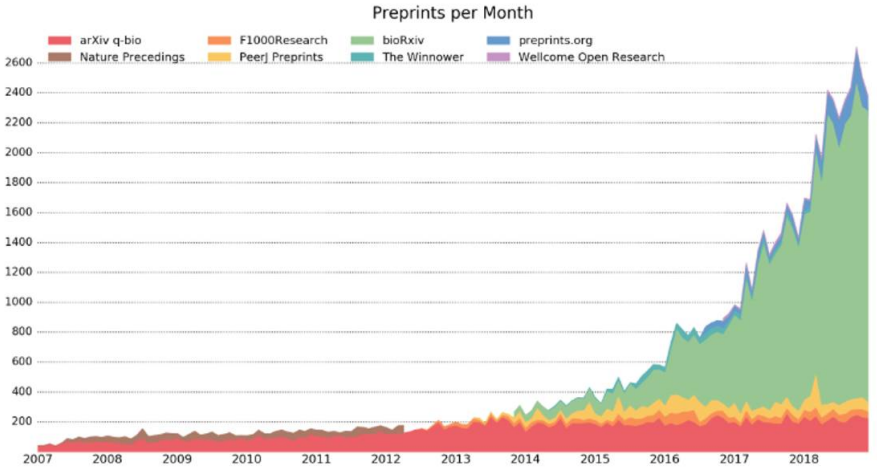
Information revolution

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



(GRAPHIC) M. WEILAND/*SCIENCE*; (DATA) PUBMED; MEDRXIV; BIORXIV; CHEMRXIV; ARXIV

Emergence of bioRxiv as Main Site for Life Sciences Preprints



"Monthly Statistics". PrePubMed. Retrieved on 2019-03-14. Available at: http://www.prepubmed.org/monthly_stats/

Plan S combination of 3 routes to reach 100% Open Access

	Route 1	Route 2	Route 3
What	**Open Access publishing venues (Gold journals or platforms)** **Immediate Open Access**	**University repository route** **Delayed (up to 24 months) Open Access**	**Transition from subscription to publishing model (Hybrid journals)** **Immediate Open Access**
How	Institutional Membership/OA Agreement. CC By License	Authors deposit Author's Accepted Manuscript (AAM) openly available in a repository. Copy right and reuse restrictions	Change from Subscription agreement to Read and Publish OR offset agreements with selected Publishers. CC By License
What Libraries can do	APCs can be negotiated down. Centralized invoice management etc.	Establish Open Access policy and repository. Integrate with other platforms, add value.	Negotiate transformative agreements, avoid double dipping.
	KAUST Have an agreement with MDPI to save APC rate	KAUST Repository in 2012, OA mandate in 2014, many integrations	KAUST X/Y = Z X – subscription cost Y – APC average Z – number of free APCs (CC-BY)

KAUST Repository (Feb 2019)

Journal Articles

13339
6767
659
5913

Conference Papers

2629
1145
7
1584

KAUST Funded

3461

Theses/Dissertations

1357
1213
144

Datasets

686

Presentations/Posters

826

Patents

471

Book Chapters

247

Technical Reports

43

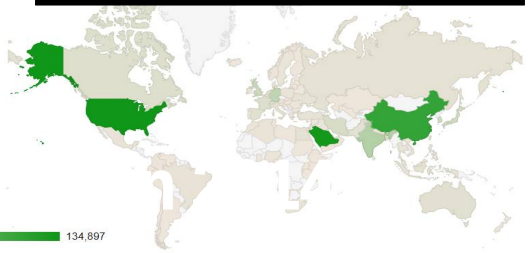
Legend: Total number of records | Open Access Records | Embargoed Records | Metadata Records Only

Top Country Visits (All Time)

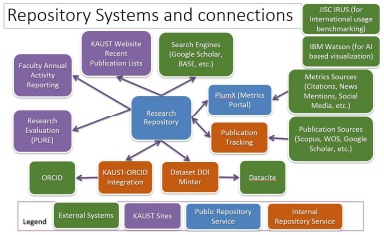
	Visits
Saudi Arabia	259606
United States	46195
China	25184
India	13501
United Kingdom	11287
Germany	8552
South Korea	5707
Japan	5395
France	3880
Pakistan	3797

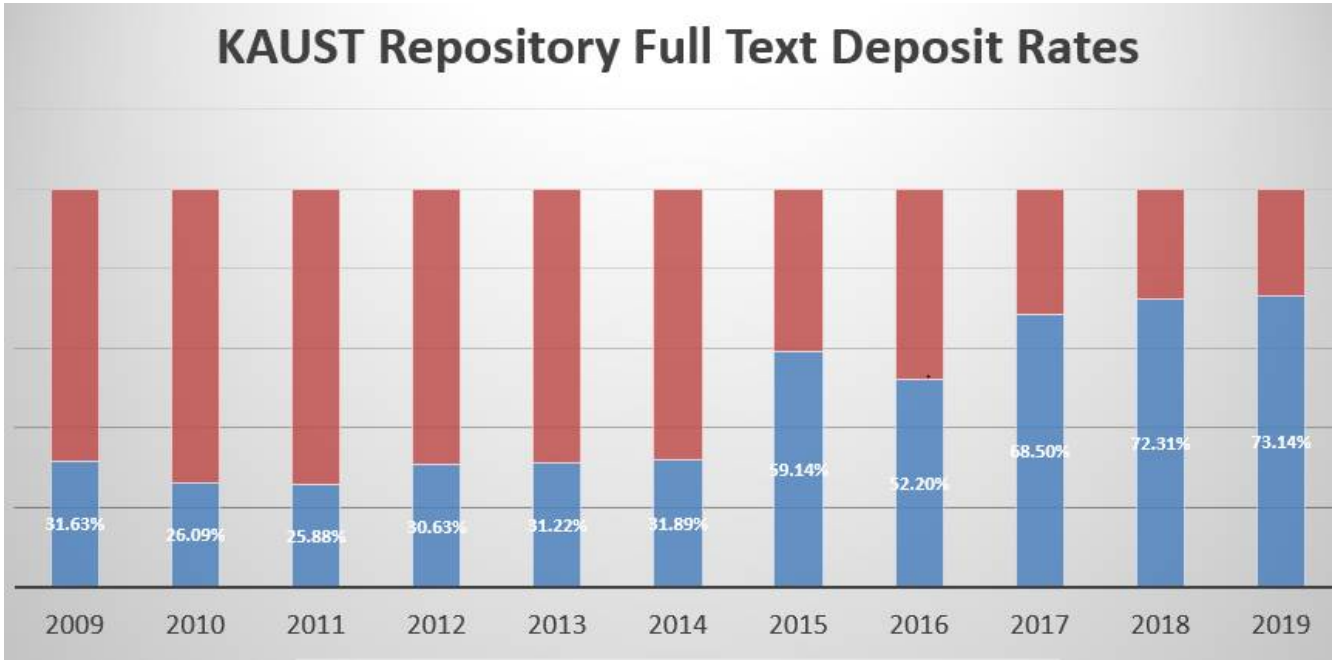
Total Visits (All Time)

	Visits
Community home page visits	39597
Collection home page visits	53560
Item page visits	419463
File Downloads	2222337

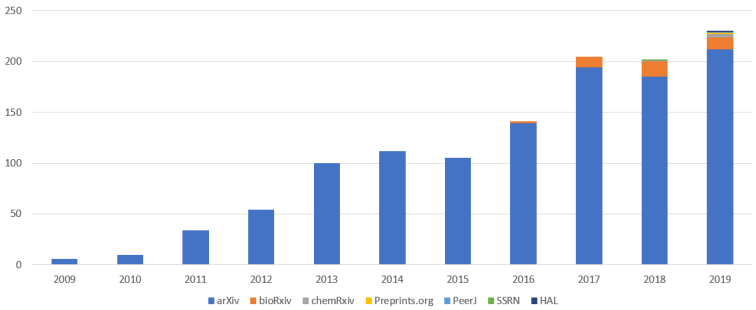


KAUST Green Open Access policy compliance





Preprints with KAUST-affiliated Authors



Source: https://repository.kaust.edu.sa

arXiv.org

DOAJ DIRECTORY OF OPEN ACCESS JOURNALS

ENGINEERING engrxiv ARCHIVE

KAUST Support to Open Access Infrastructure

Subscription cost to Publishing cost

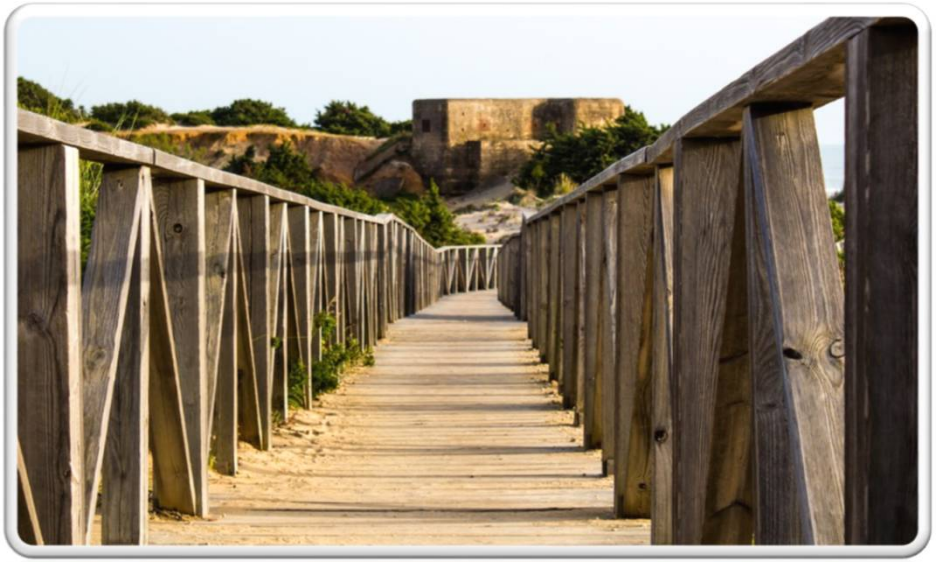
Institutional Level
Transformative (Read & Publish) Agreements

ROYAL SOCIETY OF CHEMISTRY
CAMBRIDGE UNIVERSITY PRESS
IOP Institute of Physics
AIP Publishing
ACS Publications Most Trusted. Most Cited. Most Read.
OXFORD UNIVERSITY PRESS

Green deposit terms in subscription licenses: The subscriber (KAUST) has adopted an open access mandate policy pursuant to which its affiliated researchers, faculty, students and staff grant to the University a non-exclusive permission to make available their scholarly research articles for the purpose of open dissemination. In connection therewith, and with [publisher name] committed support towards Green Open Access, the parties hereby agree that Accepted Versions of articles authored by KAUST affiliated researchers, faculty, students and staff can be deposited in KAUST research repository, immediately [can be varied to 12 months] after acceptance of the work for publication in [publisher name] journals

Research Libraries
Research Support

Open Science



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"

Scholarly?

```
float gasdev(long *idum) {
    static int iset = 0;
    static float gset;
    float fac, rsq, v1, v2;
    if (iset == 0) {
        do {
            v1 = 2.0*ran1(idum) - 1.0;
            v2 = 2.0*ran1(idum) - 1.0;
            rsq = v1*v1 + v2*v2;
```

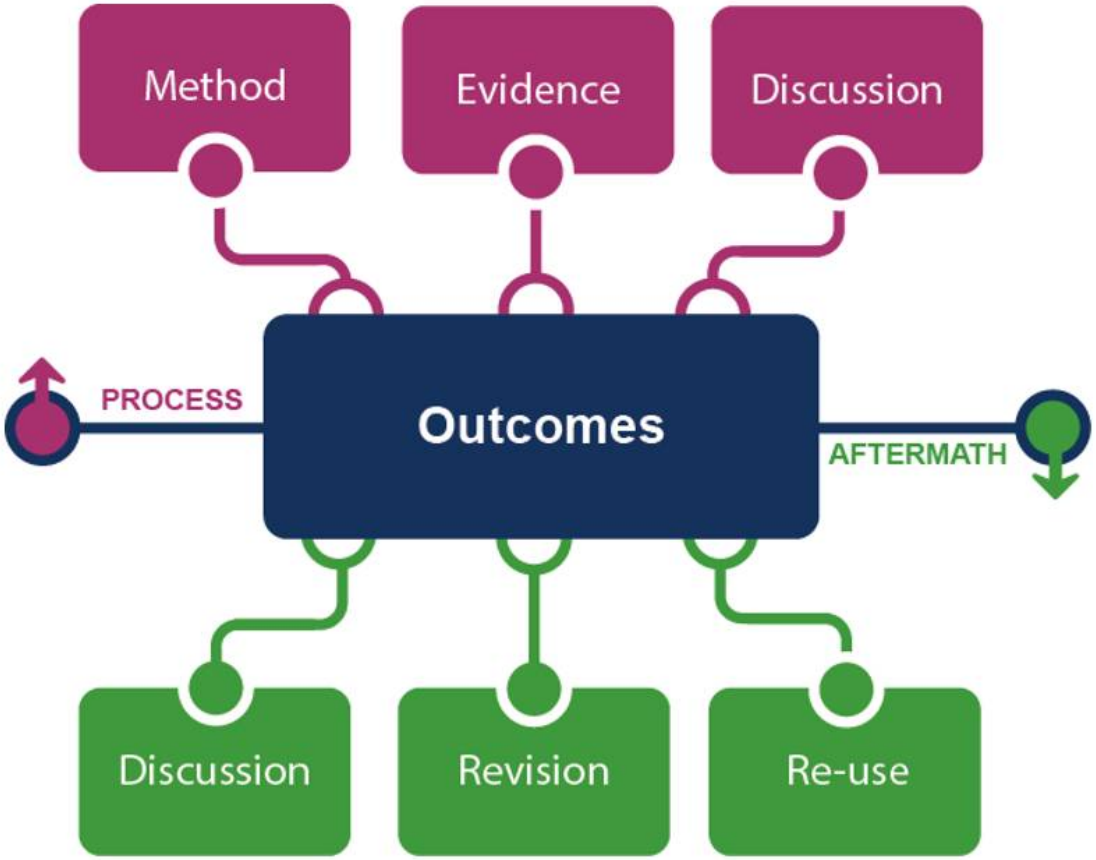
e-

Library: what is selected and preserved

OCLC Research @Brian Lavoie, 2014

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

Evolving Scholarly Record



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*

Library Support in Research Cycle

Research Libraries proactively see the opportunities and embed themselves to the Research Life Cycle

Access to Resources
Literature Search Skills
Reference Management
Embedded Librarians

Funding Proposals
Citation Profiling
Research Data Management plans

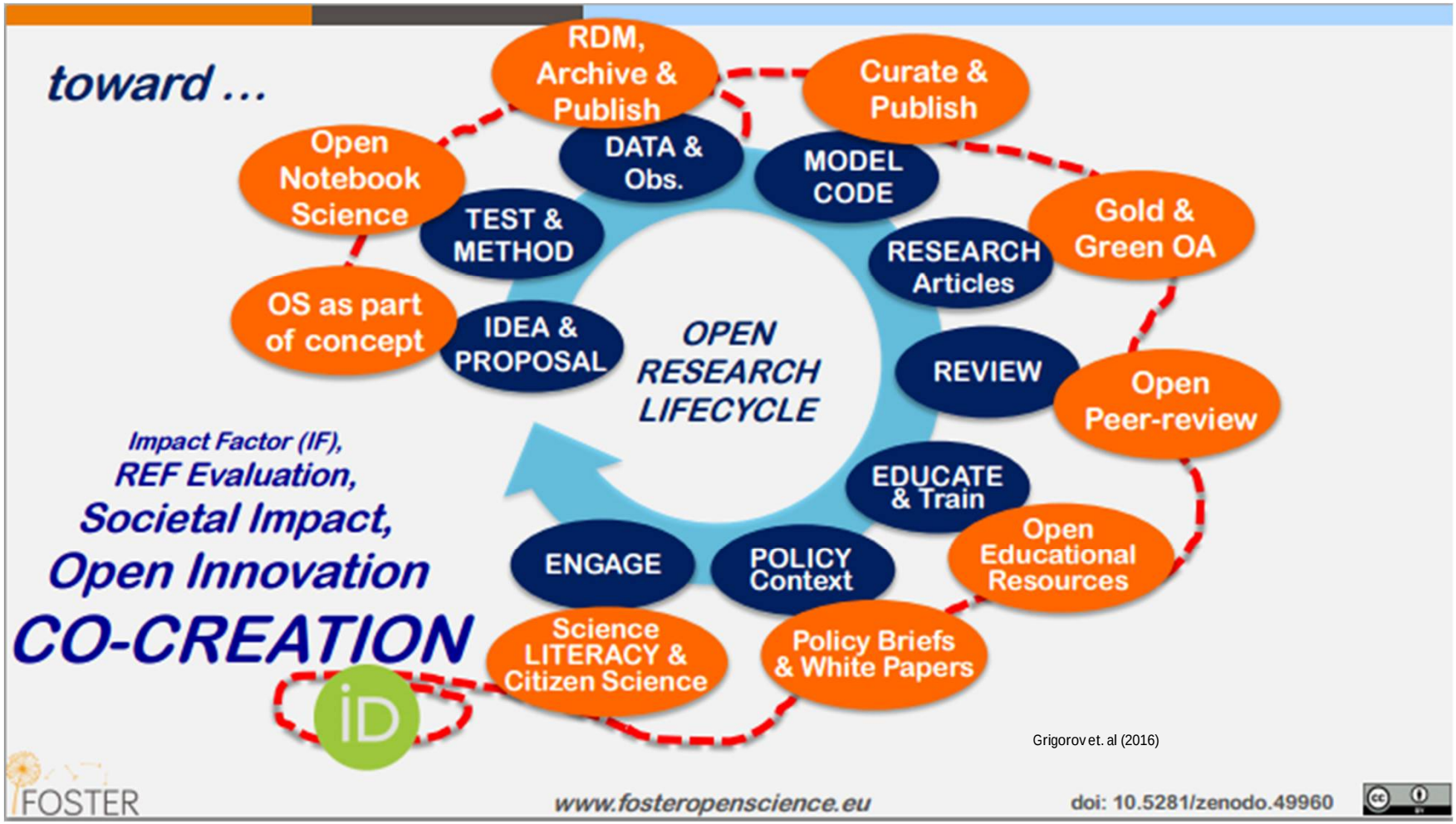
IPR & Copyright advices
Research Data Management tools
Open Science framework
Data Analysis & Visualization
Digital Scholarship Centers

Research Writing
Open Access Publishing
Research Data Publishing
Scholarly Communication

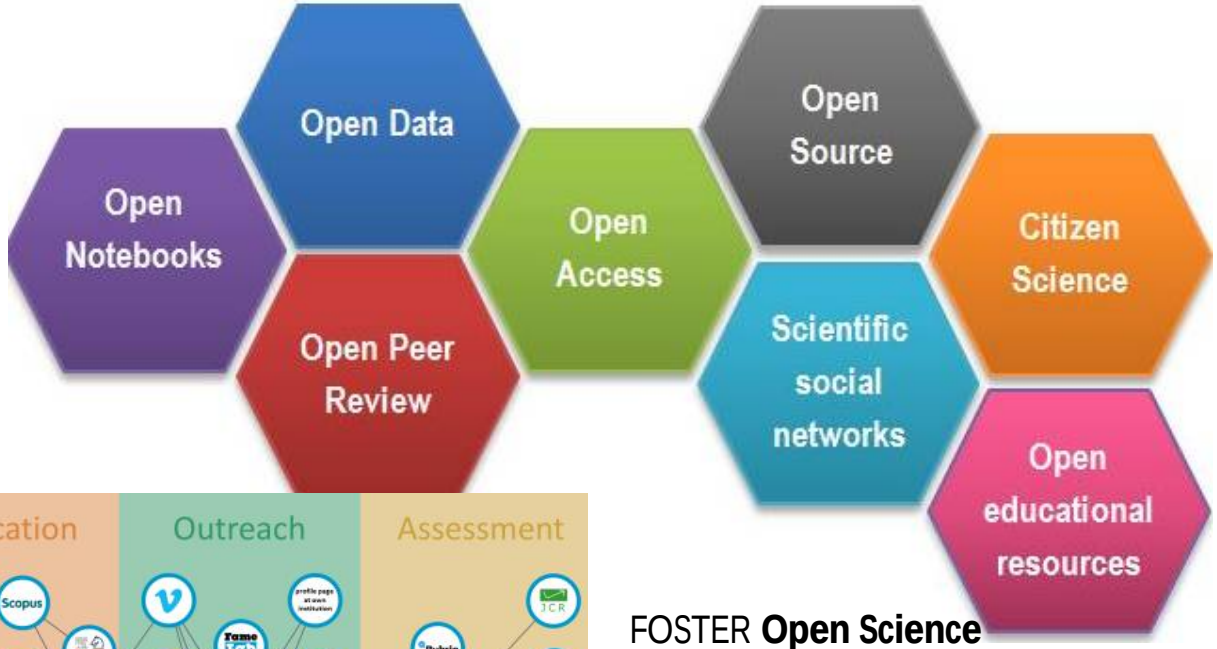
Archiving &Preservation
Institutional Repository
Open Knowledge
Registration of records

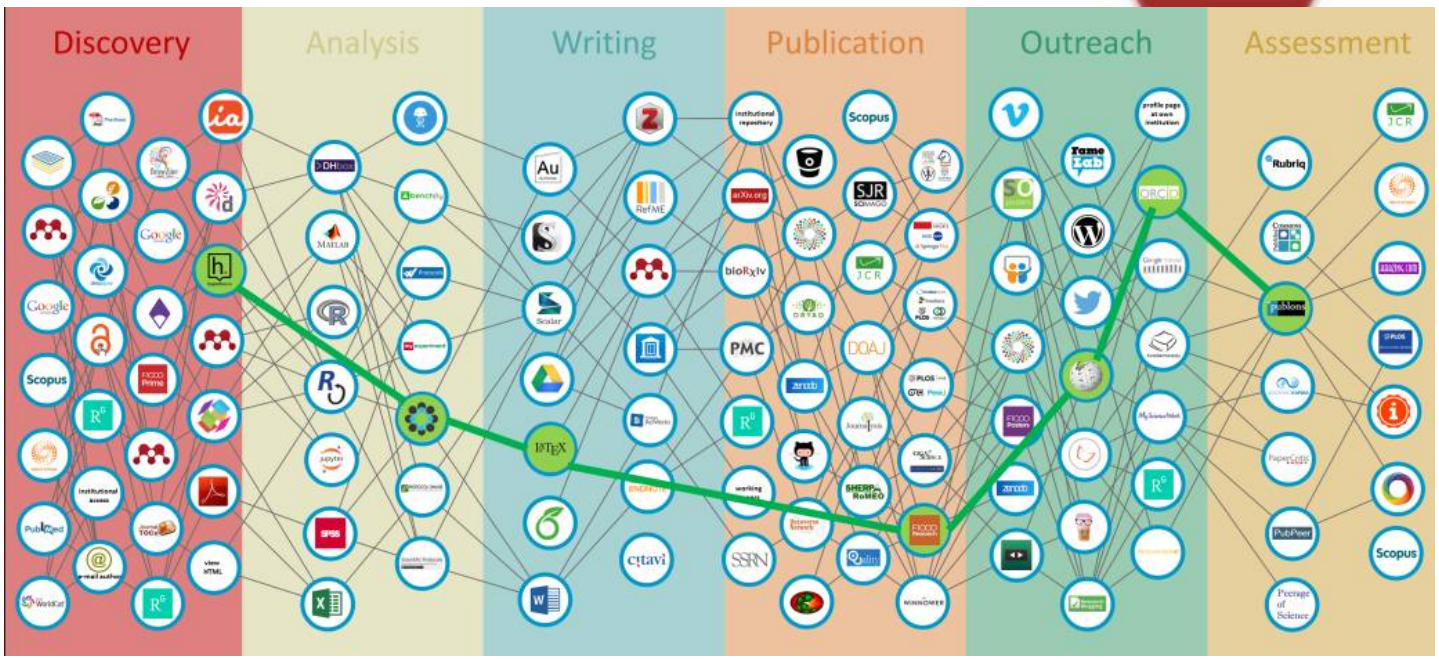
Research Impact
Profiles & Visibility
Research Evaluation

Research Lifecycle through "Open Science by Default" Workflow



Components of Open Science





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

Grigorov et. al (2016)

FOSTER Handbook
https://open-science-training-handbook.gitbook.io/book/

Open Data: research data Management

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.
© OCLC RDM report

- 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

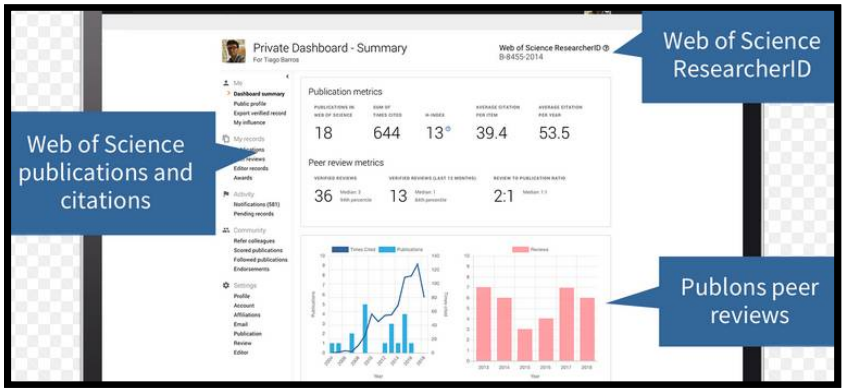
Open Source for Open Science

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.

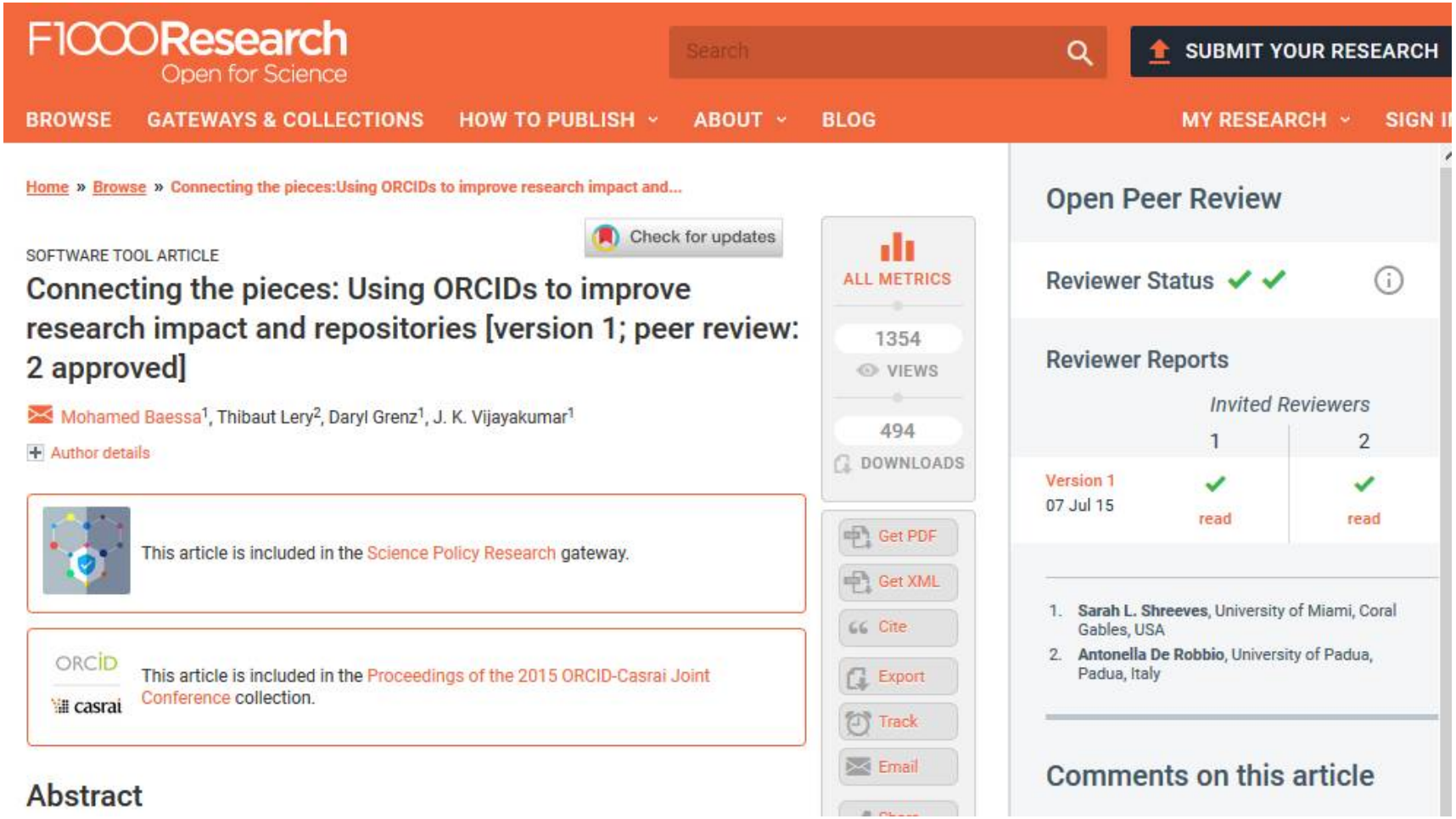
© The Open Science Training Handbook

Open Peer Review OPR

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



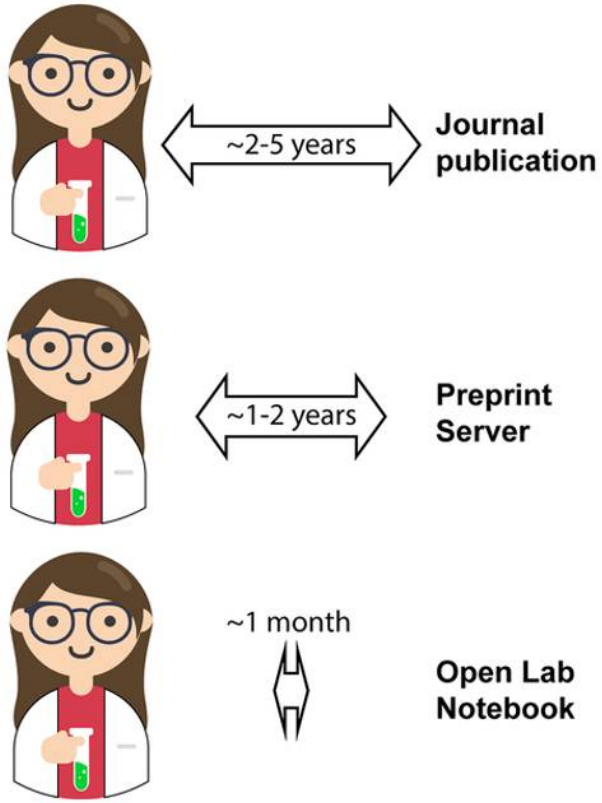
Open Peer Review Example



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

Open notebooks drastically reduce the time frame from bench to publication in the public domain.



Harding RJ (2019) Open notebook science can maximize impact for rare disease projects. PLOS Biology 17(1): e3000120. https://doi.org/10.1371/journal.pbio.3000120
https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3000120

Open Educational Resources (OER)

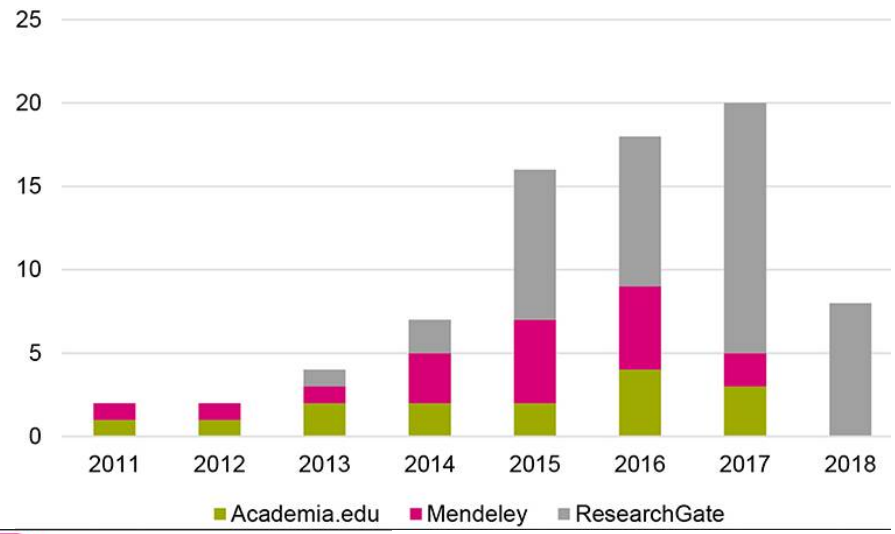
Open Educational Resources (OER) are teaching, learning and research materials in any medium – digital or otherwise – that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions.
@UNESCO

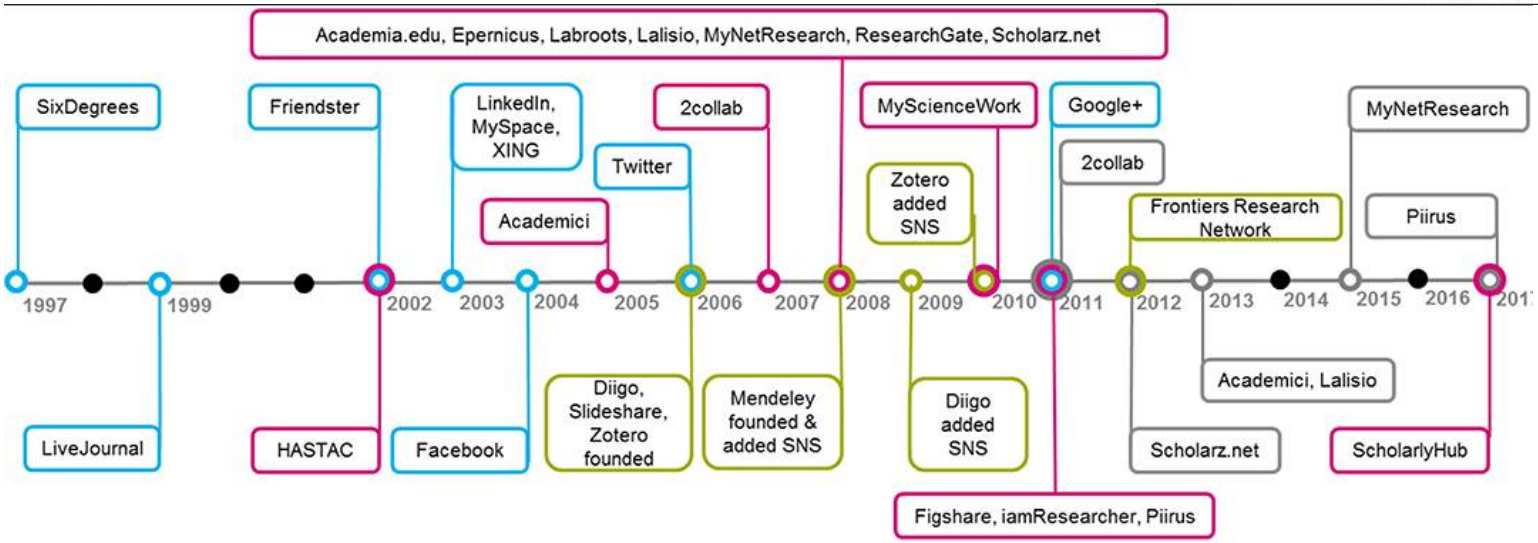
https://guides.lib.vt.edu/oer/opentextbooks

https://guides.library.illinois.edu/oer

Scientific Social Networks

"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.



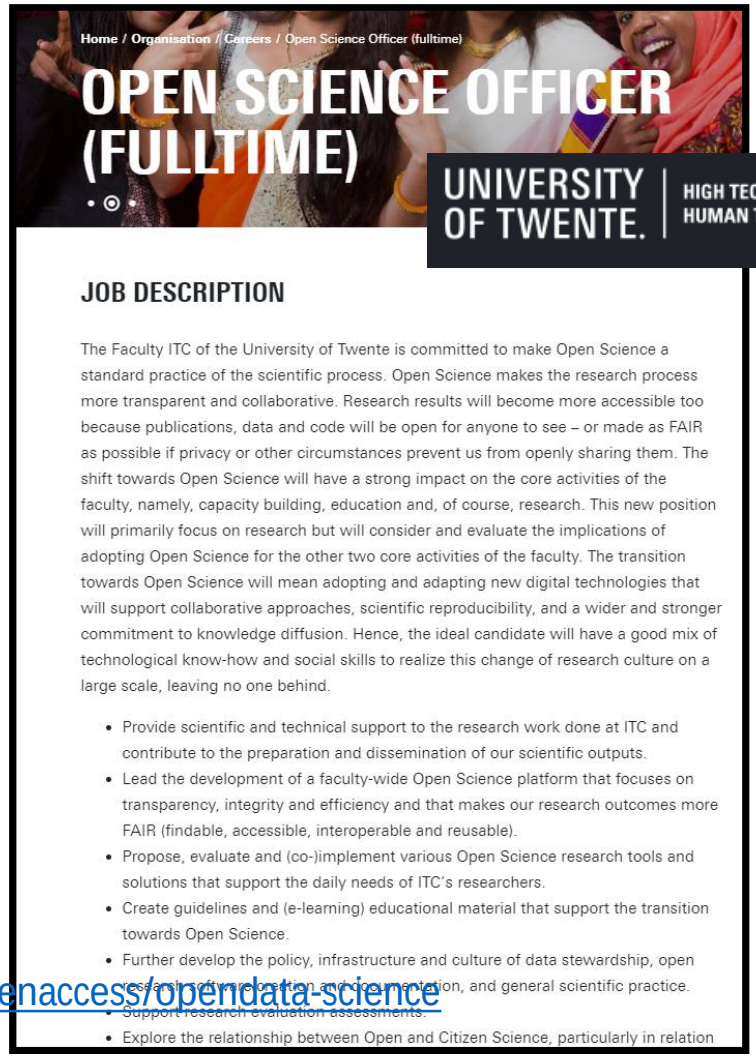


Jordan K (2019) *Front. Digit. Humanit.* 6:5. doi: 10.3389/fdigh.2019.00005

Increase visibility and impact of research activity

Open Science Skills for Librarians & Researchers

- Discipline-specific skills needed to practice open science (does not include generic computer skills, wider librarianship skills and personal competencies)
- Mapped to LIBER OS Roadmap 7 focus areas, Digcomp 2.0 framework and FOSTER learning resources
- Produced by the LIBER Working Group on Digital Skills for Library Staff & Researchers with input from other LIBER Working Groups, 2020



https://libguides.asu.edu/openaccess/opendata-science

Open Science : Role of Libraries

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.