Introduction to Open Science

Silvio Peroni

silvio.peroni@unibo.it – https://orcid.org/0000-0003-0530-4305 – @essepuntato

Open Science (A.Y. 2022/2023)
Second Cycle Degree in Digital Humanities and Digital Knowledge
Alma Mater Studiorum - Università di Bologna

DIPARTIMENTO DI FILOLOGIA CLASSICA E ITALIANISTICA

For starting

Using at most two words, describe what the concept **Open Science** evoke to you

1. *Open access / Open methodologies / Sharable Community*
2. *Transparent / Useful*
3. *Sharing Knowledge*
4. *Democracy / Community*
5. *Fair Dissemination*
6. *Available Information*
7. *Community / Collaboration*
8. *Freedom / Development*
9. *Accessibility / Open-Source*

What do we mean with "science"

From Latin *scientia* = knowledge

Archaic definition: "Knowledge gained through study or practice; mastery of a particular discipline or area." – https://en.wiktionary.org/wiki/science
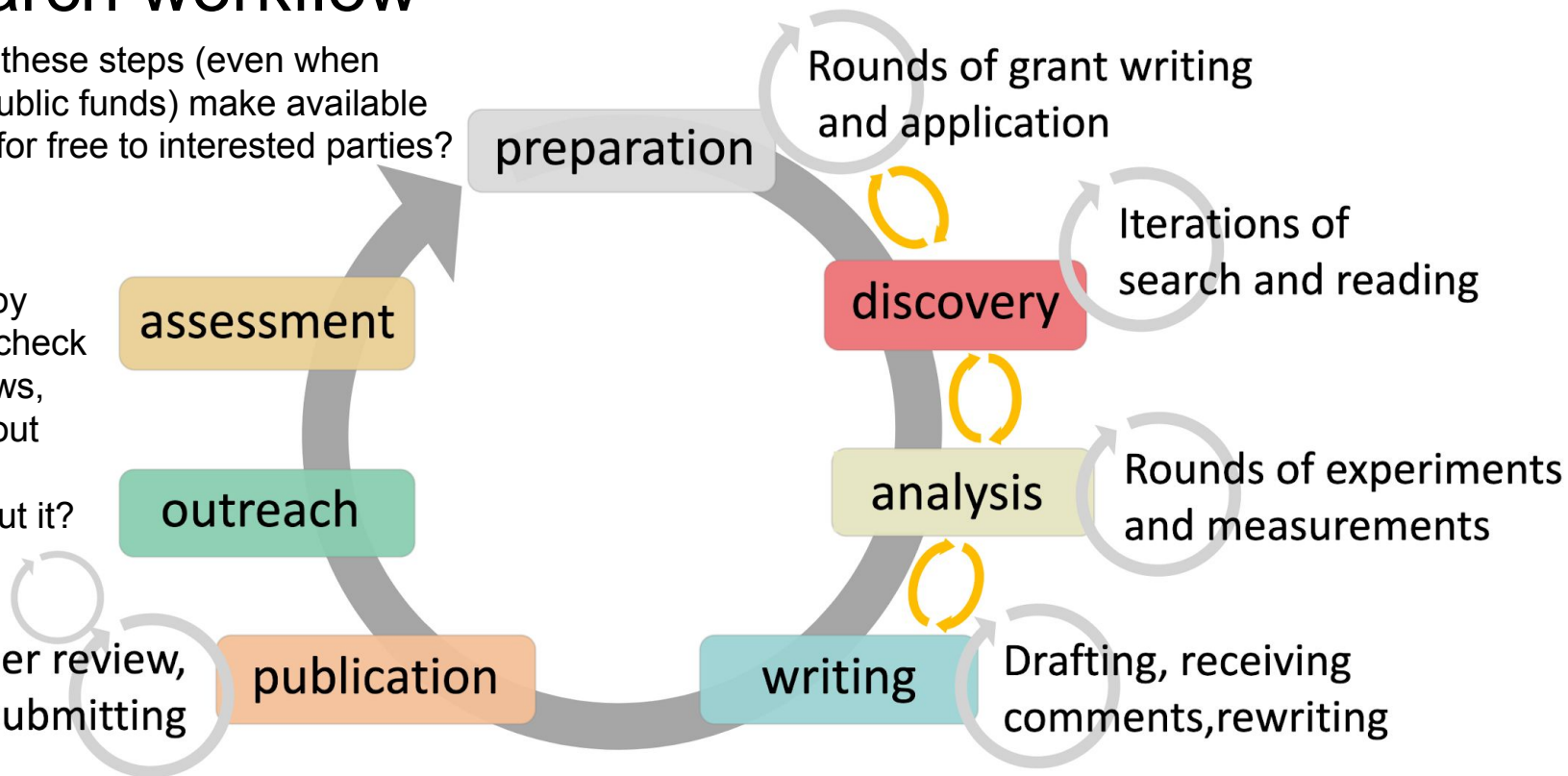
Recent definition: "the enterprise whereby humankind, acting individually or in small or large groups, makes an organized attempt, in cooperation and in competition, by means of the objective study of observed phenomena and its validation through sharing of findings and data and through peer review, to discover and master the chain of causalities, relations or interactions; brings together in a coordinated form subsystems of knowledge by means of systematic reflection and conceptualization; and thereby furnishes itself with the opportunity of using, to its own advantage, understanding of the processes and phenomena occurring in nature and society"

Research workflow

What if none of these steps (even when supported via public funds) make available their outcomes for free to interested parties?

How can we understand a research done by someone else, check if it is free of flaws, improve it, without having crucial information about it?

preparation

Rounds of grant writing and application

discovery

Iterations of search and reading

analysis

Rounds of experiments and measurements

writing

Drafting, receiving comments, rewriting

publication

Submit, peer review, rejection, resubmitting

outreach

assessment

Open Science: your definition

Could you please provide me a definition?

Informal definition (a slogan)

Imming, M., & Tennant, J. (2018). Sticker open science: Just science done right. https://doi.org/10.5281/ZENODO.1285575

Open Science schools of thought

Democratic
access to knowledge is unequally distributed → making knowledge freely available for everyone

Pragmatic
knowledge-creation could be more efficient if scientists worked together → opening up the process of knowledge creation

Infrastructure
efficient research depends on the available tools and applications → creating openly available platforms for scientists

Public
science needs to be made accessible to the public → making science accessible for citizens

Measurement
scientific contributions today need alternative impact measurements → developing an alternative metric system for scientific impact

Fecher, B., & Friesike, S. (2014). Open Science: One Term, Five Schools of Thought. In S. Bartling & S. Friesike (Eds.), Opening Science (pp. 17–47). https://doi.org/10.1007/978-3-319-00026-8_2

Advantages

Faster: "experts identified themselves, and spontaneously contributed based on what was being posted online"

Transparent: "public can be assured that funding for science, arising from their taxes, is being used responsibly and [...] no suggestion of political interference"

Available: "available on the web [...] need not cease with the graduation of students, the termination of a grant or the demise of a principal investigator"

Reliable: "review process never ends [...] commenting function on results, and a mechanism for the community to police those comments"

Woelfle, M., Olliaro, P., & Todd, M. H. (2011). Open science is a research accelerator. Nature Chemistry, 3(10), 745–748. https://doi.org/10.1038/nchem.1149
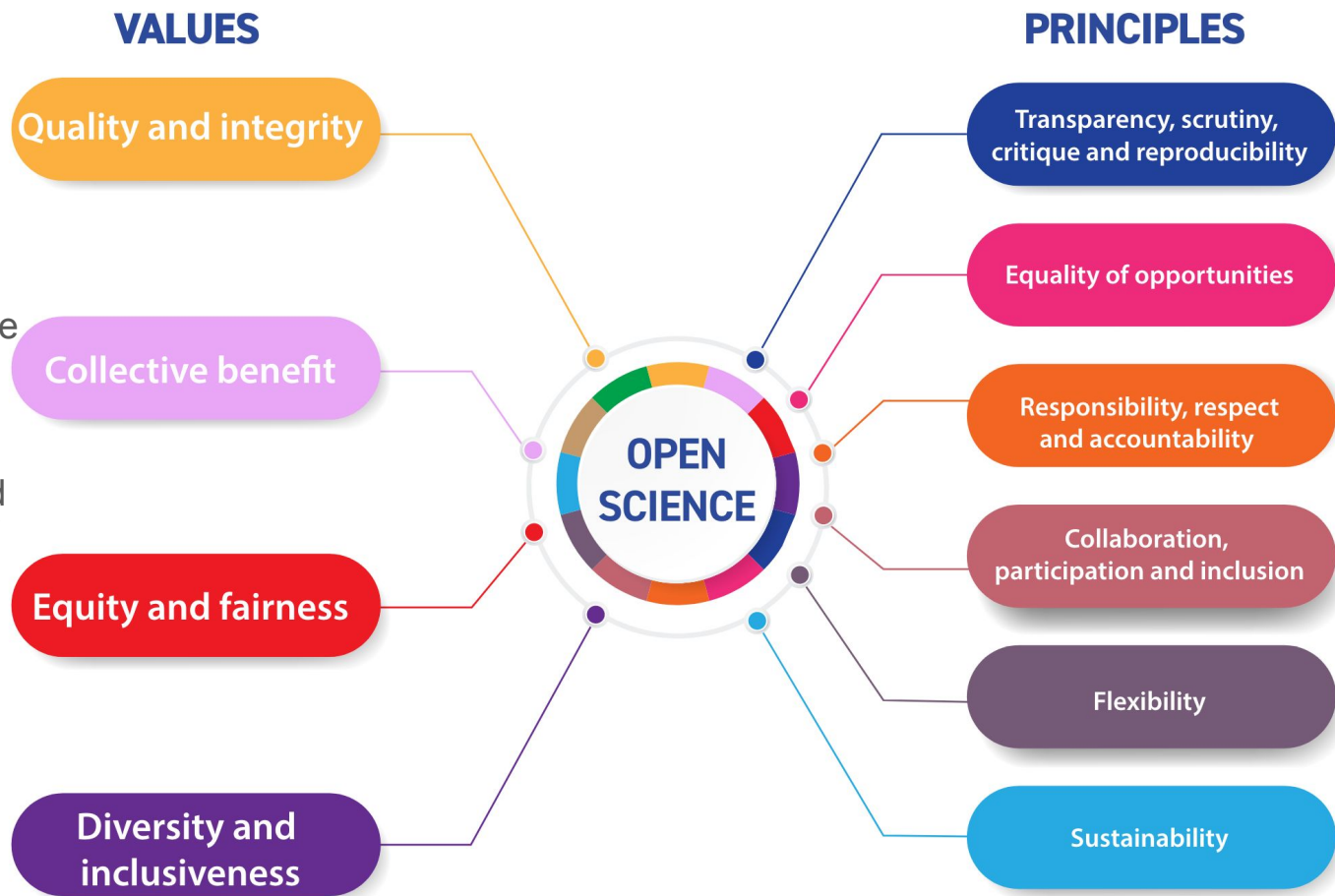
Definition by UNESCO

'Open Science' is an inclusive construct that combines various movements and practices aiming

- to make multilingual scientific knowledge openly available, accessible and reusable for everyone
- to increase scientific collaborations and sharing of information for the benefits of science and society
- to open the processes of scientific knowledge creation, evaluation and communication to societal actors beyond the traditional scientific community

In addition, it comprises all scientific disciplines and aspects of scholarly practices, including basic and applied sciences, natural and social sciences and the humanities

Values and principles

Core values of Open Science stem from the rights-based, ethical, epistemological, economic, legal, political, social, multi-stakeholder and technological implications of opening science to society, and the guiding principles provide a framework for enabling conditions and practices within which such values are upheld

VALUES

- Quality and integrity
- Collective benefit
- Equity and fairness
- Diversity and inclusiveness

OPEN SCIENCE

PRINCIPLES

- Transparency, scrutiny, critique and reproducibility
- Equality of opportunities
- Responsibility, respect and accountability
- Collaboration, participation and inclusion
- Flexibility
- Sustainability

Some other Open Science stakeholders

Research and innovation

Home > Strategy on research and innovation >

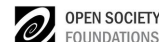Strategy 2020-2024 > Our digital future > Open Science

Open Science

An approach to the scientific process that focuses on spreading knowledge as soon as it is available using digital and collaborative technology. Expert groups, publications, news and events.
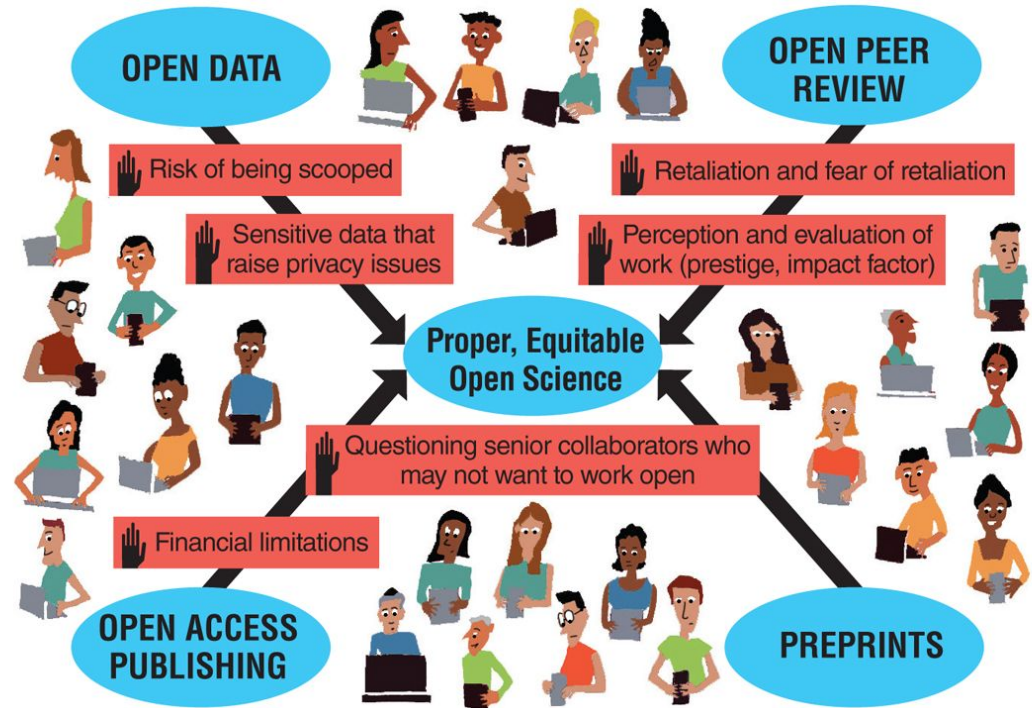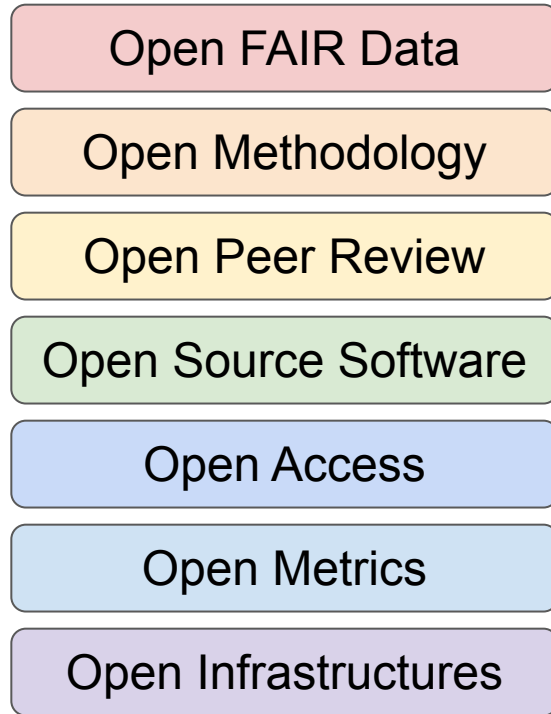
Do all support Open Science?

"Factors such as a scientist's career stage, employment stability, financial circumstances, country of origin or residence, and cultural context (including their race, gender identity, and ethnicity) may all create barriers to specific aspects of open science"

Bahlai, C., Bartlett, L., Burgio, K., Fournier, A., Keiser, C., Poisot, T., & Whitney, K. (2019). Open Science Isn't Always Open to All Scientists. American Scientist, 107(2), 78.
https://doi.org/10.1511/2019.107.2.78

Which Open Science facets we will see

Open FAIR Data

Open Methodology

Open Peer Review

Open Source Software

Open Access

Open Metrics

Open Infrastructures

point of view

Reproducibility

"a result obtained by an experiment or observational study should be achieved again with a high degree of agreement when the study is replicated with the same methodology by different researchers"

End

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