

The current state(s) of Open Science

Open Science & Open Knowledge

Dr. Ulrich Herb
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Open Knowledge

= knowledge that can be used, edited and distributed according to Open Source principles.

Open Knowledge (OK) may be freely

- used (e.g. read, analyzed);
- re-used (e.g. re-analyzed, edited, modified or combined with other information);
- distributed, shared and copied

<http://opendefinition.org/>

Assumption:

OK delivers „dramatic increases in transparency and efficiency as well as greatly increased innovation in related products, processes and services.“

Al-Ubaydli, O.A. & Pollock, R. (2010). The Dissemination of Scholarly Information: Old Approaches and New Possibilities. Faculty of Economics, University of Cambridge. <http://econpapers.repec.org/RePEc:cam:camdae:1023>



Open Science

Open Science is the area of Open Knowledge that deals with scientific information.

The ideal of Open Science is to make all objects involved in the research cycle openly accessible according to the Open Source principles.

- Open Access to text publications (Green or Gold Open Access)
- Open Access to research data
- Open Access to research software



Open Science

The ideal of Open Science is to make all *objects* involved in the research cycle openly accessible according to the Open Source principles.

- Open Access to text publications (green or gold)
- Open Access to research data
- Open Access to research software
- Open Review
- Open Metrics



Open Science+

Open Review & Open Metrics

- crucial since they don't merely report on the impact of Science but can actively steer it as scientists often strongly orient their actions towards such evaluative criteria
- the focus is less on open availability to research products, but on *transparency* in the evaluation and assessment of scientific work
- ideally reviews and the raw data underlying metrics should also be made openly accessible (as objects)



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Open Review

Not an object but a procedure that may be applied to objects (text, data and possibly code) and that produces an object (the written review)

Minimum condition:

The review used to assess a scientific object must be available online for everyone

The reviews do not have to be non-anonymous to be considered „open reviews“



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Open Metrics

Also not an object but a "para-information" (attendant information) on scientific objects

How often is an object cited, shared, mentioned, re-used?

How often is it considered as useful by others (scientists, citizen scientists)?

Requirements for (truly) Open Metrics

- data underlying the calculation of the impact scores are openly available
- impact scores and data are retrievable automatically (via an API)
- it is clearly documented how and why the selected data sources were determined
- It is clearly documented by means of which formula or with which parameters the impact scores are calculated
- decisions on the inclusion of data sources or methodological issues such as the weighting of different types of data or of information from different data sources are documented



Open Science+ components

- 1) Open Access to scientific publications
- 2) Open Access to research data
- 3) Open Access to research software
- 4) Open Review
- 5) Open Metrics



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“As a key to progress, openness—as embodied by transparency and accessibility—is a central scientific value. Given the distributed nature of scientific practice, a lack of openness reduces the efficiency and veracity of knowledge construction. Ideally, the systems of scientific communication would facilitate openness.”

Nosek, B.A. & Bar-Anan, Y. (2012). Scientific Utopia: I. Opening Scientific Communication. *Psychological Inquiry*, 23 (3), 217–243. doi:10.1080/1047840X.2012.692215.



Caveats



Some Caveats

Altmetrics = Open Metrics?

Almetrics are

- gathering a wide variety of information on usage of scientific information from heterogeneous data sources
- interpreting usage as evidence of relevance or impact

<http://altmetrics.org/manifesto/>



Some Caveats

Altmetrics: some data sources



Some Caveats

Altmetrics = Open Metrics?



Open Science+

Open Metrics

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Some Caveats

Altmetrics \neq Open Metrics



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Some Caveats

Open Science: Openly available or available free of charge?

Ideal of Open Science: all information items are available according to the the Open Knowledge principles

Reality of Open Science: most information is available free of charge (at best!)



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Open Access

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Open Science: Open Access to Text Publications

- a continuously growing number of journal articles is available open or free of charge
- widespread in Science, Technology, Medicine (STM)
- not so widespread in the Social Sciences & Humanities



Open Science: Open Access to Text Publications

Possible explanations

- Open Access is supported by statements from the scientific communities and learned societies in STM
- Open Access is demanded or required by funding agencies relevant for STM (NIH, Wellcome Trust)
- in the Social Sciences & Humanities publication charges (as used in Gold Open Access) hardly find acceptance (due to a lack of funding or small budgets?)
- in STM there seems to be a wide range of suitable publication venues (highly reputed Open Access repositories or journals)
- articles are not the only relevant type of scientific text publications in the Social Sciences & Humanities



Open Science: Open Access to Text Publications

about 22 % of the journals listed in the DOAJ are using OK-compatible licenses

Science: 32.1 %

Technology 29.2 %

Medicine 25.9 %

Social Sciences 14 %

Philosophy 9 %

History 9 %

Language & Literature 8.9 %

Herb, U. (2014). Prevalence of Creative Commons licenses in the Directory of Open Access Journals by discipline, author fees, number of journals per country and publisher. ZENODO. doi:<http://dx.doi.org/10.5281/zenodo>



Open Science: Open Access to Text Publications

Possible explanations(?)

- Is there a stronger sense of ownership in the Social Sciences & Humanities?
- Are there stronger concerns about the integrity of publications in the Social Sciences & Humanities?
- Do journals that use publication fees tend to use also open licensing because their costs/ profits are covered by fees?



Open Science: Open Access to Text Publications

- little evidence of Open Access to books

apart from prototypic projects and services as the Directory of Open Access Books
DOAB or Knowledge Unlatched KU

- possible explanations:

Lack of financing models?

Quality assurance?

Branding?



Open Access to research data and research software

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Open Science: Open Access to Research Data and Research Software

- in STM more widespread than in Social Sciences and Humanities
- supported by statements from the scientific communities and learned societies in STM
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- there seems to be a wide range of suitable publication venues in STM (data repositories, software repositories)



Open Science: Open Access to Research Data and Research Software

Some explanations

- in STM data and software are considered to be scientific objects that are independent of articles and that can be published independently (data journals, software journals)
- many STM journals have adopted policies that mandate the availability of software and/ or data
- (digital) data and software are not necessarily typical scientific products in Humanities (e.g. Archeology does not necessarily produce digital data) and many Social Sciences (or sub-disciplines such as Theoretical Sociology)
- data can be encumbered with legal restrictions, especially in Social Sciences (privacy)



Open Review & Open Metrics

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Open Science: Open Review & Open Metrics

experimental nature, but also mostly to be found in Science & Medicine

- supported by statements from the scientific communities and learned societies in STM

San Francisco Declaration On Research Assessment DORA (American Society for Cell Biology)

Kemp, E. (2009). Open letter to Senior Editors of peer-review journals publishing in the field of stem cell biology. EuroStemCell Website.

<http://www.eurostemcell.org/fr/commentanalysis/open-letter-senior-editors-peer-review-journals-publishing-field-stem-cell-biology>

- Science & Medicine publisher PLOS as Open Metrics pioneer
- Use cases for Open Review are reported mainly from STM journals, e.g. Atmospheric Chemistry & Physics



Open Science: Open Review & Open Metrics

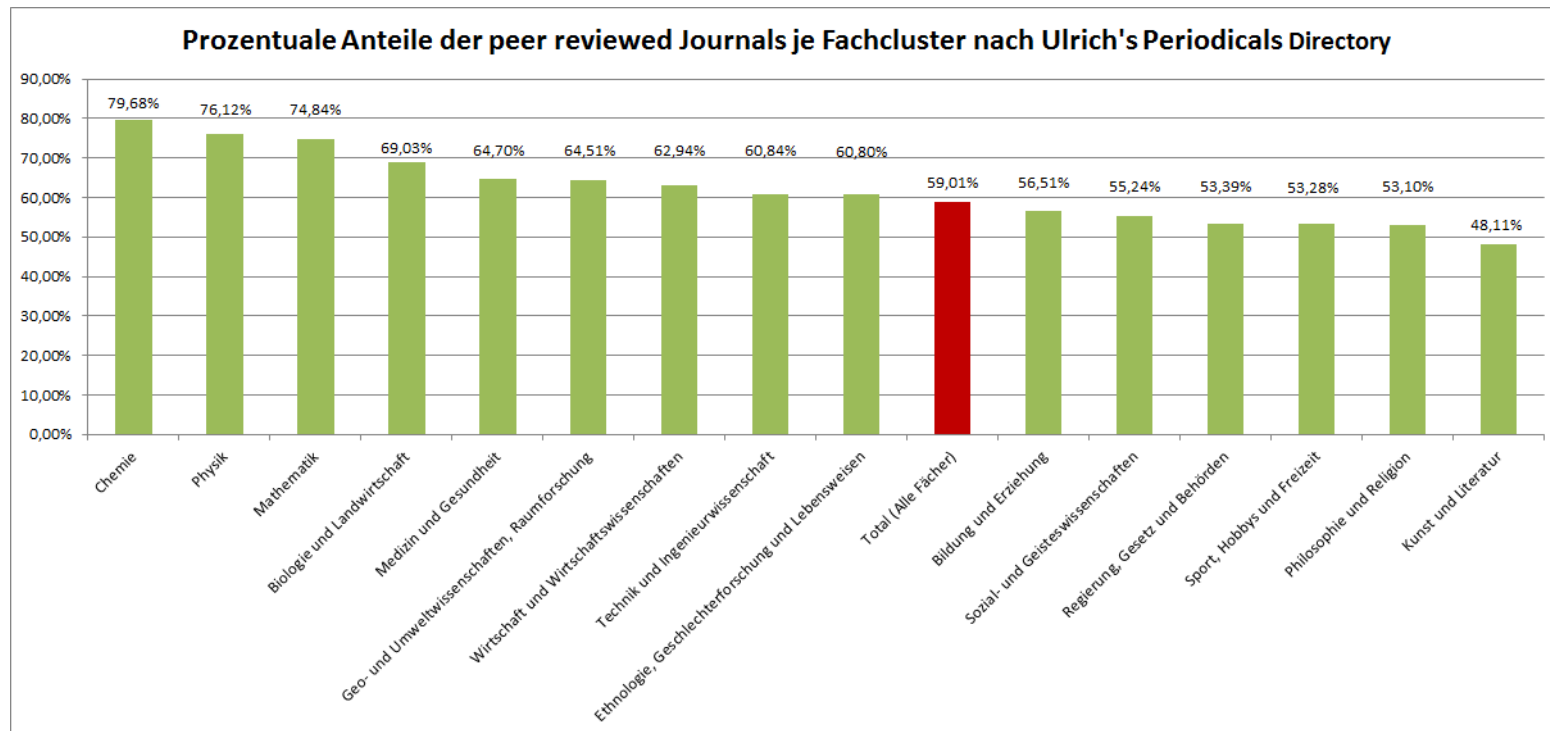
Some explanations

- in the Social Sciences and Humanities metrics are less important than in STM
- Social Sciences & Humanities are disadvantaged by citation databases (Web of Science, Scopus) due to national-linguistic conventions, their orientation to national/regional issues, preferred publication types



Open Science: Open Review & Open Metrics

- in the Social Sciences and Humanities peer review also is less important than in STM



Herb, U. (2015). Open Science in der Soziologie: Eine interdisziplinäre Bestandsaufnahme zur offenen Wissenschaft und eine Untersuchung ihrer Verbreitung in der Soziologie. Glückstadt, Germany: Werner Hülsbusch.
doi:10.5281/zenodo.31234.



In a nutshell ...

Open Science

There is no current state of Open Science

- Open Science knows different states for different disciplines
- Open Science needs to be adapted to every discipline
- Humanities Scientists and Social Scientists seem to feel pressure to adopt methods and procedures of STM, although these do not match their practices
- Social Scientists and Humanities Scientists sometimes consider Open Science as a tool for influencing and controlling Science
- Impact is often regarded the most prominent incentive to share scientific products openly (as data or software citations, citation advantages for Open Access articles, citation advantages for articles for which data or software are freely available)
- These incentives do not work in the Social Sciences & Humanities because impact is of little importance here



Open Science or Open Sciences?

Each scientific discipline should define its own Open Science

... perhaps along the following criteria

- What objects are produced?
- How openly may these objects be shared?
- How can not only accessibility of products be maximized but also transparency?
- Are there good reasons for secrecy or against the open availability of information? If so, they should be respected.
- What are the incentives to make a discipline more open?



Thank you for your attention!

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