
Reflections on open science metrics

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Current approaches

Altmetrics/ Social Media Metrics

- Greater diversity compared to traditional indicators → more context?
 - Types of engagement
 - Types of research products
 - Types of stakeholders
- Capable of acknowledging hidden work?
- Capable of capturing societal impact?



Open Educational Practice (OEP): collection of scenarios

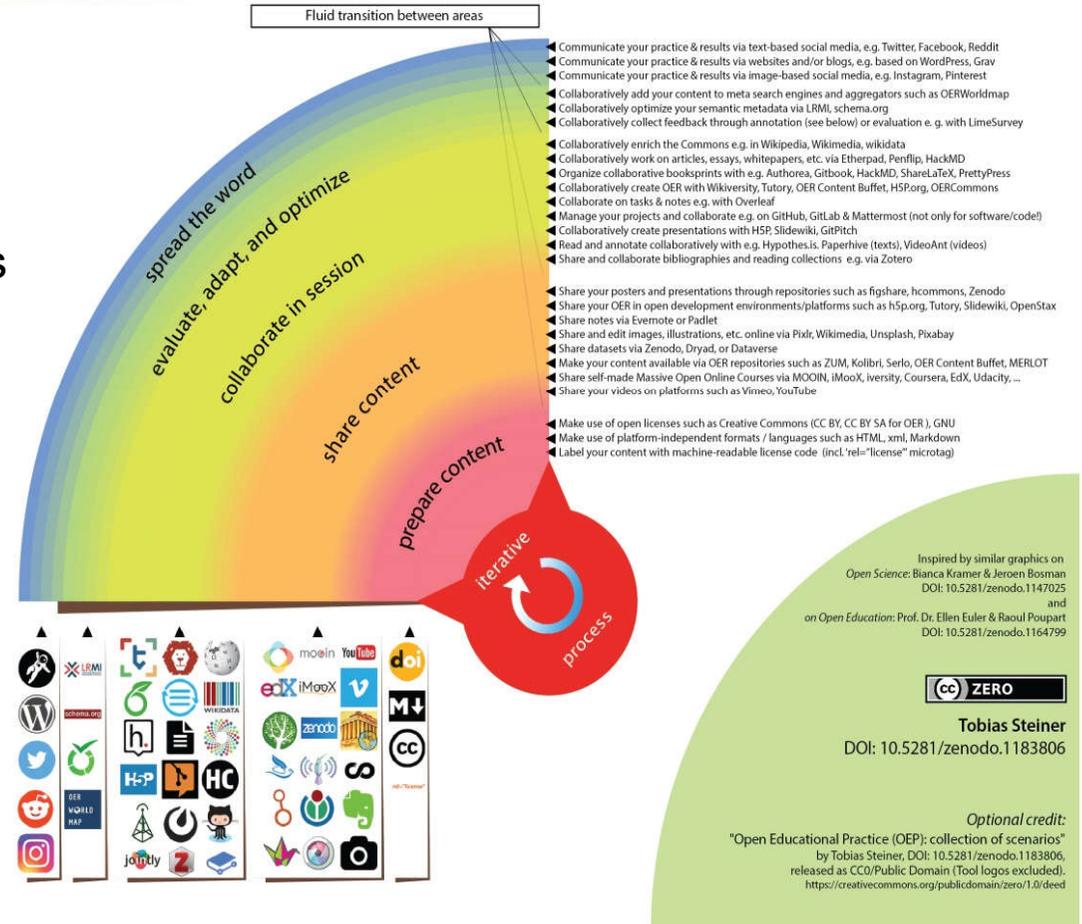
Current approaches

Doing open science

- Focus on open science practices
- Practice before output:
Could this be a basis for indicators?

Steiner, Tobias. (2018, February 23). Open Educational Practice (OEP): collection of scenarios (Version 1.01EN). Zenodo. <http://doi.org/10.5281/zenodo.1183806>

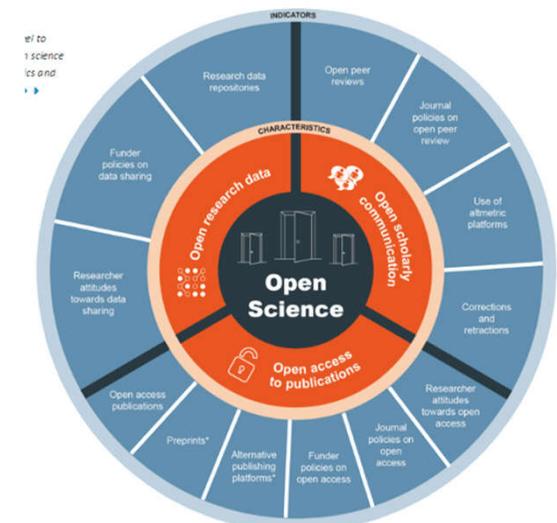
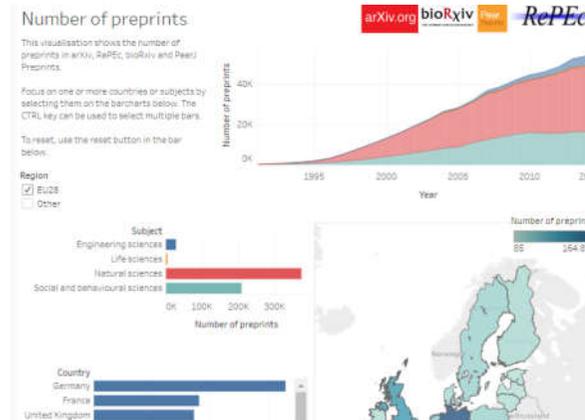
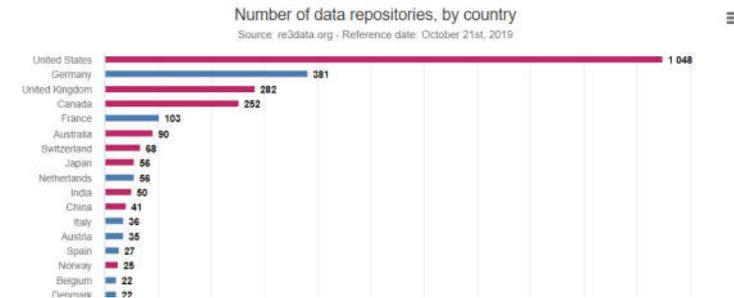
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Current approaches

Open Science Monitor

- Open access publications
- Open research data
- Open collaboration
- Monitors progress
- Enables comparisons
- Rather output-focused



Current approaches

Areas to be considered

- scientific process + publishing
 - conceptualisation, data gathering/creation
 - analysis
 - diffusion of results
 - review and evaluation
- system level
 - reputation system, recognition of contributions, trust
 - open science skills, awareness
 - science with society

NEW INDICATORS FOR OPEN SCIENCE

POSSIBLE WAYS OF MEASURING THE UPTAKE AND IMPACT OF OPEN SCIENCE

DIETMAR LAMPERT, MARTINA LINDORFER, ERICH PREM, JÖRG IRRAN AND FERMÍN SERRANO SANZ

| | | | | |
|---|-----------------------------|-----|-----|-----|
| Requirements from research funders | mean rating (0..10 max.) | | | |
| % of research funders that mandate the provision of the data / software code produced in the context of the funded activity AND who mandate the conformity to data (exchange) standards | 7.9 | | | |
| | | RFO | PM | |
| Accessibility | mean rating (0..10 max.) | | | |
| accessibility of open data / code as % of all data / code produced by publicly (co-)funded projects | 9.1 | | | |
| | | R | RO | RFO |
| Machine-readable | mean rating (0..10 max.) | | | |
| % of machine-readable data / metadata | 7.9 | | | |
| | | PU | R | RFO |
| Availability of metadata | mean rating (0..10 max.) | | | |
| availability of explanatory metadata as % of all available data (resulting from publicly (co-)funded research) | 7.5 | | | |
| | | PU | R | RFO |
| Quality of metadata | mean rating (0..10 max.) | | | |
| quality of metadata (versioning, volume, data format, description of fields, etc.) | 8.2 | | | |
| | | PU | R | RFO |
| Simulation results | mean rating (0..10 max.) | | | |
| usability of simulation results (models, data, and code) | 7.5 | | | |
| | | R | RFO | PU |

Current approaches

Open science and open innovation

- Specifies dimensions of openness for each indicator
 - Accessibility
 - Re-use
 - Recognition
 - Transparency
 - Verifiability
 - Inclusiveness
 - Collaboration
- Includes citizen science

of OA publications in Germany



TABELLE 2: ANZAHL VON OPEN-ACCESS-PUBLIKATIONEN IN DEUTSCHLAND

| NAME DES INDIKATORS | ANZAHL VON OA PUBLIKATIONEN IN DEUTSCHLAND |
|------------------------------|---|
| Untersuchungseinheit | Publikation |
| Datenquelle | Web of Science, Scopus (integriert, kuratierte Daten über KB Datenbank verfügbar) |
| Dimension | Zugänglichkeit |
| Abdeckung | Die Abdeckung der OA Publikationen in den einzelnen Datenbanken ist noch nicht zufriedenstellend. Die Integration neuer Datenquellen ist notwendig. |
| Kommentare | Genauer zu spezifizieren nach Art des Zugangswegs Gold, Grün oder Bronze. Timelag bei der Zugänglichmachung ist zu beachten |
| Art der Erhebung | Deskriptiv, Ratio im Verhältnis zu Non OA, aufgliedern nach Forschungsfeld |
| Feld/Kanal/Plattformspezifik | Aufgliedern nach Disziplin/Forschungsfeld (Subject Categories) |

Quelle: Eigene Darstellung

Current approaches

Open Science Career Evaluation Matrix (OS-CAM)

- Areas to be considered
 - Research output
 - Research process
 - Service and leadership
 - Teaching and supervision
 - Professional experience

| Open Science Career Assessment Matrix (OS-CAM) | |
|---|---|
| Open Science activities | Possible evaluation criteria |
| RESEARCH OUTPUT | |
| Research activity | Pushing forward the boundaries of open science as a research topic |
| Publications | Publishing in open access journals Self-archiving in open access repositories |
| Datasets and research results | Using the FAIR data principles Adopting quality standards in open data management and open datasets Making use of open data from other researchers |
| Open source | Using open source software and other open tools Developing new software and tools that are open to other users |
| Funding | Securing funding for open science activities |
| RESEARCH PROCESS | |
| Stakeholder engagement / citizen science | Actively engaging society and research users in the research process Sharing provisional research results with stakeholders through open platforms (e.g. Arxiv, Figshare) Involving stakeholders in peer review processes |
| Collaboration and Interdisciplinarity | Widening participation in research through open collaborative projects Engaging in team science through diverse cross-disciplinary teams |
| Research integrity | Being aware of the ethical and legal issues relating to data sharing, confidentiality, attribution and environmental impact of open science activities Fully recognizing the contribution of others in research projects, including collaborators, co-authors, citizens, open data providers |
| Risk management | Taking account of the risks involved in open science |
| SERVICE AND LEADERSHIP | |
| Leadership | Developing a vision and strategy on how to integrate OS practices in the normal practice of doing research Driving policy and practice in open science Being a role model in practicing open science |
| Academic standing | Developing an international or national profile for open science activities |

Why are open science metrics needed?

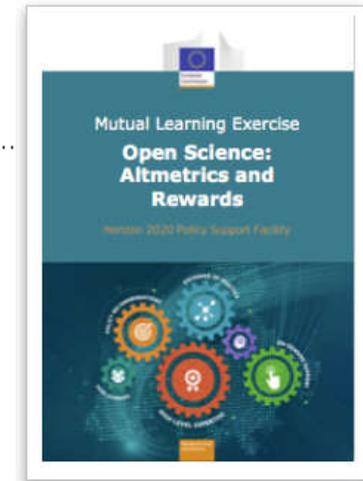
- Describe open science and open research outputs
- Make open science efforts more visible
- Provide guidance towards a ,new normal‘



Why are open science metrics needed?

Sticks and carrots

- “incentivize both research quality and open practices” (p. 26)
- “linking open practices with performance evaluation has proven to be a very effective measure, especially when made mandatory” (p. 29)



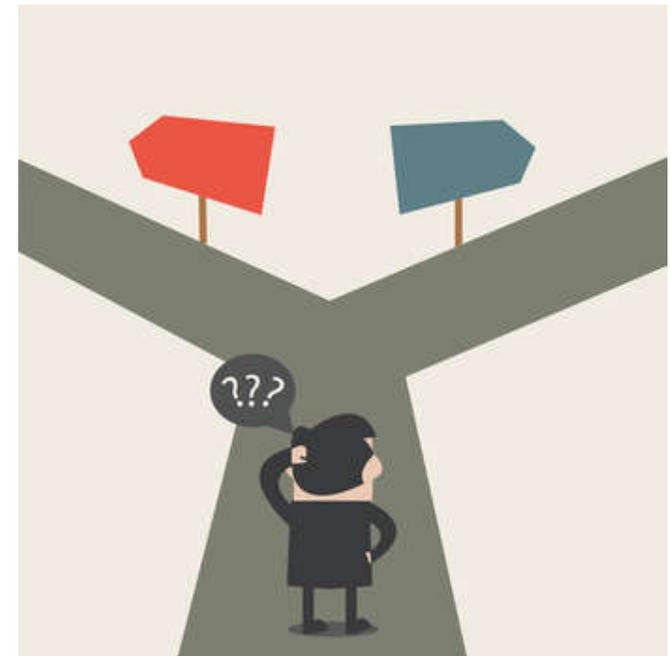
Answers to Call for Evidence

Potential for altmetrics



Dilemmata of open science indicators

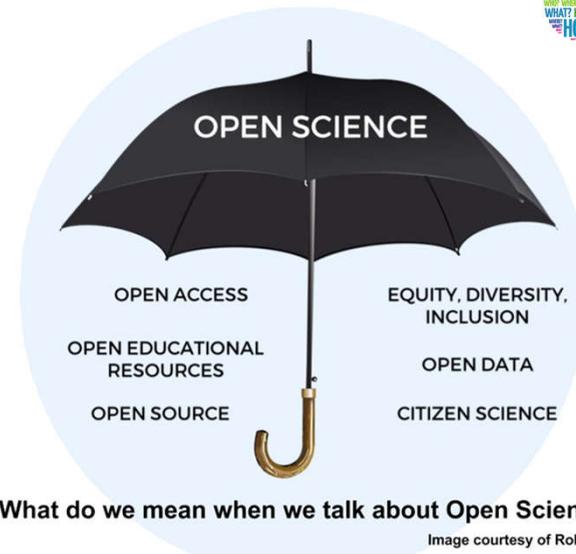
- Lack of clear meaning
- Efficiency of indicators-illusion
- Open science is a moving target
- All or nothing-principle



Dilemmata of open science indicators

Lack of clear meaning

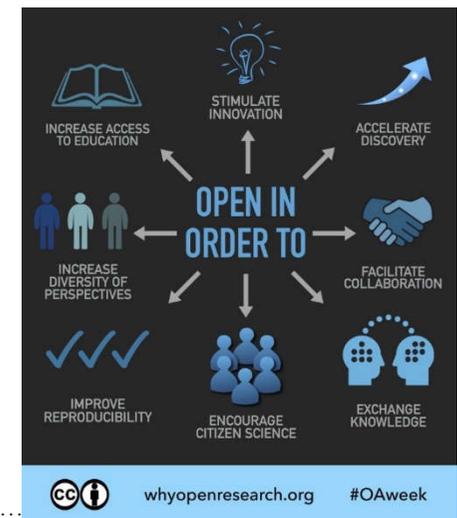
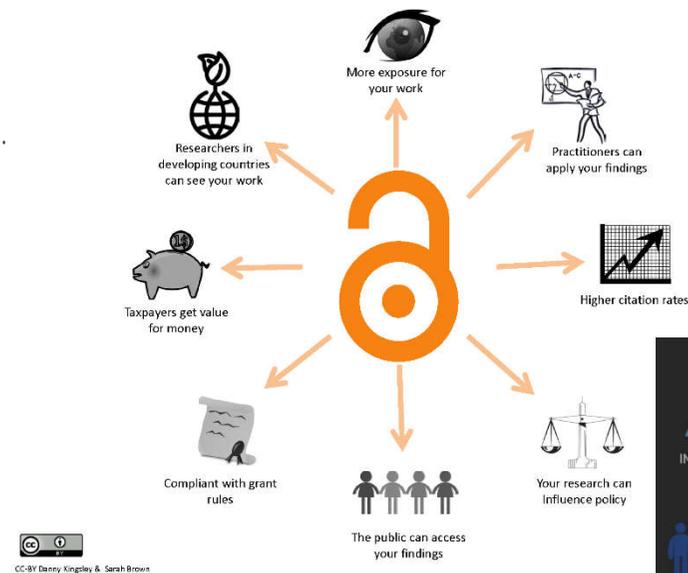
- Open access to outputs?
 - Which: articles, books, lectures, data, slides...?
- Open practices?
- Open software?
- Open peer review?
- Framework conditions, such as policies?
- Open-minded?
- Open to all?



Dilemmata of open science indicators

Lack of clear meaning

- Efficiency
- Reproducibility
- Credibility
- Visibility
- Reflexivity
- Impact
- ...
- “Open science is about improving the quality, accountability and social contribution of research...” (p. 96)



Dilemmata of open science indicators

Efficiency of indicators-illusion

- Open science indicators are hard work for everybody concerned
- „The more impact you actually have, the harder it is to account for it“ (Power, 20, p. 65)
- Are indicators the right incentives for what we want to achieve?



Dilemmata of open science indicators

Open science is a moving target

- Dependency on context: disciplines, policies, platforms, use cases....



Dilemmata of open science indicators

Open science is a moving target

Table 2. Overview of Thematic Analysis.

| Biomedical researchers' understandings of openness | Factors affecting the practice of openness in science |
|---|--|
| 1. The timely donation of and access to research components | 1. The existence of repositories and databases for data, materials, software, and models |
| 2. Standards for the format and quality of research components | 2. The competitiveness of academic fields |
| 3. Metadata and annotation | 3. The digital nature of research |
| 4. Collaboration and cooperation with peers and communities | 4. Credit systems in academic research |
| 5. Freedom to choose venues and strategies for disseminating research | 5. Career structures in academic research |
| 6. Transparent peer review systems | 6. Collaborations with industrial partners, as well as attempts at commercialization |
| 7. Access to research components in non-Western and/or nonacademic contexts | 7. Models and guidelines for intellectual property |
| | 8. Governmental views on the status and social role played by universities |
| | 9. The existence of various, and at times conflicting, government policies on Open Science |

Dilemmata of open science indicators

Open science is a moving target

- Dependency on context: disciplines, policies, platforms, use cases....
- Indicators and metrics contradict open science
- Multidimensional individual indicator space as a solution?

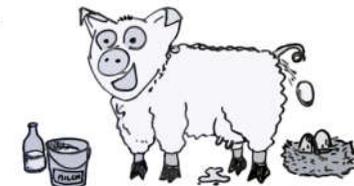


Dilemmata of open science indicators

All or nothing-principle

- Who is an open science champion?
- Are open science indicators supportive in becoming a better researcher?

I'm not necessarily on board with everything. How many people really do open data? And preregister everything. And do open peer review. And preprint. What if I only do a couple of those things? What if I do green open access but not gold? Am I not an open scientist if I don't do a live open lab notebook with a simultaneous bodycam?



Questions? Thank you!

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