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?

Current approaches

Doing open science

• Focus on open science practices

• Practice before output: Could this be a basis for indicators?

Current approaches

Open Science Monitor

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

http://ec.europa.eu/research/openscience/index.cfm?pg=home&section=monitor
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
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

<table>
<thead>
<tr>
<th>NAME DES INDIKATORS</th>
<th>ANZAHL VON OA PUBLIKATIONEN IN DEUTSCHLAND</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untersuchungseinhalt</td>
<td>Publikation</td>
</tr>
<tr>
<td>Datensquelle</td>
<td>Web of Science, Scopus (Integriert, kuratierte Daten über KB Datenbank verfügbar)</td>
</tr>
<tr>
<td>Dimension</td>
<td>Zugänglichkeit</td>
</tr>
<tr>
<td>Kommentare</td>
<td>Genauer zu spezifizieren nach Art des Zugangs (z.B. Gold, Silber, Bronze, Time to be Zugänglichmachung Ist zu berücksichtigen)</td>
</tr>
<tr>
<td>Art der Erhebung</td>
<td>Deskriptiv, Ratio in Verhältnis zu Non OA, aufgliedern nach Forschungsfeld</td>
</tr>
<tr>
<td>Feld/Thema/Plattformspiegel</td>
<td>Aufgliedern nach Disziplin/Forschungsfeld (Subject Categories)</td>
</tr>
</tbody>
</table>

Quelle: Eigene Darstellung

Only in German: https://www.stifterverband.org/download/file/fid/7855
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
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)
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?

https://www.talyarkoni.org/blog/2019/07/13/i-hate-open-science
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>
<thead>
<tr>
<th>Biomedical researchers’ understandings of openness</th>
<th>Factors affecting the practice of openness in science</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The timely donation of and access to research components</td>
<td>1. The existence of repositories and databases for data, materials, software, and models</td>
</tr>
<tr>
<td>2. Standards for the format and quality of research components</td>
<td>2. The competitiveness of academic fields</td>
</tr>
<tr>
<td>3. Metadata and annotation</td>
<td>3. The digital nature of research</td>
</tr>
<tr>
<td>4. Collaboration and cooperation with peers and communities</td>
<td>4. Credit systems in academic research</td>
</tr>
<tr>
<td>5. Freedom to choose venues and strategies for disseminating research</td>
<td>5. Career structures in academic research</td>
</tr>
<tr>
<td>6. Transparent peer review systems</td>
<td>6. Collaborations with industrial partners, as well as attempts at commercialization</td>
</tr>
<tr>
<td>7. Access to research components in non-Western and/or nonacademic contexts</td>
<td>7. Models and guidelines for intellectual property</td>
</tr>
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<td></td>
<td>8. Governmental views on the status and social role played by universities</td>
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<td></td>
<td>9. The existence of various, and at times conflicting, government policies on Open Science</td>
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</table>

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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