Building an Open Science Monitoring Framework with open technologies

19th of December
UNESCO headquarters

Workshops

- Brainstorming around open science monitoring principles 1 and 2

- How do we build an international community of actors around open science monitoring?

- What technical specifications do we need to build an open science monitor on research data?

- What technical specifications do we need to build an open science monitor on software?

Session 1 : Brainstorming around open science monitoring principles 1

Ludo Waltman (CWTS) & Bianca Kramer (Sesame Open Science)

Key elements from the discussion

Scope:
- Narrow vs. broad scope (quantifiable outputs vs. societal outcomes)
- Focus on (public) policy, but recognize it is going to affect other things, including research assessment

Tension between applicability and comparability:
- Foster comparison through transparent methods and interoperability (instead of core set of indicators)
- Start from purpose/mission?
- Relevance, interoperability, equity/inclusiveness

Indicators:
- Core set of indicators -> common set of indicators (less prescriptive)
- Multiple sets of common indicators for different purposes/contexts
- Maps of interrelated indicators
- Merge this principle with foster comparison principle

Key elements from the discussion

Quality vs. quantity indicators:
- Principle caused significant confusion (multiple interpretations), so needs to be largely rephrased
- Outcomes over outputs instead of quality vs. quantity?
- Should be dependent on purpose
- Qualitative approaches such as surveys may be needed depending on the purpose of the monitoring

Session 2 : Brainstorming around open science monitoring principles 2

Nicolas Fressengeas (MESR) and Iain Hrynaszkiewicz (PLOS)

Key elements from the discussion

- An overarching Value section should be added to guide the principles
- The values of Open Science have been defined by Unesco : expand it to monitoring
- In the values sections :
  - equity
  - inclusiveness (transparence on the research agenda)
  - diversity (of publishers…)
- Part 3 : change the name to self monitoring or self assessment
- For the sake of transparency , the goals for the monitoring should be explicit
- The word "reproducibility" of the monitoring is missing (though is it quite implicit)
- Should we, or could we, monitor the "quality" of research ? Maybe we could monitor the openness of the research processes (alongside papers, data, software…). Be careful : openness does not imply quality : carefully separate monitoring and assessment. Peer review is absent of the principles : the quality control must be transparent, and the metadata present. (should be part of the indicators)
- The participation of the stakeholders in, after and before the research process could be monitored
- The maturity section is unclear
- Missing epistemic diversity and justice

Core indicators

- The core indicator set should be defined and be standardized for interoperability but care must be expressed when comparing different disciplines and countries : papers, data, software, business models to open science & equity (no consensus on this and discussion must continue). The process to define the core set of indicators should be wider. Some domains have already a consensus on core indicators (eg bio-medicine)...
- It could also be possible to let the people people monitor what they can and select within the result (some it may induce unused work)

- Maybe we should provide an example set of indicators, or minimal amount of data, or an advised set of indicators

Session 3 : How do we build an international community of actors around open science monitoring?

Vincent Larivière (UNESCO) and Kamran Naim (CERN)

Key elements from the discussion

1. Principles of such an international community
   a. Cooperative: sharing both ways across actors
   b. Representative of various groups, stakeholders, nations
      i. Researchers
      ii. Policy makers
      iii. Providers
      iv. General public
   c. Flexible in definitions
      i. Higher levels of standards in measurement open access vs measurement of citizen science
   d. Iterative and agile
      i. OA is not as the same level than open data or citizen science
   e. Allow for new entrants
   f. Public oversight
   g. Autonomy of stakeholders
   h. Start small
2. How?
   a. Find a convening organisation—there may be more than one convening organisation depending on the dimensions of open science
   b. Making it clear what the advantages are to be part of the organisation / group
      i. Standards, Comparative data, Technical support, Shared experience

Session 4 : What technical specifications do we need to build an open science monitor on research data?

Chris Erdmann (SciLife) and Gabriela Mejias (DataCite)

[Draft doc](#)

Key elements from the discussion

- Recognizing diversity in approaches (lack of maturity of practices and indicators from various disciplines, still very new) - beginning of a journey
- Monitor and encourage open science practices, approaches based on community values in line with values of UNESCO open science recommendations
- Monitor system that is iterative, guided by values, and that can shift vs utopian approach
- Easy to address the indicators that are known to us vs spending time to look at the gaps, what is less familiar and known (worth spending the time to explore these gaps, address the difficult questions first)
- Journey towards indicators, there should be research, understand what we want to monitor, how can we monitor, study approximations/assessments, and how they will impact the community
- Importance of audience and how to communicate perspectives, limitations of indicators
- Documentation of monitors is a must - Explain to others the dynamics of how information gathered and displayed in monitor, and deficiencies (importance of responsibility)
- Group not ready to explore indicators without addressing key elements above

Session 5 : What technical specifications do we need to build an open science monitor on software?

Karthik Ram (Berkeley Institute for Data Science) and
Jonathan de Bruin (Universiteitsbibliotheek Utrecht)

Key elements from the discussion

An open science monitor for software should address the following key points:

- **Address challenges in defining research software**
  - **Converge on a standard for metadata** that address the needs of the different stakeholders (multiple aspects of upstream monitoring)
  - Account for the **unseen dependencies** in research software

Key elements from the discussion

- **Go beyond the FAIR principles**? For instance, a software management plan: https://zenodo.org/records/7248877

- **Address training and education**: to enable researchers to effectively contribute to existing OSS projects

- **Need policy recommendations and implementation strategies at various levels**

Key indicators

- **Openness**: software made open given all created software

- **Usage**: measuring the dependency on proprietary software versus open-source

- **Adoption of metadata standards** when sharing/opening a software

- **Assessment of the quality** of software given its purpose

- **Contribution to existing open software**, which countries do they come from? How is this changing over time? Are we seeing growing representation from previously underrepresented regions?

Closing remarks: Towards a community-led Open Science Monitoring Framework

Laurent Romary (Inria)

General vision

- General perspective related to open science: accessibility of all types of research to everyone
  - Publications, but also.. Data, software, clinical research, processes (also costs and ROIs), even AI generated data
  - Demographics, projects etc.
  - Inclusivity: geography, gender, economical and social perspectives
- Variety of stakeholders
  - Repositories, policy makers, technologists, lawyers… and researchers
- Accompanying national/institutional policies
  - Impacting on these policies
  - Impacting on behaviours
- Optimum set of indicators (vs. open set of indicators under the same principles)
  - Openly measuring science
- Wider context: a lot of initiatives that have to be put in synch
  - Cf. UNESCO open science outlook, Barcelona declaration, POSI, COARA, OSTP declaration, ISO/TC 46
  - Monitoring initiatives: SciX, BSO, COKI
- Collaboration is key!

Discussion points

- Tracking objects - tracking usage
- Getting credit – whatever the purpose, beyond citations
  - Not necessarily rankings
- Departing from proprietary data sources
  - Cf. enriching, combining, re-distributing
  - Open monitoring data and software
  - Licensing
- Maintaining the technological pace and improving the shared technical framework
  - Sharing, collaborating
  - Specification: data formats, indicators, recipes
  - Contributing to shared open databases (OpenAlex)
- Elephant in the room: public investment
  - Balancing what we invest in proprietary services and public infrastructures

Monitoring – where do we go from here?

- Principles for sharing indicators (and identifying new ones)
  - Finalizing current proposal…
  - Putting it on the table
- Continuous monitoring of such collaborative work
  - Working groups
  - Monitoring monitors
- Technical specifications, standardisation
- Being pragmatic (layers)
  - Aggregating vs. having everyone around the table from the start