Stories from the open science “revolution”

How (some) scientists talk about openness

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Where am I coming from?

- Trained in science
  - Undergraduate biology
- 3 years in open access publishing
  - PLOS journals
- Re-trained in social studies of science
  - (UCL, University of Edinburgh)
- Studying scientists’ views of openness since 2014
My PhD project

- How is the meaning of “open” in science being constructed?
  ...by (biological) scientists, and open science policymakers & advocates
  ...via in-depth qualitative interviews, and documents (policy, advocacy, research)
- 44 interviews (31 with scientists, 13 with policymakers/advocates)
  ○ Varied career stages, genders & biological disciplines, in UK & some in Australia

Deliberately broad topic: exploring “openness in science”, “open science” and various meanings they conjure. Interested less in defining openness, more in understanding what it means to different people and groups.
Why I study “openness in science”...

1) Increasingly salient in research, policy, publishing, universities...
2) Grand promises for the future - *open science “revolution”*
3) Hard to pin down - *flexible, changing, means many things*
4) Both very old and very new - *historical depth and interest*
5) Involves [re]defining “good science” - *epistemic virtue? e.g. objectivity*
6) Gap between [many] scientists and policy/advocacy - “*culture” problem*?
(2) Grand promises for the future

“...the openness I am advocating would be a giant cultural shift in how science is done, a second open science revolution extending and completing the first open science revolution, of the seventeenth and eighteenth centuries.”
- Nielsen, 2011, pp. 183-4

“The internet...may pave the way for a second open science revolution, as great as that triggered by the creation of the first scientific journals.”
- The Royal Society, 2012, p. 7
(3) Hard to pin down

“Open Science is an umbrella term encompassing a multitude of assumptions about the future of knowledge creation and dissemination.”

- Fecher & Friesike, 2014
Openness in science...gives me a sense of the extent to which researchers are being open, it’s sort of a behaviour thing...

...whereas open science...is more like a “thing”, if that’s the right word! [laughs]. You know, open science is the box, and it’s very hard to define what goes in that box, because I think the goalposts are continually shifting.”

- Open science advocate [interview #26]
“Open” has become a powerful, flexible term for what is good and desirable in science.
17th century onwards: a traditional kind of “openness”

- Expectation that science will be shared (published?) in a community
- An ethos of “commun[al]ism” as definitive to science

**Merton on “communism”:**

“The substantive findings of science are a product of social collaboration and are assigned to the community […]

Secrecy is the antithesis of this norm; full and open communication is its enactment.”

(1973, p. 273-4)

“*If I have seen further, it is by standing on the shoulders of giants.*”

*Newton, 1675*
(4) ...and very new

- 21st century: emergence of related but distinct “open science”
- “Open” often explicit - open access, open data etc.
- Diverse practices but connected by common narrative/ethos:

**Science is open at heart...now it needs to be more open**

- e.g. “...open communication and deliberation sit at the heart of scientific practice.” *
- e.g. “...much of today’s scientific practice falls short of the ideals of intelligent openness...” *

Shared ethos with older, traditional openness

*subtext* because science has been corrupted, and/or because new technology (digital, internet) is available

*Royal Society, 2012, Science as an open enterprise, p.13,16*
(5) Involves [re]defining “good science”

"...if you do not make the data, which you use to justify a truth claim in science, openly available, you are not doing science, and what you're doing is scientific malpractice.”
- Senior scientist/policy maker

Open is a mindset that represents the best scientific values. One that focuses on bringing scientists together, to share work as rapidly and as widely as possible, to advance science faster and to benefit society as a whole.

Source: https://www.plos.org/who-we-are

“...Open Science is just good science! My talk from @tudelft is now online via @figshare! figshare.com/articles/Open_ ... #tudelft #dies2018

- Jon Tennant @ProtoHedgehog

When will ‘open science’ become simply ‘science’?

Mick Watson

Watson Genome Biology (2015) 16:101

Open Access
(5) Involves [re]defining “good science”

Second research question:

Is openness being constructed as an epistemic virtue?

- **Epistemic virtue**: something taken for granted as a truth-making quality, e.g. objectivity
- Daston & Galison, 2007 →
- Morality and knowledge-making as inseparable
- Also [re]defines the “good scientist”
(6) **Gap between [many] scientists and policy/advocacy**

- Open science movements are often led by scientists
- But many (or most?) scientists are perceived to be ambivalent, or slow adopters
- Policy/advocacy discourse is turning towards a need for “cultural change”

“There are real dangers in trying to introduce new practices without **carrying the academic community with the leaders of those changes** [...] In many ways, **cultural change** is the most difficult outcome to achieve in embracing Open Science...” (LERU, 2018, p. 21)

But what is that culture?
How do scientists talk about openness?

- Scientists [that I spoke to] do tend to see openness as an a virtue
  - A quality associated with good scientists and good scientific practice
    “Being open about what you’re doing is bred in the bone - it’s just something that good scientists do. They don’t hide things away.” - Cedric, retired scientist

- They sometimes even say that openness defines science
  - “Science is science if it’s open.” - Gavin, senior scientist
But what do they mean by “openness”?

- Most are aware of “open science” agenda/movements
  - Especially open access publishing, open data
  - Some awareness of open peer review, open preprints (bioRxiv), open notebook science

- A couple of trends:
  - **Open access**: high awareness, high acceptance, skepticism about economics, not emotive
  - **Open data**: high awareness, mixed acceptance (context-dependent), can be highly emotive
    - Sometimes accepted as default (e.g. genomic data)
    - Some don’t see it as “relevant” (e.g. biochemical data)
    - Some curious but don’t feel they have the time/tools (e.g. histology, photographic data)
    - Brings up close emotional tie to data
But what do they mean by “openness”?

- Many construct openness outside the “open science” agenda/movements
  - Openness via “talking”, i.e. personal conversations with other scientists - “interactive disclosure”
  - Applies to unpublished ideas and data - involves shared vulnerability and reciprocity
  - Boundaries and context are key: when, how, and with whom is it wise to share?
  - Developed through taking risks, trusting, and cultivating collaborative relationships
  - Moral and strategic aspects: “generosity pays” (Jenny), “enlightened self-interest” (Cedric)

“I don’t think it [openness in science] means open access, I think that’s trivia [...] I think openness really is about sharing information – probably with some common purpose [...] sharing information before the story is complete.” (David, senior scientist)

“Openness – what first comes to mind would be feeling free to talk, at meetings about work that hasn’t been published yet.” (Stephen, senior scientist)
Significance of openness as “interactive disclosure”?

- Acknowledging *(pre)existing “openness” cultures* in science
  - Similar, but not the same as ethos of communalism (Merton)
  - Could be seen as: ideal of “open” sharing, adapted to risky/competitive science system

- Window into how scientists navigate openness of *unpublished ideas and data*?
  - Publication or “priority” as important boundary
  - Comparable to online contexts?

- Relevant to proposed “culture change” towards openness

But note: *generational effects? career security effects?*
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Bibliography (general indication)

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