Is ‘Open Science’ a solution or a threat?

Open science, transparence et evaluation. Perspectives et enjeux pour les chercheurs.

https://sygefor.reseau-urfist.fr/#!/training/6701/7159/?from=true

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Dr Danny Kingsley
Head of Scholarly Communication
University of Cambridge
@dannykay68
Slides -XXXXXX
Today’s talk

• The problem
  – The problems caused by the way research is measured
• The solution?
  – How Open Science can address these
• The reality
  – Why it is difficult to implement Open Science ideas
• I will be live tweeting – so all links to papers will be tweeted as we go #XXXX
The coin in the realm of academia

The only thing that counts in academia is publication of novel results in high impact journals

The insistence on the need to publish novel results in high impact journals is creating a multitude of problems with the scientific endeavour.
The problems

• Problem 1: Reluctance to share data
  – (all disciplines)
• Problem 2: Hyperauthorship
  – (Physics)
• Problem 3: Reproducibility
  – (Psychology, Neuroscience, Pharmacology)
• Problem 4: Retraction
  – (Biological and Medical Sciences)
• Problem 5: Poor Science
  – (Sociology, economics, climate science also vulnerable)
• Problem 6: Attrition
  – (all disciplines)
Focus today

• Problem 1: Reluctance to share data  
  – (all disciplines)
• Problem 2: Hyperauthorship  
  – (Physics)
• Problem 3: Reproducibility  
  – (Psychology, Neuroscience, Pharmacology)
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## Problem 1: Data Excuse Bingo

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<tr>
<th>My data contains personal/sensitive information</th>
<th>My data is too complicated</th>
<th>People may misinterpret my data</th>
<th>My data is not very interesting</th>
</tr>
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<td>Commercial funder doesn’t want to share it</td>
<td>We might want to use it in another paper</td>
<td>People will contact me to ask about stuff</td>
<td>Data Protection/National Security</td>
</tr>
<tr>
<td>It’s too big</td>
<td>People will see that my data is bad</td>
<td>I want to patent my discovery</td>
<td>It’s not a priority and I’m busy</td>
</tr>
<tr>
<td>I don’t know how</td>
<td>I’m not sure I own the data</td>
<td>Someone might steal/plagiarise it</td>
<td>My funder doesn’t require it</td>
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# Data Excuse Bingo created by @jenny_molloy

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‘A second concern held by some is that a new class of research person will emerge — people who had nothing to do with the design and execution of the study but use another group’s data for their own ends, possibly stealing from the research productivity planned by the data gatherers, or even use the data to try to disprove what the original investigators had posited. There is concern among some front-line researchers that the system will be taken over by what some researchers have characterized as “research parasites.”’

Solution – reward data sharing

- REgistry of REsearch Data REpositories
  http://www.re3data.org/

- Joint Declaration of Data Citation Principles
Scientists are very rarely rewarded for being right, they are rewarded for publishing in certain journals and for getting grants.
The nine circles of scientific hell
(with apologies to Dante and xkcd)
“Simulations show that for most study designs and settings, it is more likely for a research claim to be false than true.”
Conducted replications of 100 experimental and correlational studies published in three psychology journals using high-powered designs and original materials when available.

- Replication effects = half the magnitude of original effects (substantial decline)
- 97% of original studies had significant results
- 36% of replications had significant results

https://osf.io/ezcuj/
Crisis?

**IS THERE A REPRODUCIBILITY CRISIS?**

- 7% Don’t know
- 52% Yes, a significant crisis
- 3% No, there is no crisis
- 38% Yes, a slight crisis

1,576 researchers surveyed

*Nature, 533, 452–454 (26 May 2016) doi:10.1038/533452a
http://www.nature.com/news/1-500-scientists-lift-the-lid-on-reproducibility-1.19970*
Interest at highest level

- Research Integrity Enquiry
  - UK Government Science and Technology Committee - Submissions closed 10 March 2017
The whole outdated enterprise is kept alive for one main reason: the fact that employers and funders of researchers assess researchers primarily by where they publish. It's extraordinary to me and many others that the employers, mainly universities, outsource such an important function to an arbitrary and corrupt system.

‘Richard Smith: Another step towards the post-journal world’ BMJ blog, 12 Jul, 16
Solution – Open Science

• We need to change the way we reward researchers by distributing the dissemination of outputs across the research lifecycle

• We will hear more about reproducibility and open science later today

• I will be talking now about the challenges of implementing Open Science in institutions
Resources if you want to know more

  - [https://unlockingresearch.blog.lib.cam.ac.uk/?page_id=2#OpenResearch](https://unlockingresearch.blog.lib.cam.ac.uk/?page_id=2#OpenResearch)
- My talk about the open argument
  - “Reward, reproducibility and recognition in research - the case for going Open” Eleventh Annual Munin Conference on Scholarly Publishing, 21 November 2016
- Useful slides and list of references
  - "Fake Results": The Reproducibility Crisis in Research and Open Science Solutions
The challenges of implementing Open Science

It is difficult to get ANY change in research institutions
We need institutions to play along

• “Improving the quality of research requires change at the institutional level”

• “Universities and research institutes should play a major role in supporting an open data culture”
Resistance

• Generally institutions are reluctant to step up, partly because of the governance structure.

• The nature of research itself is changing profoundly. This includes extraordinary dependence on data, and complexity requiring intermediate steps of data visualisation. These eResearch techniques have been growing rapidly, and in a way that may not be understood or well led by senior administrators.

  — “Openness, integrity & supporting researchers” Emeritus Professor Tom Cochrane
  https://unlockingresearch.blog.lib.cam.ac.uk/?p=307
Governance

- These are big changes that need to be pushed through the system.
- This is particularly complicated at Cambridge

https://www.governance.cam.ac.uk/governance/key-bodies/Pages/default.aspx
Academics at the 800-year-old institution have a unique role in the running of their university and, along with owning their own intellectual property rights, members of the university's Regent House can lobby for a vote on all amendments and additions to the university's governing rules.

The ancient system of governance has come under attack in the past for being too cumbersome, and ill-designed for the 21st century. The university has come under pressure from government to reform its system of governance and intellectual property rights.

“Dons clash with Cambridge over intellectual rights”, The Guardian, 2005
https://www.theguardian.com/education/2005/nov/22/highereducation.businessofresearch
• Academia is an unusual economy – no payment for publishing, instead esteem
• The people and institutions who have succeeded have done so within the current ‘economy’
• If the way research is rewarded changes, then the winners might not be winners any more
Academia is tribal

• ‘Invisible colleges’ relate to the community people have with their discipline.
• This stuff sounds scary! If people have not experienced things themselves they don’t believe it
A whole other tribal system

The people who sit on all the committees and make decisions are academics. While they hold these posts, they are still individuals whose research is based in a particular discipline.
Is it our ‘place’?

http://www.keepcalm-o-matic.co.uk/p/keep-calm-and-know-your-place-3/
What is Scholarly Communication?

• Association of College and Research Libraries (ACRL) 2003 definition:
  – "the system through which research and other scholarly writings are created, evaluated for quality, disseminated to the scholarly community, and preserved for future use. The system includes both formal means of communication, such as publication in peer-reviewed journals, and informal channels, such as electronic listservs."

• Often Scholarly Communication services are run out of libraries
What is the role of the library?

• Discussion at RLUK2017 conference.
  – Are librarians support staff or research partners?
  – Should we be collaborating and partnering with the research community?
  – Should we be leading the University over these issues?

• See: “Become part of the research process – observations from RLUK2017”
  – https://unlockingresearch.blog.lib.cam.ac.uk/
Yes we should be driving this agenda

- Scholarly Communication takes a ‘meta’ view of the research ecosystem
- Disciplinary differences mean individual researchers come to the table with very specific perspectives
- They all think they are right
- Very few understand that things are different in other disciplines – and that these are as valid as their own
- Scholarly Communication is a research discipline of its own. This is not recognised by most academics!
And then there is the administration

You Tube Cambridge in Numbers

https://www.youtube.com/watch?v=FwZsb2CkMsM
• “Academic administrators that I’ve talked to are genuinely confused about how to update legacy tenure and promotion systems for the digital era. This book is an attempt to help make sense of all this.”

So what are the problems?

- Lack of perceived need from the academic community for scholarly communication support and advice
- Questions about whether it is appropriate for libraries to be driving this agenda through the institution
- Institutions are set up to maintain the status quo
- Researchers think they know all about how the research ecosystem works. (They mostly don’t.)
  - See: “The value of embracing unknown unknowns” [https://unlockingresearch.blog.lib.cam.ac.uk/?p=594](https://unlockingresearch.blog.lib.cam.ac.uk/?p=594)
• Making data and other non traditional research outputs available is difficult
• We need to train our research community in how to research openly
    http://biorxiv.org/content/early/2017/01/28/103895
A lot of persuading!!

• Academics
  – don’t believe you
  – don’t necessarily think they need you
• Institutions
  – not always supportive
  – designed not to change
• Libraries
  – don’t think this is their role
  – having something of a crisis of purpose as we move to an open world
Some institutions are standing up

Stand out from the crowd by Steven Depolo
Flickr Licensed Under CC BY 2.0
Leading the way

• Indiana University-Purdue University Indianapolis (IUPUI) —
  – Have included open access as a value in promotion and tenure guidelines
    (2016) http://crln.acrl.org/content/77/7/322.full

• University of Liege
  – “[The university] linked internal assessment to the scientific output stored in {repository] ORBi. Those applying for promotion have no choice but to file all their publications in full text.” (2011)
  – http://www.ooocanada.ca/motivating_open_practices_rpt

• NIH “Including Preprints and Interim Research Products in NIH Applications and Reports” – 6 October 2016

• Report: Next-generation metrics: Responsible metrics and evaluation for open science.
Open can mean success

- McGill University's Montreal Neurological Institute and Hospital, Canada
  - First academic institution to adopt an open science approach
  - Institute has received considerable donations in the wake of this decision
  - $20 million in January 2017 to establish the Tanenbaum Open Science Institute
Lots of work to be done

Image by Danny Kingsley
Thanks!

Dr Danny Kingsley
Head of Scholarly Communication
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