The Future of Peer Review: Four Schools of Thought

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RoRI scholarly communication workstream

• Our work is embedded in the scholarly communication workstream of the Research on Research Institute (RoRI)
• RoRI aims to co-design and co-produce research projects together with stakeholders in the research system, providing evidence-informed insights that can be translated into practical solutions
• At the start of RoRI in 2019/20, innovation in peer review was identified as one of the key challenges in the scholarly communication system
• With help from publishers, preprint servers, and other stakeholders, RoRI has performed a systematic analysis of the landscape of peer review innovation
• We hope our work will serve as a starting point for joint research projects aimed at addressing some of the most pressing problems in the peer review system
Studying peer review innovations

- Research on peer review innovation mostly focuses on particular types of innovation, e.g. fully open peer review vs. double-blind (e.g. Torny & Pontille, 2015), or filter-then-publish vs. publish-then-filter (Fitzpatrick, 2009).

- But there are also some overview studies (cf. Woods et al., 2022):
  - Studies from an “activist” perspective (Tennant et al., 2017; Barroga, 2020; Bruce et al., 2016): Focus on “fixing” peer review, implies general criteria of “robustness” and “quality” of peer review.
  - Another type of study focuses on uptake and incorporation of peer review innovations into editorial and review practices of journals (Horbach & Halffman, 2020) – conclusion is often that peer review actually doesn’t change much.

- We focus on innovation projects as objects of study in their own right.

- What are the main thrusts of innovation when seen on an aggregate scale? Possible to group innovation activities together?

Data collection

- 95 responses (i.e. self-defined innovations) by 54 respondents
- Various types of actors: Publishers, (academic) journal editors, NFP organizations, peer review startups
- Inductive taxonomy of innovations: How do particular innovations configure the peer review process regarding object of review, role of reviewers, nature of review etc.?

Four schools of peer review

- **Quality & Reproducibility school**
  - Focus: Role of peer review in evaluating and improving research quality and reproducibility
  - Key issues: Reviewer training, statistical peer review, reviewer agreement, registered reports, research integrity

- **Democracy & Transparency school**
  - Focus: Making evaluation of research more democratic and transparent
  - Key issues: Reviewer accountability, soundness-only peer review, open peer review, open evaluation, post-publication peer review

- **Equity & Inclusion school**
  - Focus: Making review processes more equitable and inclusive
  - Key issues: Reviewer diversity, editorial board diversity, gender bias, geographic bias, racial/ethnic bias, double-blind peer review

- **Efficiency & Incentives school**
  - Focus: Improving efficiency of review processes and incentives for reviewers
  - Key issues: Pressure on review system, reviewer fatigue, portable peer review, journal-independent peer review, reviewer recognition


Quality & Reproducibility School

- Review processes currently are not robust enough, quality & rigor of review must be increased to **make better accept/reject decisions**
- Tends to see **high level of inter-reviewer agreement as a sign of robustness** of peer review
- Examples
  - Reviewer **training**
  - Use of **review checklists**
  - Addition of a **statistical reviewer**
  - Review should focus also on **data and code** used for submissions and **make use of AI**
  - Registered reports – **peer review of a research plan** before data collection and analysis
  - Emphasis on ensuring **research integrity**
Democracy & Transparency School

- Traditional peer review model is too secretive and encourages gatekeeping
- Advocates broader participation in the review process to increase the accountability of editors and peer reviewers and enable reuse of peer review reports by others
- Examples
  - "Open peer review" or "transparent peer review" – publish review reports, editorial decisions and/or reviewer identities alongside manuscripts
  - "Soundness-only review" – discount any criteria besides rigor of a submission, such as novelty or fit with journal profile e.g. PLOS ONE, Scientific Reports
  - "Publish-then-filter" – publish scientific work and only then let community review it e.g. F1000, eLife
What is the joint commitment?

The Joint commitment for action on inclusion and diversity in publishing was launched in June 2021. It was developed following a workshop in which we shared our Framework for action — a practical guide to reducing bias in our own publishing activities — in a workshop with other publishers.

Collectively we agreed to pool our resources to take decisive action. We promised to:

1. Understand our research community
   We will collaborate to enable diversity data to be well reported by members of our community, and we will work towards a collective and compliant system so that researchers only need to self-report data once. We will share and analyse anonymised diversity data to understand where action is needed.

2. Reflect the diversity of our community
   We will use anonymised data to uncover subject-specific diversity baselines, and set minimum targets to achieve appropriate and inclusive representation of our authors, reviewers and editorial decision-makers.

3. Share success to achieve impact
   We will share and develop new and innovative resources to improve representation and inclusivity of diverse groups. We will transparently share policies, measurements, language and standards, to move inclusion and diversity in publishing toward together.

4. Set minimum standards on which to build
   We will scrutinise our own publishing processes and take action to achieve a minimum standard for inclusion in publishing, based jointly on the Royal Society of Chemistry’s Framework for Action in Scientific Publishing. We will engage all relevant stakeholders to improve outcomes on inclusion and diversity at all stages of the publishing process. Our minimum standards have now been launched and can be found here.
Equity & Inclusion School

- Peer review suffers from **biases related to gender, geography, race, ethnicity, etc.**
- Need for **balanced representation** of different groups of researchers in peer review system
- Examples
  - **Increase diversity** of reviewers and editorial board members; set minimum targets
  - “**Double-blind peer review**” – hide author identity from reviewers e.g. Institute of Physics
Efficiency & Incentives School

- Concerned about **pressure on peer review system**, making it difficult to find reviewers and slowing down publication of scientific results
- Need to **increase efficiency** of peer review system and to **better incentivize** reviewers
- Examples
  - “Portable peer review” – reuse of peer review reports of rejected articles by other journals
  - “Journal-independent peer review” – Peer review focusing on quality rather than journal fit e.g. Review Commons
  - **Reviewer recognition** – Publons and ORCID
Tensions between schools

Equity & Inclusion school favors anonymity to prevent bias in peer review, while Democracy & Transparency school promotes open peer review, preprinting, and post-publication peer review.

“open review is ethically superior to anonymous review” and gives “less scope for biased or unjustified judgments”

“evidence suggests that in particular early career researchers feel reluctant to engage with the review process ... if their names will be publicly shared. Publishing anonymous peer reviews can therefore greatly increase the transparency of the review process”
Tensions between schools

- **Quality & Reproducibility school** aims for more rigorous filtering, while **Democracy & Transparency school** questions emphasis put on binary accept/reject decisions.

- **Quality & Reproducibility school** assumes specific notions of quality, possibly favoring certain types of research, while **Equity & Inclusion school** aims for diversity of authors and types of research.

- **Quality & Reproducibility school** causes amount of review work to increase, while **Efficiency & Incentives school** aims to reduce pressure on peer review system, possibly at the expense of rigour of review.
Conclusion

- Ideas and ambitions of all four schools deserve serious consideration; conversations between schools may help find **creative ways to deal with the tensions** between the schools.

- Provide room for **more heterogeneity in the peer review system**, allowing for co-existence of different forms of peer review, e.g.:
  - All research outputs: Basic quality assurance followed by post-publication peer review
  - Selected research outputs: In-depth rigorous peer review organized in equitable and inclusive way

- Need for development of the publishing peer review system to be aligned with **broader developments in the research system** (e.g. peer review for grant funding; responsible research assessment; open science; diversity, equity, and inclusion)

- Need for research on research community to develop a **rigorous evidence-informed understanding** of the peer review system