Peer Review – Alternatives?

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Rigour and Openness in 21st Century Science, Oxford, UK
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Improving peer review?

Most scientists regarded the new streamlined peer-review process as ‘quite an improvement.’

http://rationallyspeaking.blogspot.co.uk/
Background – and Breakdown?
The beginning of peer review

The first peer-reviewed journal was founded in 1665 by the Royal Society.

Although journal publishing has evolved dramatically since, the core functions remain:

- Registration of new research findings
- Quality Assurance through peer review
- Dissemination globally
- Archiving in perpetuity
In 2011 there were 1,727,317 research articles published in peer-reviewed journals:

- That’s about 3 per minute or one every 20 seconds
- But an average peer review takes 2 to 4 hours…

Electronic submission and online publishing have led to an explosion in the number of submissions and in the number of outlet journals.
In 2012, just over 1 million research articles were submitted to Elsevier journals:

- That’s an average of about 1.5 per day per journal
- They were handled by Editors-in-Chief, Associate Editors, Editorial Boards and over 542,000 reviewers

After review and revision Elsevier will ultimately publish around one third of these submissions.
Increased volume = Increased noise

As the number of papers has increased this seems to have been accompanied by a general erosion of faith in peer review:

- It holds back innovative research
- It does not improve research articles
- It is biased
- It is not good at stopping plagiarism or fraud
Mainstream media takes notice

“Peer-reviewed journals aren't worth the paper they're written on” (Nigel Hawkes - director of Straight Statistics, Sept 2010)

“Is peer review broken?” (August 5th, 2010)

“Criminal minds betray the academy's higher principles” (August 5th, 2010)

“Has the peer review process lost credibility?” (Sandy Starr, Oct 9th 2010)
Researchers Researched
The Peer Review Survey was an electronic survey conducted between 28th July and 11th August 2009.

40,000 researchers were randomly selected from a database containing author names from over 10,000 journals.

Researchers answered a series of questions regarding their attitude towards peer review.

Altogether 4,037 researchers completed the survey.

Builds on a previous survey in 2007 and has been built on again with peer review guide for young researchers.
Broad satisfaction with peer review

**Question:** Overall, how satisfied are you with the peer review system used by scholarly journals?

![Pie chart showing satisfaction levels](chart.png)

- Very Satisfied
- Satisfied
- Neither satisfied nor dissatisfied
- Dissatisfied
- Very Dissatisfied

2007 study – 6% Very satisfied, 59% satisfied, 22% neither satisfied nor dissatisfied, 10% dissatisfied, 2% very dissatisfied, 1% don’t know/not applicable n=3040

The results show an increase in satisfaction since the 2007 survey.

69% in 2009 are very satisfied or satisfied, compared to 65% in 2007.
But peer review is not a panacea

**Questions:**
To what extent do you agree or disagree that the following objectives *should be* the purpose of peer review?

To what extent do you agree or disagree that peer review is currently *able to* do the following?

<table>
<thead>
<tr>
<th>Objective</th>
<th>% Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improves the quality of the published paper</td>
<td>93</td>
</tr>
<tr>
<td>Determines the originality of the manuscript</td>
<td>92</td>
</tr>
<tr>
<td>That it selects the best manuscripts for the journal</td>
<td>86</td>
</tr>
<tr>
<td>Determines the importance of findings</td>
<td>84</td>
</tr>
<tr>
<td>Ensures previous work is acknowledged</td>
<td>81</td>
</tr>
<tr>
<td>Detects plagiarism</td>
<td>81</td>
</tr>
<tr>
<td>Detects fraud</td>
<td>79</td>
</tr>
<tr>
<td>Should be able</td>
<td></td>
</tr>
<tr>
<td>Is able</td>
<td></td>
</tr>
</tbody>
</table>

0 10 20 30 40 50 60 70 80 90 100 % agree
Peer review - Researcher perceived value

90% of researchers believe that the peer review process improves the quality of published research but there were also comments about speed and overload.

Source: Peer review: benefits, perceptions and alternatives, Mark Ware Consulting, Publishing Research Consortium 2008
### Can we do better?

**Question:** Please indicate the extent to which you agree with the following statements:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Disagree</th>
<th>Neither Agree/Disagree</th>
<th>Agree</th>
<th>2007 (Agree)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without peer review there is no control in scientific communication</td>
<td>7%</td>
<td>8%</td>
<td>84%</td>
<td>83%</td>
</tr>
<tr>
<td>Peer review is unsustainable because there are too few willing reviewers</td>
<td>45%</td>
<td>35%</td>
<td>19%</td>
<td>n/a</td>
</tr>
<tr>
<td>Scientific communication is greatly helped by peer review of published journal papers</td>
<td>5%</td>
<td>12%</td>
<td>82%</td>
<td>85%</td>
</tr>
<tr>
<td>Peer review is a concept well understood by the scientific community</td>
<td>5%</td>
<td>7%</td>
<td>88%</td>
<td>n/a</td>
</tr>
<tr>
<td>The current peer review system is the best we can achieve</td>
<td>35%</td>
<td>32%</td>
<td>32%</td>
<td>32%</td>
</tr>
</tbody>
</table>
Who bears the burden of peer review

% of global reviews vs % global research output

The proportion of global reviews completed by the US is much greater than its proportion of global research articles (12% more).

Ideally a country should sit on the line - its proportion of world reviews should match its proportion of world papers.

China's contribution to global reviews is 5%. It produces 12% of the world's research articles. However, this low number is not because Chinese researchers are unwilling.

*Based on data from Elsevier
Peer review and rigour

What does this mean?

It means that peer review is seen as critical to:

- maintaining standards,
- identifying excellent research, and
- encouraging articles that are comprehensive enough to be reproducible

Peer review is a vital part of rigour in science.

But can the system be improved?
Alternatives
Evolution and efficiencies

In recent years the journal structure has evolved:

- Editorial desk rejects of clearly unsuitable papers are now more widely accepted as standard (and beneficial for reviewers, authors and editors)

- Journals have been restructured – more editors, less emphasis on regional structures or editorial offices

Electronic workflows/systems have allowed for the efficient movement of manuscripts around the world
Cascades

Journals have now begun to group together to cascade articles to more suitable journals to reduce reviewer requests and increase efficiency:

- Reviews stay with the paper so that papers are not reviewed twice
- The Neuroscience Peer Review Consortium is an alliance of around 40 journals that have agreed to accept manuscript reviews from other members

Cascades will become more popular but they will probably remain in-house in many cases
Open Peer Review

New workflows have been trialled in recent years:

- Open Peer Review which is designed to increase transparency and remove bias by allowing authors to see reviewer names and, in some cases, publishing reviewer reports alongside the paper.
- Has been trialled in several journals but to date uptake has been low and reviewers still have a reluctance to be revealed.
- Can be pre- or post publication.
- Already exists to some degree in discussion papers in existing journals.
Reducing the need for reviews

Several reduce peer review:

- Some allow for a more flexible system which will publish anything that is technically sound. For instance PLOS One’s criteria is “Submissions are considered on the basis of scientific validity and technical quality, not perceived impact.”

- Others deliberately look for rejected (but still peer reviewed) material.

- Often these start as cascades that fill a need for fast publication but they can become the first choice.
Several new initiatives are also gaining exposure:

- **Review and then allocation to journal** – authors choose review deadlines and journals offer publication based on Peerage Article Quality (PAQ)

- **Peer review independent of journal** – papers are chosen by journals based on “R-Score (an overall score based on Quality of Research, Quality of Presentation, and Novelty and Interest) as a new article level metric.” Claims to reduce bias.

- **Review without readership context** or allocation is more difficult.

Almost all these initiatives (to date) are in health and life sciences.
What do researchers think?

**Question:** For research papers published in your field, to what extent do you agree that the following types of peer review are/would be effective?

- **Single-blind peer review:**
  - Disagree: 39%
  - Agree: 45%
  - Neither Agree/Disagree: 16%

- **Double-blind peer review:**
  - Disagree: 12%
  - Agree: 76%
  - Neither Agree/Disagree: 11%

- **Open peer review:**
  - Disagree: 61%
  - Agree: 20%
  - Neither Agree/Disagree: 17%

- **Open & published peer review*:**
  - Disagree: 56%
  - Agree: 25%
  - Neither Agree/Disagree: 17%

- **Supplementing review with post-publication review:**
  - Disagree: 24%
  - Agree: 47%
  - Neither Agree/Disagree: 26%

- **Peer review could in principle be replaced by usage statistics:**
  - Disagree: 67%
  - Agree: 15%
  - Neither Agree/Disagree: 17%

* This is where the authors and reviewers are known to each other and additionally the reviewers’ signed reports are openly published alongside the paper.
Other challenges

The **number of articles** is a challenge but there are other challenges to the peer review process:

- **Reward and recognition.** Not just financial but recognition by research assessment, the academic community and publishers

- **What defines a paper?** Increasingly papers now include data sets, executable code, video and audio – what should be reviewed and how will we define these elements in the future?
Conclusion

Why? Peer review, in whatever form, is still seen as vital to the publication process as an indicator of quality.

How? There are many new models for peer review. The “traditional” model prevails but the pressure on the system has led to an evolution of the system. The review needs to be appropriate for the material being considered.

Drivers for Change? The key driver for change in peer review has to the scientific community. Peer review has to meet your needs.

THANK YOU