

Open Science Kitchen



*TODAY:
Rewards and
Recognition in
the context of
Open Science*

Next Open Science Kitchen: Thursday, 4th Nov at 14:00

Frank Ostermann will report on a study about the computational reproducibility of papers from the area of geographic information science. However, the insights are also very interesting and relevant for people from other disciplines.



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ITC

Markus Konkol,
Open Science Officer



@MarkusKonkol

Rewards and Recognition in the context of Open Science

A quick poll: Please go to www.menti.com and use the code 76769659

Which indicators are usually used to evaluate the quality of a researcher?

Which indicators are usually used to evaluate the quality of a scientific paper?

Researcher

Paper

Quantitative metrics

Journal Impact Factor (JIF)

- The JIF is the mean citation rate of all articles contained in a journal
- Used as an indicator for the influence of a journal
- Regarded as a quality ranking for journals (often used as advertisement)
- Often used to evaluate individual scientists and research groups, e.g., for hiring, promotion, and tenure

h-index

- The number of papers co-authored by the investigator with at least h citations each
- Used to measure the success of researchers, e.g., for funds and positions

Why citing?

- To provide background reading
- Identifying methodology
- Paying homage
- Identifying original publications
- Giving credit for related work
- Criticizing previous work
- Correcting a work
- Disclaiming others' work
- Disputing claims

A cited work may be

- Refuted
- Noted only
- Reviewed
- Applied
- Supported

→ All reflected in the same number: The number of citations

Citations, Citation Indicators, and Research Quality: An Overview of Basic Concepts and Theories

Dag W. Aksnes , Liv Langfeldt, Paul Wouters

First Published February 7, 2019 | Research Article



<https://doi.org/10.1177/2158244019829575>

[Article information](#) ▾



108



Abstract

Citations are increasingly used as performance indicators in research policy and within the research system. Usually, citations are assumed to reflect the impact of the research or its quality. What is the justification for these assumptions and how do citations relate to research quality? These and similar issues have been addressed through several decades of scientometric research. This article provides an overview of some of the main issues at stake, including theories of citation and the interpretation and validity of citations as performance measures. Research

Four dimensions of scientific quality

- Solidity and Plausibility
 - Assumption: Authors cite papers they find solid and plausible
 - But: Citation behaviour can be based on very different reasons
- Originality and Novelty
 - Assumption: Research with high originality and novelty are much cited
 - But: Review papers are also cited frequently
- Scientific value (impact)
 - Assumption: Scientists referring to a paper show it is more useful than hardly cited papers
 - But: Articles published by more recognised scientists gain more citations than less known researchers
- Importance for society
 - Assumption: Articles important for society gain more attention and thus more citations
 - But: Academic search engines only take into account scientific output; local vs. international impact



Quantitative metrics

Why the impact factor of journals should not be used for evaluating research

Per O Seglen

Institute for Studies
in Research and
Higher Education
(NIFU),
Hegdehaugsveien
31, N-0352 Oslo,
Norway
Per O Seglen,
professor

BMJ 1997;314:498-502

Evaluating scientific quality is a notoriously difficult problem which has no standard solution. Ideally, published scientific results should be scrutinised by true experts in the field and given scores for quality and quantity according to established rules. In practice, however, what is called peer review is usually performed by committees with general competence rather than with the specialist's insight that is needed to assess primary research data. Committees tend, therefore, to resort to secondary criteria like crude publication counts, journal prestige, the reputation of authors and institutions, and estimated importance and relevance of the research field,¹ making peer review as much of a lottery as of a rational process.^{2,3}

On this background, it is hardly surprising that alternative methods for evaluating research are being sought, such as citation rates and journal impact factors, which seem to be quantitative and objective

Summary points

- Use of journal impact factors conceals the difference in article citation rates (articles in the most cited half of articles in a journal are cited 10 times as often as the least cited half)
- Journals' impact factors are determined by technicalities unrelated to the scientific quality of their articles
- Journal impact factors depend on the research field: high impact factors are likely in journals covering large areas of basic research with a rapidly expanding but short lived literature that use many references per article
- Article citation rates determine the journal impact factor, not vice versa

nature

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nature > editorials > article

Published: 27 July 2016

Time to remodel the journal impact factor

Nature 535, 466 (2016) | Cite this article

478 Accesses | 22 Citations | 450 Altmetric | Metrics

Nature and the Nature journals are diversifying their presentation of performance indicators.

Metrics are intrinsically reductive and, as such, can be dangerous. Relying on them as a yardstick of performance, rather than as a pointer to underlying achievements and challenges, usually leads to pathological behaviour. The journal impact factor is just such a metric.

 **frontiers**
in Human Neuroscience

Front Hum Neurosci. 2016; 10: 556.

Published online 2016 Nov 2. doi: [10.3389/fnhum.2016.00556](https://doi.org/10.3389/fnhum.2016.00556)

PMCID: PMC5089989

PMID: [27853429](https://pubmed.ncbi.nlm.nih.gov/27853429/)

The Slavery of the *h-index*—Measuring the Unmeasurable

Grzegorz Kreiner*

▸ Author information ▸ Article notes ▸ Copyright and License information ▸ Disclaimer

This article has been cited by other articles in PMC.

Introduction

Go to: 

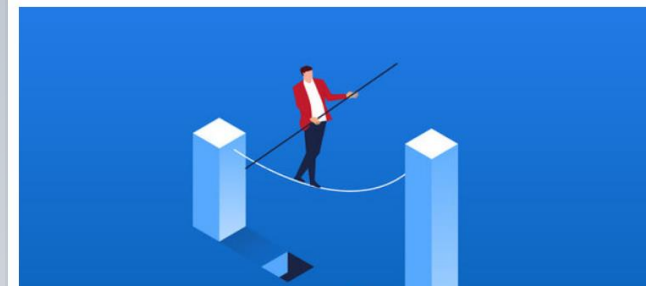
Last year we “celebrated” the 10th anniversary of the invention of the *h-index* (also known as the *Hirsch factor*; Hirsch, 2005), an indicator created by Jorge E. Hirsch, that attempts to measure the achievements of a research scientist. However, it not only appears that *h-index* has taken on a life of its own but also that the complexity of this formula currently obscures the initial idea for its use envisioned by the inventor.


What's wrong with the *h-index*, according to its inventor

“Severe unintended negative consequences.”


24 March 2020

Gemma Conroy






Sarah de Rijcke
Professor of Science,
Technology, and
Innovation Studies



Ludo Waltman
Professor of Quantitative
Science Studies



Thed van Leeuwen
Senior Researcher

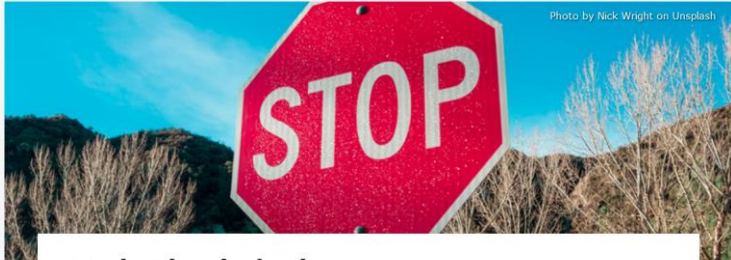


Photo by Nick Wright on Unsplash

Halt the *h-index*

May 19, 2021 • Science & Society • 2 comments • 7 min read

Quantitative metrics

PLOS ONE

Why Researchers Choose

Journal Information

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Journal Impact and Article Metrics

PLOS does not consider Impact Factor to be a reliable or useful metric to assess the performance of individual articles. PLOS supports DORA – the San Francisco Declaration on Research Assessment – and does not promote our journal Impact Factors. We will provide the metric to individuals when specifically requested.



Plan S

Principles & Implementation

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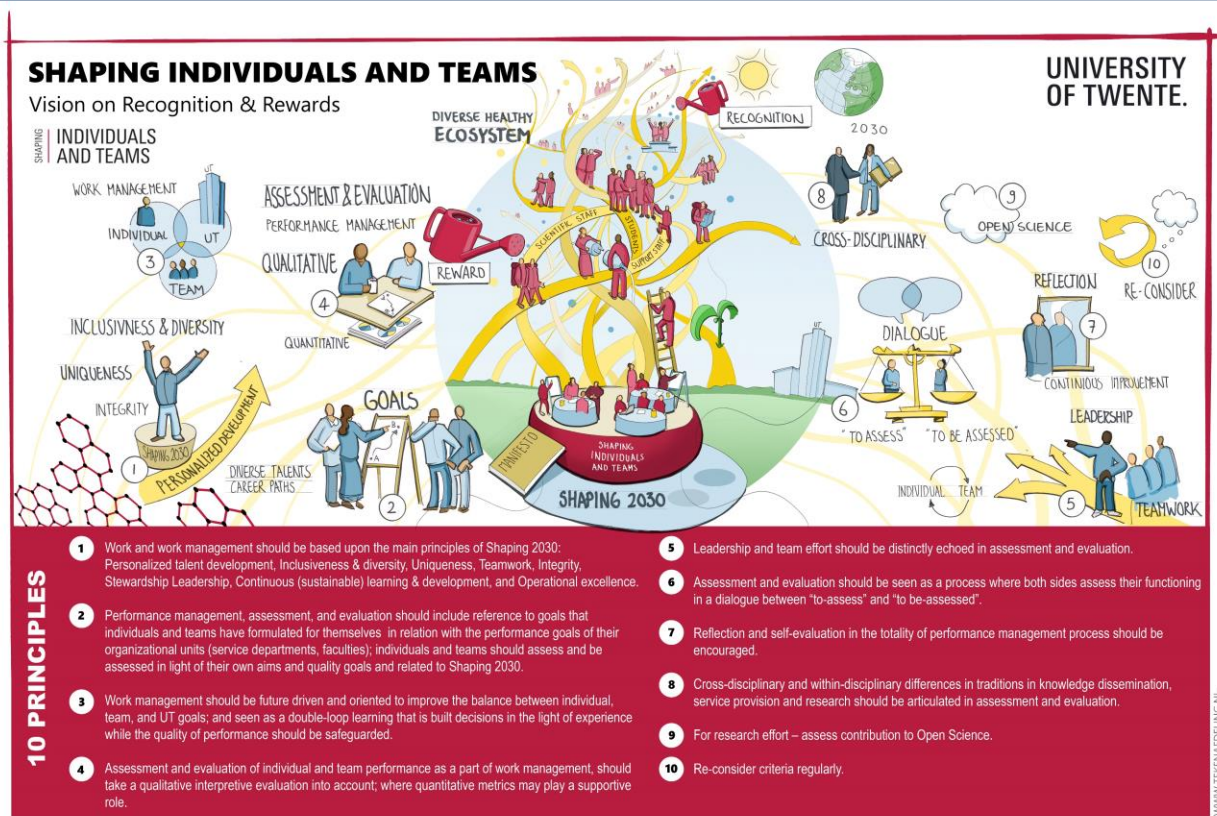
Con

Principles and Implementation

10

The Funders commit that when assessing research outputs during funding decisions they will value the intrinsic merit of the work and not consider the publication channel, its impact factor (or other journal metrics), or the publisher.

Quantitative metrics



"Assessment and evaluation of individual and team performance as part of a work management, should take a qualitative interpretive evaluation into account; where quantitative metrics may play a supportive role."

Strategy Evaluation Protocol

2021-2027

VSNU KNAW NWO

on the other. Where appropriate, the unit can use quantitative indicators of research activity, progress and impact. Some indicators may also be useful to underpin the case studies. The research unit should take into account that it is not allowed to use the Journal Impact Factor in a SEP evaluation. The Journal Impact Factor was not created as a measure of the scientific quality of research in an article. It has a number of well-documented deficiencies as a tool for research assessment¹¹. The use of the h-index is advised against because 1) it is sensitive to age and experience (so young scholars always have low h-index values) 2) it is

H-index

- Does not incentivize other activities, e.g., education, sharing, public outreach
- Correlates with age to the disadvantage of early-career researchers
- “Incentivises” publishing in high-impact journals, which “allows” these journals to charge high APCs.
- Does not consider different citation cultures in different scientific fields
- Does not differentiate between first and last co-authorships
- Does not consider data and software citations, and citing other materials is possible but not established.

Hirsch: *“If you make decisions just based on someone’s h-index, you can end up hiring the wrong person or denying a grant to someone who is much more likely to do something important. It has to be used carefully.”*

Journal Impact Factor

- Correlates poorly with actual citations of individual articles
- Conceals the difference in article citation rates:
 - most cited 15% of the articles account for 50% of the citations.
 - most cited 50% of the articles account for 90% of the citations.
- Review articles are heavily cited and inflate the JIF
- JIF depend on the research field and citation culture of a discipline
- Databases can have an English language bias

Overview of metrics



Downloads, Books and book chapters

Downloads, Software

Field Weighted Citation Impact

Github: Forks, collaborators, watchers

Goodreads: Ratings and reviews

h-index

Journal Acceptance Rate

Journal Impact Factor

Mendeley Readers

Monograph holdings

Monograph sales and rankings

News Mentions

Journal Impact Factor

Field	Field Value
Name	Journal Impact Factor
Appropriate Use Cases	The JIF can be useful in comparing the relative influence of journals within a discipline, as measured by citations. Used appropriately and in conjunction with other metrics, the JIF can be useful in collection development decisions made by librarians. As with all metrics, the JIF should be presented with appropriate context .
Limitations	<p>The JIF has been published annually since 1975, and an extensive literature is available on its characteristics, limitations, and common misunderstandings related to its use. Some commonly noted limitations of the JIF include the following.</p> <p>The Journal Impact Factor only applies to journals indexed in the Science Citation Index Expanded and/or Social Sciences Citation Index by Clarivate Analytics. Journals are reviewed using several criteria and not all journals are selected for inclusion in the Journal Citation Reports.</p>
Inappropriate Use Cases	As a journal level metric, the JIF should not be used as an indicator for the quality or impact of particular articles or authors . Put another way, the JIF is not statistically representative of (the citations to) individual articles and cannot summarize the quality of an author's entire body of work.

Alternatives to bibliometrics

Lindau Guidelines



Published: 22 April 2015

Bibliometrics: The Leiden Manifesto for research metrics

Diana Hicks , Paul Wouters, Ludo Waltman, Sarah de Rijcke & Ismael Rafols

Nature 520, 429–431 (2015) | [Cite this article](#)

6900 Accesses | 767 Citations | 2142 Altmetric | [Metrics](#)

Use these ten principles to guide research evaluation, urge Diana Hicks, Paul Wouters and colleagues.




<https://lindauguidelines.org/>

<https://sfidora.org/read/>

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3000737>

<https://www.nature.com/articles/520429a>

The Hong Kong Principles for assessing researchers: Fostering research integrity

David Moher , Lex Bouter, Sabine Kleinert, Paul Glasziou, Mai Har Sham, Virginia Barbour, Anne-Marie Coriat, Nicole Foeger, Ulrich Dirnagl

Published: July 16, 2020 • <https://doi.org/10.1371/journal.pbio.3000737>

Box 1. Complete wording of the HKPs

Principle 1: Assess researchers on responsible practices from conception to delivery, including the development of the research idea, research design, methodology, execution, and effective dissemination

Principle 2: Value the accurate and transparent reporting of all research, regardless of the results



San Francisco Declaration of Research Assessment (DORA)

- Provide a set of 18 recommendations considering the need to **assess research based on the content** rather than bibliometric proxies
- Address different stakeholder (funders, institutions, publishers etc.)

General Recommendation

1. Do not use journal-based metrics, such as Journal Impact Factors, as a surrogate measure of the quality of individual research articles, to assess an individual scientist's contributions, or in hiring, promotion, or funding decisions.

3. For the purposes of research assessment, consider the value and impact of all research outputs (including datasets and software) in addition to research publications, and consider a broad range of impact measures including qualitative indicators of research impact, such as influence on policy and practice.

4. Be explicit about the criteria used to reach hiring, tenure, and promotion decisions, clearly highlighting, especially for early-stage investigators, that the scientific content of a paper is much more important than publication metrics or the identity of the journal in which it was published.

6. Greatly reduce emphasis on the journal impact factor as a promotional tool, ideally by ceasing to promote the impact factor or by presenting the metric in the context of a variety of journal-based metrics (e.g., 5-year impact factor, EigenFactor [8], SCImago [9], h-index, editorial and publication times, etc.) that provide a richer view of journal performance.

18. Challenge research assessment practices that rely inappropriately on Journal Impact Factors and promote and teach best practice that focuses on the value and influence of specific research outputs.

San Francisco Declaration of Research Assessment (DORA)



Résumé for Researchers

Below is the suggested structure for the Résumé for Researchers tool.

Personal details

Module 1 – How have you contributed to the generation of knowledge?

Module 2 – How have you contributed to the development of individuals?

Module 3 – How have you contributed to the wider research community?

Module 4 – How have you contributed to broader society?

<https://royalsociety.org/-/media/policy/projects/research-culture-images/2019-10-research-culture-resume-for-researchers-template.pdf>

San Francisco Declaration of Research Assessment (DORA)



Résumé for Researchers

Below is the suggested structure for the Résumé for Researchers tool.

Personal details

Module 1 – How have you contributed to the generation of knowledge?

Module 2 – How have **How does NWO implement DORA?**

NWO signed DORA in April 2019. Since then, NWO has been implementing DORA's principles in its assessment procedures step by step. The following measures have been taken:

Module 3 – How have

Module 4 – How have

- Removal of all references to Journal Impact Factors and the H-index in all call texts and application forms
- Actively informing referees and committee members about having signed DORA and the consequences for assessment procedures
- Introduction of a narrative CV format

Narrative CV format

The narrative CV is based on the premise that there is no ideal type of researcher. Different research projects require varying talents. The narrative format allows applicants to highlight their own academic profile without being limited by prescribed questions and criteria. The narrative CV consists of two parts:

- The academic profile (narrative)
- Key outputs

<https://royalsociety.org/-/media/policy/projects/research-culture-images/2019-10-research-culture-resume-for-researchers-template.pdf>

<https://www.nwo.nl/en/dora>

San Francisco Declaration of Research Assessment (DORA)



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Narrative CV format

The narrative CV is based on the premise that projects require varying talents. The narrative academic profile without being limited by consists of two parts:

- The academic profile (narrative)
- Key outputs

- Lines of (independent) research;
- Theoretical and/or methodological contributions;
- Collaborations and networking capabilities;
- International orientation and activities;
- Conference participation and organisation;
- Educational activities, e.g. the connection of research and education;
- Supervision of students, academic and non-academic staff;
- Relevance of research results and their position relative to societal topics;
- Knowledge utilisation, outreach and popularisation;
- Membership of scientific boards, editorial boards, and committees;
- Invited lectures;
- Prizes, awards and grants, and how the opportunities offered by grant(s) were used;
- Interdisciplinary activities;
- Administrative and managerial tasks;
- Contributions to open data and open science;
- Motivation for doing research in general and this project in particular;

- Focus shifts from paper to other outputs (e.g., data, software, education, societal engagement) ✓
- Takes more time to read/evaluate ✗
- Relies on the interpretation of the evaluator

<https://royalsociety.org/-/media/policy/projects/research-culture-images/2019-10-research-culture-resume-for-researchers-template.pdf>

<https://www.nwo.nl/en/dora>

<https://www.nwo.nl/sites/nwo/files/media-files/EXAMPLE%20Veni%202020%20Pre-proposal%20Form%20with%20expanded%20-%20AES%20SSH%20ZonMw.pdf>

San Francisco Declaration of Research Assessment (DORA)



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Joining DORA = Joining good practice?



SPRINGER NATURE

Menu

DORA

Promoting better ways to evaluate the outputs of scholarly research

Springer Nature has signed DORA to show its support for the development of better and research.

What does that mean for Springer Nature?

By signing Springer Nature undertakes to work towards upholding the recommendations that DORA outlines for publishers.

- ✓ We will provide a wide array of metrics to allow for a fair assessment of research.
- ✓ We encourage responsible authorship practices and will seek to either include author contribution statements or adapt CRediT in line with the standards NISO is currently establishing.
- ✓ We are a participant in the Initiative for Open Citations (I4OC) and have committed to release reference list metadata publicly.
- ✓ Our journals do not have a constrain on the number of references in research articles.
- ✓ We will seek to encourage the citation of primary literature in favour of reviews.



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EDITORIAL | 21 July 2021

Responsible research assessment faces the acid test

The University of Liverpool is planning to make lay-offs on the basis of controversial measures. How should the global movement for responsible research respond?

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Abandoning the Journal Impact Factor

Open Research Europe

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FAQs

Does Open Research Europe have an Impact Factor?

Open Research Europe does not and will not ask to have an Impact Factor. The European Commission is providing funding agencies, institutions and organizations who are keen to support a broader view of a researcher's output, the value of what is published, shared and re-used, that is important as opposed to the venue, journal or platform where an article is published.

Open Research Europe supports the responsible use of research-related metrics and its application to research assessment – following, among other, the [Leiden Manifesto](#) and the [DORA Declaration](#). Each article published on Open Research Europe includes an article level metrics page demonstrating the individual article's reach, interest and 'quality'. It also includes traditional indicators (such as article citation data) alongside more qualitative indicators such as views, downloads, social media and wider engagement.

nature

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CAREER NEWS | 25 June 2021

Impact factor abandoned by Dutch university in hiring and promotion decisions

Faculty and staff members at Utrecht University will be evaluated by their commitment to open science.

[Chris Woolston](#)

[Twitter](#) [Facebook](#) [Email](#)

Abandoning the Journal Impact Factor



<https://doi.org/10.1038/d41586-021-01759-5>

- The Utrecht University formally abandoned the impact factor
- Paul Boselie: *“Impact factors don’t really reflect the quality of an [...] academic. We have a strong belief that something has to change, and abandoning the impact factor is one of those changes.”*
- Citation-based metrics (JIF, h-index) “contribute to a ‘productification’ of science”: output > quality
- Instead, evaluate academics based on teamwork and Open Science (DORA)
- The evaluation process might include interviews with external experts
- Applying the new rewards & recognition system will be difficult since each department will need to design its own evaluation process
- Researchers applying for a job at a university that sticks to the traditional metrics might have a competitive disadvantage

Abandoning the Journal Impact Factor

Nieuwe Erkennen en waarderen schaadt Nederlandse wetenschap

Opinie | door gastauteurs

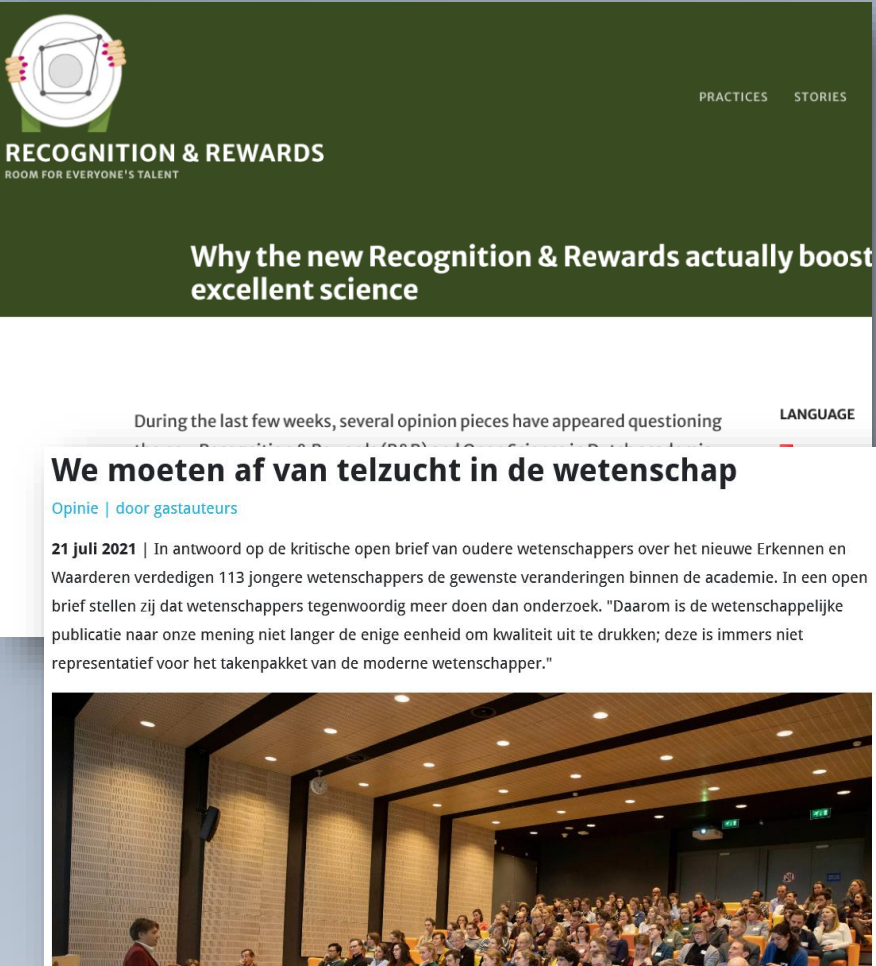
19 juli 2021 | Een groep van 171 wetenschappers, waaronder 142 hoogleraren, waarschuwt in deze open brief dat het nieuwe Erkennen en Waarderen de Nederlandse wetenschap schaadt. Zeker de medische, exacte en levenswetenschappen dreigen door het nieuwe Erkennen en Waarderen hun internationale toppositie te verliezen omdat niet meer duidelijk is waarop wetenschappers worden beoordeeld.



<https://www.scienceguide.nl/2021/07/nieuwe-erkennen-en-waarderen-schaadt-nederlandse-wetenschap/>

- A group of 171 researchers (incl. 142 professors) warned in an open letter that the new R&R system will harm Dutch science
- They see several problems:
 - Unclear how scientists are judged if not by impact factors → More arbitrariness, less quality
 - Affects international recognition of Dutch scientists
 - Negative consequences for ECR, cannot compete internationally
 - Narrative CV makes assessment difficult
- Saying that JIF says little about quality is a misconception
 - Average Nature/Science paper based on more work than in other journals
 - Top journals consult the best experts → high impact and quality

Abandoning the Journal Impact Factor



- Science comes before everything else
 - ⚡ mental health care responsibilities
- Performance should be measured against existing metrics, e.g., JIF
 - ⚡ JIF says little/nothing about articles/researchers
- Recognition & Rewards jeopardizes our top position in intern. Science
 - ⚡ Funders/publishers refute JIF, trend towards new R&R system (see number of DORA signatories incl. Nature, Science)
- Recognise that
 - Not everything of “the old way” needs to be abandoned
 - Scientific articles still matter but are not the only relevant output
 - Change takes time
 - Reviewers need training for evaluating narrative CVs

To sum up...

- The evaluation of researchers and articles is often based on citations and citation-based metrics.
- Citations can have very different (positive and negative) reasons and do not always indicate quality.
- Still, these citations are the basis for many evaluation metrics.
- There seems to be a trend towards abandoning the JIF and moving towards alternatives, such as
 - DORA
 - The Hong Kong Principles
 - The Leiden Manifesto
 - The Lindau Guidelines
- However, the scientific community is still divided into proponents and opponents
- What is your view on that?

Discussion

- Imagine there would be an initiative at the UT saying that we abandon the JIF and instead use qualitative decision criteria. Would you support it or would you be against it?
- Shall we as a University of Twente sign DORA?
- What do you prefer?
 - Quantitative, qualitative, or mixed evaluation metrics
 - And why?
 - Do you see any other advantages or disadvantages?

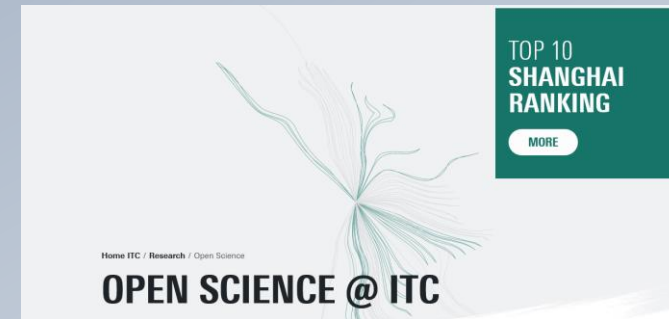
Concrete realisations

Six principles for assessing researchers

- Contributing to societal needs is an important goal
- Based on indicators that incentivise best practices (pre-registration, sharing materials, reproducible research, alternative metrics)
- All research should be published completely and transparently, regardless of the results
- Facilitate dissemination and use of research data, procedures, and code by others, e.g., following the TOP guidelines
- Investments in research to provide the necessary evidence to guide development of new assessment criteria
- rewarding researchers for intellectual risk-taking that might not be reflected in early successes or publications. Otherwise, ECR tend to be conservative and less creative

Barriers to change

- Universities want to climb the ranking



How should Dora be enforced?

By Stephen Curry

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