

Cite Makes Right

Citation Metrics, Their Use and Misuse, and a Discussion of Citations in General

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The Measure of a Manuscript

- What are Citation Metrics?
 - An attempt to measure the worth of a journal
 - An attempt to measure the worth of a researcher
- Why Citation Metrics?
 - To identify the best journals in a field
 - To measure the worthiness of a researcher for promotion, tenure, or collaboration
- How are Citation Metrics Determined?
 - By counting very simple numbers

The Measure of a Manuscript

- Impact Factor
 - $(\text{Number of Citations in the Current Year to Articles Published in the Preceding 2 Years}) / (\text{Number of Articles Published in the Preceding 2 Years})$
 - *Example:* If Journal A published 100 articles from 2006-2007, and those articles were cited 50 times in 2008, Journal A has an Impact Factor of 0.5 for 2008.

The Measure of a Manuscript

- Eigenfactor
 - $(\text{Number of Citations}^* \text{ in the Current Year to Articles Published in the Preceding 5 Years}) / (\text{Number of Articles Published in the Preceding 5 Years})$
 - * Citations made by articles published in the journal being measured to the other articles published in the journal being measured are discounted. Each reference is weighted “according to a stochastic measure of the amount of time researchers spend reading the journal.”
see <http://www.eigenfactor.org/methods.htm>

The Measure of a Manuscript

- Immediacy Index
 - $(\text{Number of Citations to Articles Published in a Given Year}) / (\text{Number of Articles Published in That Year})$
 - *Example:* Articles published by Journal A in 2008 were cited 10 times in 2008. Journal A published 40 articles in 2008, so Journal A has an Immediacy Index of 0.25 for 2008.

The Measure of a Manuscript

- Article Influence
 - (Journal Eigenfactor)/(Normalized Fraction of All Articles in the Journal's Field that are Published in the Journal)

The Measure of a Manuscript

- H-Index
 - Largest n for which they have published n articles, each with at least n citations.
 - *Example*: Researcher B has published 50 articles, of which 13 have have 10 or more citations, and the rest have 9 or fewer. Researcher B has an h-index of 10.

The Measure of a Manuscript

- Citation Count
 - Number of times an author has been cited
 - May take into account:
 - Self-citations
 - Journal impact factor or reputation
 - Primary author versus secondary author
 - Number of co-authors

So Why Metrics Anyway?

- Publish or Perish
- Publish for Profit

Why We Cite

- It's Complicated
 - Brooks (1986) suggests 7 motivations
 - Currency: Favor current works over older research to establish own work as being cutting-edge
 - Negative Credit: Disputing other researchers' work
 - Operational Information: Providing a source for facts or conclusions drawn from previous research
 - Persuasiveness: Highlighting other research that agrees with their own results or conclusions
 - Positive Credit: Acknowledging intellectual debts, verifying previous research results

Why We Cite

- Reader Alert: Bring to light obscure references, forgotten research, new results, or potential new areas of research
- Social Consensus: Reflect the current thinking in the field
- Less noble reasons
 - Quid Pro Quo: Authors informally agreeing to cite each other in their papers. Not necessarily deliberate, but can arise where authors frequently collaborate but also conduct research independently.
 - Currying Favor: Citing another author in an attempt to ingratiate themselves with that author, possibly to open the door to collaboration, or to ease the path to tenure or promotion.

Garbage in Garbage Out

- Citations are not Perfect
 - Errors of Fact
 - Estimated average 10% error rate in citations; varies across disciplines
 - Systemic Factors
 - Characteristics of the Field of Research
 - Size of field
 - Citing habits
 - Publishing habits

Garbage in Garbage Out

- Nature of the Journal
 - Review articles vs Research articles
 - Scope of journal: Broad, Niche, Multidisciplinary
- Self Citations
 - Citations by the author, or by a co-author
- Non-Journal Publications
 - Books, Conference Papers, Technical Reports, Presentations, Open Access journals, Preprints, and other “gray literature”
- Access to Journals

Garbage in Garbage Out

- Human Factors
 - Unread Citations
 - Courtesy Authorships
- Errors of Interpretation
 - Averages vs Probabilities
- Active Malfeasance
 - Phantom Journals: Merck, Elsevier, and the *Australasian Journal of Bone and Joint Medicine* case
 - Ghostwriters: The Wyeth case
 - False Credentials and Abuse of Power: The *Chaos, Solitons & Fractals* case

References and Further Reading

References

Adler, Robert, John Ewing, Peter Taylor. 2008. Citation Statistics. International Mathematical Union.

<http://www.mathunion.org/fileadmin/IMU/Report/CitationStatistics.pdf>

Brooks, Terrence. 1986. Evidence of complex citer motivations. *Journal of the American Society for Information Science*, Vol 37, No. 1, pp. 34-36, 1986.

Further Reading

Ethics in Science and Environmental Politics. Special Issue on Citations. v. 8, no. 1, 2008. <http://www.int-res.com/abstracts/esep/v8/n1/>

University of Connecticut Libraries. Citation Analysis for Promotion & Tenure. <http://classguides.lib.uconn.edu/content.php?pid=65261&sid=482112>