

impact metrics <http://bit.ly/1z0arqz>

what is it?

Impact metrics, bibliometrics, citation impact, research impact, scholarly productivity metrics and scholarly metrics—all of these terms (and others) refer to roughly the same thing: calculations to quantify the impact of research or scholarly activity.

These calculations, most commonly referred to as impact metrics, are not without controversy or bias but are typically used as measure of research impact within the university and college environment.

While citation counts are now included in many databases, the three primary providers of more extensive metrics are:

- Thomson Reuters
- Elsevier
- Google



how does it work?

The basic premise of most citation metrics is that the more an article is cited the more impact it has. Counts of citations are then used to calculate a range of metrics that are believed to indicate the research impact of journals, journal articles, and authors of these articles.

The majority of metrics are calculated at the level of the journal. A few examples of this type of metric are:

- Impact Factor
- Eigenfactor[®]
- SCImago Journal Rank (SJR)
- h5-index

There are fewer metrics that exist for measuring impact at the level of the article. The most commonly used indicator is citation counts, i.e., how often a particular journal article is being cited by other articles. Some other options for determining the impact of an article are:

- usage statistics (e.g., downloads and page views)
- number of blog or twitter references
- Neylon and Wu (2009) suggest using calculations based on reference management software, e.g., Mendeley or Zotero, to measure how often people choose to bookmark a paper

The primary metric currently in use for author impact is the h-index (Hirsch, 2005). Another metric at the author level that is sometimes used is a count of the total number of citations to published articles in a one year period.

who's doing it?

Impact metrics are used by:

- **Administrators** to rank department's, institution's and country's research output
- **Institutions** to evaluate research and researchers performance, e.g. tenure and promotion, bonuses, and funding
- **Publishers** to assess or market a journal
- **Authors** to choose a journal in which to publish
- **Libraries and database producers** for collection development

why is it significant?

Impact metrics are the most common method used in the sciences and social sciences to determine research impact. While flawed, these calculations are still used as a major indicator for departmental reviews, tenure and promotion, funding allocations, as well as institutional rankings.

further reading

Colledge, L., et al. (2010). SJR and SNIP: two new journal metrics in Elsevier's Scopus. *Serials*, 23(3): 215-221. doi: 10.1629/23215.

Eysenbach, G. (2011). Can Tweets Predict Citations? Metrics of Social Impact based on Twitter and correlation with traditional metrics of science. *Journal of Medical Internet Research*, 13(4), e123. doi: 10.2196/jmir.2012.

Hirsch, J.E. (2005). An index to quantify an individual's scientific research output/ *PNAS*102 (46) 16569-16572; published ahead of print November 7, 2005 doi:10.1073/pnas.0507655102

Neylon, C. & Wu, S (2009) Article-Level Metrics and the Evolution of Scientific Impact. *PLoS Biol* 7(11): e1000242. doi:10.1371/journal.pbio.1000242.

Priem, J., Piwowar, H.A., & Hemminger, B.M. (2012). Altmetrics in the wild: Using social media to explore scholarly impact. arXiv:1203.4745v1

Roemer, R. C. & Borchardt, R. (2012). From bibliometrics to altmetrics: A changing scholarly landscape. *Coll. Res. Libr. News*. 73: 596-600.

Waltman, W., Jan van Eck, N., Van Leeuwen, T. N. & Visser, M. S. (2013). Some modifications to the SNIP journal impact indicator. *Journal of Informetrics*. 7(2): 272-285. doi:10.1016/j.joi.2012.11.011

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what are the challenges?

There are several major issues with citation counts that can skew the calculation of impact metrics. Many of these are slowly being addressed by the major providers, but the most important ones are:

- Bias towards North American, Western European, and English-language titles
- Books, book chapters, dissertations, working papers, reports, and conference papers are often excluded
- Different journal coverage among disciplines (more complete for the sciences)
- Citing errors, e.g. inconsistency in use of initials and in spelling non-English names
- Number of journals published in a discipline varies
- The frequency of citation between disciplines varies
- Self-citations can be used to manipulate/increase some of the metrics

where is it going?

Metrics are changing in two different ways: i) the extent to which they being used and ii) new and innovative metrics that are being calculated.

In Australia (Excellence in Research for Australia) and the UK (Research Excellence Framework), metrics are being used in conjunction with other measures to allocate funding and assess research impact across multiple disciplines within higher education institutions.

Metrics are going in a second interesting direction: the creation of new metrics to measure the impact of scholarly activities in an increasingly online environment. One example is ongoing research into usage-based metrics including projects like the Counting Online Usage of Networked Electronic Resources (<http://www.projectcounter.org/>) and the METrics from Scholarly Usage of Resources project (<http://mesur.lanl.gov/MESUR.html>).

Another example is Thomson Reuter's new Data Citation Index, which helps quantify researcher's contributions to data repositories. Altmetrics, new metrics that are being created based on social media tools, e.g., number of blog posts and tweet counts are also being explored by researchers and publishers.

what are the implications for libraries?

Libraries are well-placed to assist faculty, graduate students, and administrators in understanding the tools and methods used to calculate impact and the limitations of these methods. As the use and range of impact metrics change, librarians have the opportunity to support and enhance the services they offer.

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