ISSUES BRIEF

Research Metrics

Prepared on behalf of COPPUL by Leonora Crema, Devina Dandar, & Carmen Kazakoff-Lane

Overview

Research metrics in academia refers to the measurement of research impact using Bibliometrics, Altmetrics, Impact Factors and Author Level Indexes of influence. Broadly speaking these methods measure (1) the impact of a journal in a field of research (Journal Level Metrics), (2) the impact of an article (Article Level Metrics), and (3) the influence of a specific researcher (Author Level Metrics). A fourth level exists, Institutional Level Metrics; these tend to be managed by campus research administration but are less well developed as a matter of library practice.

Academic libraries have developed research impact services as part of the scholarly communication support provided to researchers within their institutions. This includes the acquisition of databases and tools that provide research metric data, as well as education and advice on the use of this data in research activities. These tools reside in databases, websites, publisher sites, and increasingly, social networking platforms. While these tools are useful for some disciplines, differences in how frequently an author is cited vary by field, and the tendency of some disciplines to publish in non-journal formats with fewer tools, means that existing metrics can provide poor measures for other fields. Some can also disadvantage younger researchers, or advantage self-citers, multi-author papers and the social media savvy.

Consequently, academics wishing to use metrics for the purposes of research grants, tenure, or promotion need to be (1) made aware of the strengths and weaknesses of different measures, (2) advised what measures are best used to tell a story about what their scholarly activities mean and (3) assisted in making their work more visible.

The scholarly community itself has begun questioning traditional metrics in measuring research quality and impact. The [Declaration on Research Assessment](#) (DORA) and [Leiden Manifesto](#) are two such initiatives, though to date, most North American universities are not signatories. For the near future, universities are likely to rely on traditional metrics, with all their strengths and shortcomings.

Research Metrics 101

Libraries are providing researchers with a range of services and supports related to a variety of metrics at the author-, discipline-, and institutional-level. These metrics include:

- **Bibliometrics:** the statistical analysis of written publications used to provide a quantitative analysis of academic literature. The most commonly used bibliometric is citation analysis, the

data for which is often available via databases or Google Scholar. Library services pertinent to bibliometrics include providing access to citation indexes (e.g., Web of Science; Scopus) and educating faculty about them.

- **Journal Level Metrics:** a measure reflecting the yearly average number of citations to recent articles published in a journal. More sophisticated measures assess journal impact by enabling fair comparisons in fields (1) using more and less citations as measured by what is typical for a field of research or (2) using rankings based on longer or shorter periods of time. Common ones include Journal Impact Factor (JIF), Eigenfactor and Source Normalization Impact per Paper (SNIP). JIF is the most widely used, and is increasingly being challenged as a measure of research quality.

- **Article Level Metrics:** measure the impact of a specific article based upon citation analysis. Each article can be assessed for its Relative Citation Ratio (a field normalized metric that shows the influence of one or more articles in relation to the average paper in a discipline.)

- **Author Level Metrics**: the measurement of a scholar's impact by assessing the quality and quantity of publications. The most common is the H-Index but there are many variations of this measure including Egghe's g-index and Age-Weighted Citation Rate (AWCR).

- **Institutional Level Metrics:** measure the reputation of an institution of higher education as reflected in its (1) ranking and (2) influence. Metrics in this area range from rankings such as Maclean's, to measuring the productivity and influence of research occurring at a given institution using tools such as InCites, SciVal, Essential Science Indicators, Web of Science, Scopus and Dimensions.

- **Altmetrics:** the measurement of a scholar's impact by measuring the dissemination of the research over social media sites. Common measures include views, downloads, shares, recommendations, blog posts, mentions and comments. Increasingly publishing platforms will have such tools embedded; for example, Paperbuzz was recently introduced as an Open Journal Systems plugin.

- **Researcher IDs:** registered IDs that enable computer algorithms to locate all research created by a specific author and thereby reduce confusion among authors with common last names. Common ones include ORCID, Researcher ID and Scopus Author ID.

- **Author Profiling Systems:** tools that enable researchers to easily create a profile by importing citations and metrics from databases and from their researcher ID. These profiles provide authors and viewers (including potential collaborators and funding agencies) with a wealth of information about a researcher's impact. Common ones include Publons, Google Scholar Researcher Profile, ResearchGate, Kudos, and ImpactStory.

How are Canadian Libraries Supporting Metrics?

Libraries are currently providing an array of metrics services such as:

- Creating metrics guides that discuss Bibliometrics and Altmetrics, e.g., University of Waterloo's guides on Bibliometrics & Measuring Research Output & Bibliometric Measures in Citation-Tracking Databases.
- Instructing researchers in how to calculate their academic footprint, e.g., University of Waterloo's Calculate Your Academic Footprint guide.
- Teaching researchers how to maximize the impact of their research and enhance their researcher identity, e.g., the University of Toronto's guide on Research Impact & Researcher Identity.
- Assisting in preparation of grant proposals or promotion and tenure submissions where impact measures are included, e.g., MacEwan University's Research Metrics assistance.
- Tracking and benchmarking faculty/departmental/institutional research performance via institutional repositories or custom reports using bibliometrics and altmetrics, e.g., University of Calgary's most popular author and item statistics detailed on the repository homepage.
- Promoting ORCID adoption and working on local integrations with HR or research management systems to improve data accuracy, e.g. ORCID integrations by the University of Prince Edward Island and Queen's University.

In a number of cases the library supports a staff position dedicated to these services collaborating with the Research Services Office. Librarians dedicated to research impact are more common in the UK-Europe and are often also tasked with tracking open access compliance.

Recommendations & Considerations

- Ensure awareness of these issues and development of expertise to strengthen the library's role in metrics and altmetrics on campus. Specific areas for engagement could include assisting departments with benchmarking against peers, grant preparation, and supporting faculty in promotion and tenure submissions.
- Where possible, libraries should acquire databases with metrics. Content is increasingly being coupled with analytics tools relevant to faculty and research administrators. Libraries have an opportunity to partner in adopting and co-funding these.
- Forge closer relationships with research and grant administrators, particularly when selecting metrics systems for campus use. Communications departments are also potential collaborators given their expertise with social media.
- Engage faculty and administration regarding mindful analysis, assessment, and use of metrics and altmetrics. This includes critical awareness of the corporate interests underlying many metrics platforms used in the academy, and ways that metrics can vary across disciplines, research topics, and when something has been published.

Learn More

- Brandon University's Assessing Impact: Metrics, Altmetrics and Impact Factors guide provides a comprehensive overview of different types of metrics and ways that researchers can increase the visibility of their work.
- Meaningful Metrics: A 21st Century Librarian's Guide to Bibliometrics, Altmetrics, and Research Impact. (Robin Chin Roemer & Rachel Borchardt, 2015).
- The Metric Tide: Independent Review of the Role of Metrics in Research Assessment and Management. James Wilsdon (Sage Publications, 2016).
- Metrics Toolkit
- ACRL Scholarly Communications Toolkit- Measuring Impact