

Principles on the responsible use of bibliometrics in the era of Open Science DRAFT - 1.11.2018

Open Science intends to revolutionise academic and scientific research by making it more efficient, transparent, interdisciplinary, reproducible, ethical and accessible. While progress has been made and the research community generally embraces the principles of Open Science, there remains significant challenges to overcome less desirable institutional and cultural practices. Hence, the transition from vision to practice has been slow. This delay is generally considered to be caused by a lack of incentives for researchers to change their behaviour towards more open practices.

The system currently rewards researchers based on a set of traditional metrics that are interpreted as indicators of research and researcher qualities. However, these metrics have tended to be used uncritically, and at times commandeered for purposes beyond their original design. For example, the journal impact factor was reasonably developed to indicate average journal citations (over a defined time period), but it has also been used inappropriately as a proxy for the quality of individual articles within a journal. Researcher affinity towards traditional journals with high, but at times inappropriate metrics, reduces the incentives for researchers to seek Open Access alternatives.

Further, in some circumstances, metrics have taken precedent over alternative forms of evaluations, such as, expert judgement. This is problematic because research “quality”, “influence”, and “impact” are abstract concepts that prohibit direct measurement. Here, problematic becomes unethical when metrics are wrongly applied in some contexts, such as, hiring, promotion, and funding decisions.

Last, a shift to Open Science, and associated practices like Open Access, are creating a new-generation of data for how research is used and received within research communities and society. This provides greater power and learning opportunities to capture and track information on research and science than we could in the past. But only if metrics and data are used and interpreted in the correct context, because blind or uncritical acceptance of new metrics can lead to issues of metric misuse of the past and present.

UCL is a leader in Open Science, and is developing a set of principles to guide and support the appropriate use of metrics at UCL. This builds on a number of prominent external initiatives on the same task, including the [San Francisco Declaration on Research Assessment](#); the [Leiden Manifesto for Research Metrics](#) and the [Metric Tide report](#). This urged UK institutions to develop a statement of principles on the use of quantitative indicators in research management and assessment, where metrics should be considered in terms of **robustness** (using the best available data); **humility** (recognising that quantitative evaluation can complement, but does not replace, expert assessment); **transparency** (keeping the collection of data and its analysis open to scrutiny); **diversity** (reflecting a multitude of research and researcher career paths); and **reflexivity** (updating our use of bibliometrics to take account of the effects that such measures have had). The following ten principles reflect these recommendations.

Ten principles for interpreting bibliometrics

1. Quality, influence, and impact of research are typically abstract concepts that prohibit direct measurement. Hence, there is no recognized or universal way to measure research quality, and quantitative approaches can only be interpreted as indirect proxies of quality.
2. Perspectives of research qualities are diverse across the UCL community. Hence, we must value all research outputs, not just traditional publications, and understand bibliometrics are only useful when considered in an appropriate context that reflects the needs and diversity of research fields and outcomes.

3. No quantitative system can replace qualitative assessment. At times, quantitative bibliometrics can be helpful and informative when used alongside qualitative assessment, such as peer review. But ultimately, a piece of work must be considered on its own merits.
4. No one set of indicators will suit all needs. But suites of indicators, where appropriate, may better reflect diversity and comprehensiveness, creating a broad picture of attainment. This is particularly important when dealing with a range of disciplines with different publication practices and citation norms.
5. Not all indicators are useful or informative, and metrics that are meaningful in some contexts can be misleading in others. Avoid the use of inappropriate metrics, such as assessing the quality of individual papers based on the impact factor or reputation of the journal in which they were published.
6. Performance, individual or collective, is best measured against the goals of the individual, the Department, School or institution. UCL 2034, School, Faculty, and Departmental strategies form an appropriate context to set and assess goals.
7. All processes used in evaluation should be transparent and open to scrutiny, as should any quantitative goals or benchmarks. Quantitative indicators should be selected from those which are widely used and easily understood.
8. If goals or benchmarks are expressed quantitatively, care should be taken to avoid the metric itself becoming the target of research activity at the expense of research quality. Numerical targets should be treated as indicative and should not replace or override the initial characteristic under investigation.
9. New and alternative metrics are continuously being developed to inform the reception, usage, and value of all types of research output. Any new or non-standard metric or indicator should be used and interpreted in keeping with the other principles listed here for more traditional metrics. Additionally, consider the sources and methods behind such metrics and whether they are vulnerable to being gamed, manipulated, or fabricated.
10. UCL maintains the IRIS and RPS systems to keep a record of research outputs. Where possible, use the data in these systems as the basis for assessment, allowing researchers to verify that the information on their publications is comprehensive and accurate.