

## Metrics to avoid – the h-index

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The [UCL bibliometrics policy](#) sets out some principles for the use of citation metrics in research assessment at UCL. As part of [the overall guidance](#), this paper sets out some recommendations for metrics to avoid. Some very commonly used metrics are potentially very misleading, and we do not recommend using them in most circumstances. The two most common are the h-index and the impact factor.

All things being equal, people evaluating researchers and research groups and organisations tend to favour the production of a higher number of research outputs, because funders and employers get more research for their investment. But, of course, things aren't equal, and research outputs vary in their quality (at least in principle – determining that variation is a different challenge addressed elsewhere).

The h index is a simple metric which tries to balance the quantity of papers produced by an individual researcher with the quality of those papers. Notwithstanding the issues with using citations as a proxy for quality, this metric was designed to allow a meaningful comparison between a researcher who has written a small number of highly-cited papers, and one who has written a large number of lightly-cited papers.

The index is defined so that someone with an h-index of h has at least h papers, each of which has h citations. For example, someone with 50 papers, of which 20 have been cited 20 or more times, would have an h-index of 20. The calculation is unaffected by how many times those twenty papers were cited – they could be cited thousands of times and the index would remain the same.

The h-index is a popular measure, with many researchers knowing their own h-index (and how it compares to their colleagues!). It is easily calculated, intuitively comprehensible, and as a result it is often used to compare researchers, or as a benchmark of career stage.

However, while well meaning and an intuitive counter to producing copious amounts of suboptimal research, the h-index has its own deficiencies that make it an unreliable indicator. There are three significant problems with the h-index, none of which are easy to correct for, and all reasons why UCL's bibliometrics principles is firm against its use.

- It will never decrease unless papers are retracted. Because older papers continue to gain new citations, the h-index can potentially increase indefinitely, even after the researcher has stopped actively publishing. A high h-index tends to reflect a long career as much as it reflects quality of research.
- The h-index is predominantly driven by the oldest papers, which have had more time to accrue citations. Newer papers – which may be more relevant or more significant – have little to no effect on the totals. This also means that a researcher's past career can have a disproportionate effect on their current h-index – two equally productive researchers, one of whom took a career break ten years ago and one of whom did not, are likely to have quite different h-indices today as a result of the long-term effects of that break.
- Finally, because the average number of citations accrued by papers, as well as the number of papers published over a career, varies so dramatically between disciplines, it is not possible to use the h-index to compare researchers in different areas. There is no absolute way to calculate a "good" h-index.

Bearing in mind these issues, **the h-index, or any similar metric, should not be used to directly compare researchers**, and we recommend that it is used with great caution in other circumstances. There are simply too many complicating factors to be able to produce a single number to meaningfully describe someone's overall publication record.