Editorial: Metrics in research - For better or worse?

Author(s):
Dolenc, Jožica; Hünenberger, Philippe H.; Renn, Oliver

Publication Date:
2016-12-12

Permanent Link:
https://doi.org/10.3929/ethz-a-010748857

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If you are an academic researcher but did not earn (yet) your Nobel prize or your retirement, it is unlikely you never heard about research metrics. These metrics aim at quantifying various aspects of the research process, at the level of individual researchers (e.g. h-index, altmetrics), scientific journals (e.g. impact factors) or entire universities/countries (e.g. rankings). Although such “measurements” have existed in a simple form for a long time, their widespread calculation was enabled by the advent of the digital era (large amount of data available worldwide in a computer-compatible format). And in this new era, what becomes technically possible will be done, and what is done and appears to simplify our lives will be used. As a result, a rapidly growing number of statistics-based numerical indices are nowadays fed into decision-making processes. This is true in nearly all aspects of society (politics, economy, education and private life), and in particular in research, where metrics play an increasingly important role in determining positions, funding, awards, research programs, career choices, reputations, etc...

In somewhat simplistic terms, numerical indicators allow to simplify the choice between two complex options A and B, associated with quality indices $N_A$ and $N_B$, in two ways. First, the choice is *immediate*, as it boils down to solving an inequality (if $N_A > N_B$, pick A, otherwise pick B, no need to dive into the painful complexity of options A and B). Second, the choice is *objective* (as long as the procedures to derive $N_A$ from A and $N_B$ from B are deterministic and identical, the comparison itself is unbiased). In a society where public resources are tight, so that their efficient use and fair distribution must be justified, and where the time of decision-makers is precious, speed and objectiveness are clearly two major assets of metrics-assisted decision-making. And let us not forget a third psychological factor: the human brain (especially that of scientists and managers!) is by construction fascinated by numbers, and their strong power for classification and rationalization.

There are, however, two major downsides to metrics-based decision-making. First, the reduction of a complex entity A (university, scientist, project, journal, publication) into a single number $N_A$ representing quality is a projection from a high-dimensional space to a single number. Thus, it will always be *reductionistic* (incomplete, simplistic, distortive, dehumanized), and may even in some cases be entirely off-topic. In fact, most current research metrics do not measure a scientific quality, but rather a scientific output or impact (i.e. only – and arguably – one component of quality). Second, the systematic coupling of a reductionistic index $N_A$ to decisions strongly influencing A induces a feedback loop, in which the entity A will start to optimize itself against $N_A$ rather than against quality in a broader sense. At the extreme, this may result in a research community striving very competitively for output and impact, and considering collaboration, diversity, creativity, curiosity, risk-taking, education and ethics (definitely other components of scientific quality!) as dispensable virtues.

The “metrics system” is not a perspective for the future – it is already well-installed and gaining strength, because it is fundamentally compatible with the usual mechanisms and mainstream values of a modern society in the digital era. Yet, individual opinions diverge widely concerning how to weigh the above strengths and flaws of this system, and whether one should strive to reinforce it, to improve/refine it, or to abolish it.

Clearly, the debate is important (maybe vital!) for the future of academic research. For this reason, in this special issue of *Infozine*, we have collected 18 opinion statements concerning the topic of “research metrics”. The potential contributors have been invited with the goal of providing a wide spectrum of opinions (supportive, moderate, or critical) and covering a wide spectrum of perspectives (including those of professors, students, publishers, editors, and metrics providers). This special issue is meant to provide a broad and unbiased spectrum of possible viewpoints and arguments on the topic, with the idea to feed into the thinking of the readers, and help them define lucidly their own position regarding the issue.

The “metrics system” is *de facto* already in place, and it is spontaneously self-reinforcing. You may decide to actively support it, or to accept and do the best out of it, or to fight against it … but, as always, it is extremely unwise to let others decide for you.