
Viewpoints

Making an impact instead of ‘publish or perish’

The time has come to thoroughly reconsider the current dominance of scientific impact scores as a measure of the performance of health researchers. We advocate a more balanced approach which values societal impact as well. Some valuable efforts are being made to measure societal impact and it is now a matter of courage to give both of these impact scores equal weight.

Indexes to measure scientific impact of science

Since science has always been considered a public good, academics have felt it their responsibility to ensure scientific quality. In 1731, the Royal Society of Edinburgh described how medical essays were judged by editors having comparable knowledge of the topic, to ensure objectivity. This practice gradually developed into the peer-review system for scientific reports, to ensure high quality in science. After the Second World War, this system gained momentum, and the process was institutionalized.

Nowadays, the Web of Science (WoS) covers more than 12 000 journals on all subject areas, and journals that can be tracked for ≥ 3 years are given an impact factor. In addition to the annual Journal Impact Factors, the cumulative impact of an individual researcher's scientific output can be quantified by bibliometric methods. Similarly, metrics for the academic ranking of world universities include the numbers of highly cited authors and numbers of articles in *Nature* and *Science*, as well as the mean citation score and the number of awards per university. These are used to measure the performance of universities, while scientific quality is guaranteed by the peer-review system.

Indexes to measure societal impact of science

In addition to scientific quality, societal impact is an explicit objective for important areas of research. This is especially true for applied research. The nature of societal impact is complex because it is a long-term dynamic process of knowledge co-production in which research knowledge can be made meaningful to society. Nevertheless, various studies have addressed the valorization of research knowledge, both from a societal and an economic perspective. Valorization requires social networks to improve communication between academics, policy makers and practitioners, in order to prevent demand and supply mismatches, or poor mutual understanding.¹ It is in such collaborative networks that indicators, or ways of measuring ‘influence’, are formulated,² such as references and contributions to textbooks, policy or conference papers, reports, tutorials, lay or non-WoS publications, guidelines and public media, as well as membership of advisory committees.^{3,4} Various countries, such as Canada,⁵ the UK,⁶ New Zealand,⁷ Australia³ and The Netherlands⁴, have developed transparent, valid, accurate and acceptable assessment procedures.

Dutch health research: the state of affairs

Although research quality has been assessed in the Netherlands since 1993, societal impact was not included in the assessments until 2003. In 1998, the Council for Medical Sciences of the Royal Netherlands Academy of Arts and Sciences recognized the importance of achieving a balanced assessment of scientific and societal impact. The Council developed indicators complementary to the evaluation criteria of scientific quality, in the sense that ‘scientific quality is a *sine qua non* and that societal impact is, for applied health research, an important additional requirement’ (p. 11).⁴ The indicators were assessed for

validity, reproducibility, responsiveness and applicability, and the most suitable were then selected and added to the quality assurance system.

The Dutch University Medical Centres (UMCs) produced about 12 000 peer-reviewed scientific publications in 2009 and 900 theses, with a quality level well above the European average. Nevertheless, the Advisory Council on Health Research concluded in 2003, and again in 2007, that a number of socially relevant public health topics were inadequately covered by the UMC. One reason was the easier achievement and higher valuation of scientific impact in clinical research compared with public health research.

The lump sum budget for universities is still not distributed on the basis of a balanced formula for scientific and societal impact. Even when faculties or schools at universities are rated as ‘centres of excellence’, which means that they excel in scientific quality as well as in societal relevance, the internal distribution of the lump sum budget is based on the traditional criteria of citation scores. Consequently, managers evaluate their staff on scientific impact, as this brings in money. The requirements for professorial chairs are mainly based on a minimum number of highly cited scientific publications without a clear measure of societal performance. Obviously, the Dutch universities’ incentive system for societal impact is merely rhetoric.

Wicked problems

There is an urgent need for academic research focusing on the societal problems that are central to governments’ interests. Many of these problems are complex and contested, and they are called ‘wicked’ for good reasons. They are persistent despite considerable efforts to solve them. Causal relations are numerous, interwoven and difficult to identify, like many public health problems are. There is also a great need to involve patients, citizens and policy makers in scientific research, as there are many legitimate social perspectives to take into account.⁷ Research on and in communities needs to be replaced by research with and for communities. By using a more iterative approach, academics, practitioners and policy makers can try to transform societal problems into research questions—what has been termed the *ex ante* evaluation of societal impact. The *ex post* societal impact refers to the degree to which research is able to answer questions, and subsequently transform its scientific conclusions into practical solutions or policy implications. The Netherlands has a long tradition of creating high societal impact through intensive dialogues between stakeholders from the policy, practice and research fields, e.g. in the Dutch Academic Collaborative Centres for Public Health⁸ and the Public Health Status and Forecasts reports.^{9,10}

Tipping point

If we allow universities to become more integrated in society, we might be able to prevent reputational damage by the media, of the kind exemplified by a recent article in *The Guardian* newspaper (5 September 2011) by Colquhoun, entitled ‘Publish-or-perish: Peer review and the corruption of science’. Based on the steep rise in the number of papers being published (1.3 million in 2006), the *Guardian* journalist blamed the ‘publish or perish’ culture of universities, in which productivity and rewards are only measured by publications in prestigious journals with an impact factor of at least five. With regard to such reputational damage, academics should be seriously concerned about the tipping point phenomenon (an advantage turning into a disadvantage). The sophisticated aspects of the peer-review system should not result in

pressure on scientists to publish, leading to citation bartering, dubious publishing behaviour and the quality inflation of papers.

Concluding remarks

Even when the quality of research is not at stake, it seems that fundamental and clinical research is more successful in terms of high scientific impact scores than applied and public health researches. We consider the scientific and societal impacts as two more or less extremes of a continuum. We strongly encourage the development of a compound indicator to equally value scientific and societal impacts. This will contribute to a more balanced and responsible career for health academics. An international task force may help to go beyond rhetoric.

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Feeling the impact

Maria Jansen and Dirk Ruwaard state that '*in addition to scientific quality, societal impact is an explicit objective of important areas of research. This is especially true for applied research.*' Hence, they advocate that societal impact should be given equal weight to scientific impact when measuring the performance of health researchers. We feel that this raises some fundamental questions for all Public Health academics who work in universities.

What is a university designed to do? How should academia and its outputs be assessed and valued? Should different academic subjects be valued differently?

The Bologna declaration of 1988 tells us what a university is designed to do. This declaration has been turned into an EU Joint declaration of the European Ministers of Education and signed by 752 universities worldwide, almost certainly including the universities of many people reading this. This document defines a university as 'an autonomous institution' which 'produces, examines, appraises and hands down culture by research and teaching,' describing the university as 'enriching minds.' The Bologna declaration proclaimed four fundamental principles of a university.

The four fundamental principles are: (i) moral and intellectual independence from political authority and economic power; (ii) inseparability of teaching and research; (iii) freedom in research and training; and (iv) attainment of universal knowledge, to transcend geographical and political frontiers, and to affirm the need for different cultures to know and influence each other.

Once we decide what the underlying purpose and fundamental principles of a university are meant to be, how do we translate these into measurable indicators of performance in a reasonable and cost-effective way? Much research has gone into this subject, including research on how we rate and rank universities for their teaching and research, and on how governments and others decide which ones to give more or less money to. These questions are of course largely insoluble and any answers relate very strongly to political and economic considerations within a country and to the political power (or lack of it) which the universities themselves can wield. Answers are also of course likely to violate at least one—if not all—of the four Bologna principles by the implicit incentives that they engender. In the UK, the Higher Education Funding Council for England is about to undertake another Research Excellence Framework (REF) exercise in which all universities are assessed on the basis of published papers and citations (65%) the impact of their research (20%) and the research environment (15%) that they provide. Each of these dimensions is ranked on a star rating, from four star 'world-leading in originality and significance and rigour.' and three star 'internationally excellent in terms of originality, significance and rigour' to one star 'recognized nationally in terms of originality, significance and rigour.' Papers will be scored by members of panels, and researchers may worry that scoring may be somewhat subjective.

As a result of the REF, however, we face daily stark choices about how much time we allocate to teaching, and how to enhance our impact by