NUFFIELD COUNCIL ON BIOETHICS

Response to the UNESCO Revision of the Recommendation on the Status of Scientific Researchers

August 2015

KEY POINTS

- Any revisions to the 1974 Recommendation on the Status of Scientific Researchers should be be considered in the context of changes to the culture of scientific research over the past 40 years, particularly the increasingly competitive nature of research careers, the introduction of formal research assessment mechanisms by many countries, and the advent of online publishing.

- More specifically, revisions to the Recommendation should consider the recommendations of the Nuffield Council on Bioethics that:

  - There is a collective obligation for all the actors in the system to ensure the culture of research supports good research practice and the production of high quality science. Therefore the Recommendation should apply to the research ecosystem as a whole.

  - Research ethics should be an integral part of scientific research, and scientists should have a thorough grounding in research ethics.

  - Scientists' work should be assessed broadly by funders of research and employers, without undue reliance on metrics such as journal impact factors or citations, or receipt of grant funding.

  - Mentoring and career advice should be provided to help scientists plan their future careers, expand their skills to be broadly applicable outside of academia, and tackle perceived barriers to working beyond academia.

  - The employment practices, ethos and environment of research institutions should support diversity and inclusion.

  - Researchers should strive to share work with others, for example, by choosing accessible journals, making published work available in public repositories and sharing datasets, wherever possible.

BACKGROUND

1 The Nuffield Council on Bioethics is an independent UK body that examines and reports on the ethical issues raised by developments in biology and medicine. The Council has achieved an international reputation for advising policy makers and stimulating debate in bioethics. It was established in 1991, and is funded by the Nuffield Foundation, the UK Medical Research Council, and the Wellcome Trust. For more information about the Council see: www.nuffieldbioethics.org

2 The majority of this response draws on the Council's report *The culture of scientific research: findings from a series of engagement activities* (published 2014).[1] Where indicated, we have also highlighted findings from the Council's report *Emerging biotechnologies: technology, choice and the public good* (published 2012).[2]

The culture of scientific research

3 In 2014, the Nuffield Council on Bioethics embarked on a series of engagement activities aiming to inform and advance debate about the ethical consequences of the culture of scientific research in terms of encouraging good research practice and the production of high quality science.

4 The Steering Group for the project included staff of some of the UK's leading scientific organisations, namely the Royal Society, Academy of Medical Sciences, Society of Biology, Royal Society of Chemistry and the Institute of Physics. The activities of the project included:

- An online survey that received 970 responses
- Fifteen discussion events co-hosted with universities around the UK involving 740 speakers and participants
- Evidence-gathering meetings with funding bodies, publishers and editors of scientific research, and academics from the social sciences

5 Most of those who took part in our activities are involved or interested in research being undertaken by higher education institutions in the UK. However, we believe some important themes and ideas emerged during the project, which are relevant to the broader context of scientific research in the UK, and internationally. The report is available online: www.nuffieldbioethics.org/research-culture

Emerging biotechnologies

[1] Available at: www.nuffieldbioethics.org/research-culture
[2] Available at: www.nuffieldbioethics.org/emerging-biotechnologies

6 This report was the result of a two-year inquiry looks that explored at the ethical issues of raised by emerging biotechnologies, including how the research, policy, regulations and business environments influence the development of biotechnologies.

COMMENTS ON UNESCO RECOMMENDATION ON THE STATUS OF SCIENTIFIC RESEARCHERS

General comments

7 Since the Recommendation was adopted 1974, there have been several important changes to the culture of scientific research in many countries. First, it is widely believed that a career in science in the UK has become more competitive. Our survey in 2014 revealed that applying for funding is thought to be very competitive by the majority of respondents (94 per cent), as is applying for jobs and promotions (77 per cent). Around nine in ten think making discoveries and gaining peer recognition is quite or very competitive.

8 Competition appears to be a double-edged sword. Many believe that competition can bring out the best in people as they strive for ever better performance, and that science advances more rapidly as a result. It is also thought that high levels of competition go against the ethos of scientific discovery and can create incentives for practices that are damaging to the production of high quality research. We see these views about the increasingly competitive nature of scientific research reflected in other countries.[3]

9 Second, many countries have seen the introduction of formal research assessment mechanisms. In the UK for example, since 1986 core research funding to higher education institutions has been allocated on the basis of the results of the Research Assessment Exercise, and more recently the Research Excellent Framework (REF). The REF process involved peer review of each institution on the basis of 1) the outputs of research (such as journal publications, datasets and patents), 2) the impact of past research on the economy, society and culture, and 3) the vitality and sustainability of the research environment.

10 In a competitive system, the criteria (or perceived criteria) used by funding bodies, journals and research institutions to assess the quality and value of science influences what science is pursued and how scientists behave. For example, we found that the perception that publishing in high impact factor journals is the most important element in assessments for funding, jobs and promotions is creating a strong pressure on scientists to publish in these journals. This is believed to be resulting in important research not being published,

[3] For example, the US. See: Alberts B, Kirschner MW, Tilghman S, and Varmus H (2014) Rescuing US biomedical research from its systemic flaws *Proceedings of the National Academy of Sciences* 111(16): 5773–7.

disincentives for multidisciplinary research, authorship issues, and a lack of recognition for non-article research outputs. In addition, attempts to assess the societal and/or economic impact of research are welcomed by some, but others believe this is creating a culture of short-termism and is pushing aside interest in curiosity-driven research, as well as resulting in researchers exaggerating the potential application of research in grant proposals. We suggest that the track record of researchers should be assessed broadly, without undue reliance on journal impact factors, in processes for making appointments, conducting staff appraisals and awarding promotions. The San Francisco Declaration on Research Assessment (DORA) also recognises that research should be assessed on its own merits rather than on the basis of the journal in which the research is published.[4]

11 Third, online publishing has allowed for a far greater volume of peer reviewed research and data to be made available to others and for this to happen much more quickly. It is also easier to search across the body of literature for relevant papers or authors. In addition, publishing models are beginning to change. In the UK, there is support from policy makers, funders and others for a move to open access publishing, where peer-reviewed journals allow free access to their articles, paid for by article processing charges (often referred to as 'Gold' open access), or where published research is placed in a separate public repository for anyone to see after an agreed period of time (often referred to as 'Green' open access). Many research funders now require or encourage their grant holders to ensure free, online access to their published work, and most universities have publicly accessible research repositories for their researchers to use. Discipline-specific repositories also exist, such as arXiv.org, where pre-prints of papers in the fields of physics and mathematics are self-archived by authors. Approaches to peer review are also changing. Open peer review, for example is used by several journals and aims for open and fairer scrutiny of research, and can allow peer reviewers to get more credit for the work they do.

12 Any revisions to the Recommendation on the Status of Scientific Researchers should be considered in the context of these changes in the culture of scientific research.

Specific comments

I. Scope of application

[4] See: http://www.ascb.org/dora/

13 We agree with the UK submission[5] to this Review that the Recommendation should not apply only to scientific researchers but also to the research ecosystem as a whole. Although externally-imposed conditions play a role, the culture of research is largely shaped by the actors in the system. These actors include funding bodies, research institutions, publishers and editors, professional bodies and individual researchers. We believe there is a collective obligation for those actors to do everything they can to ensure the culture of research supports good research practice and the production of high quality science.

II. Scientific researchers in the context of national policy-making

14 Participants at several events broadly welcomed the attempt by funding bodies to assess the impact of future or previous research beyond academia, believing that scientists have obligations to maximise opportunities for and demonstrate the benefit of their work to society. It also, some believe, focuses researchers' attention on the purpose of their research and forces them to explain their research clearly.

15 However, others were less enthusiastic, and concerns include:

- A culture of **short-termism**: pressure to create impact was one factor cited by survey respondents as causing a culture of short-termism in the UK, potentially resulting in fewer new ideas, a decrease in the time available to plan good research, greater adherence to 'safer' research topics and cutting corners in research.

- A focus on **applied research**: participants at several events were concerned that an increased focus on the impact of research may be pushing aside interest in and funding of curiosity-driven research.

- The **risk of hype**: some event participants expressed a concern that a focus on impact was resulting in researchers exaggerating the potential application of research in grant proposals and the timescales to which they might be delivered.

16 Our report on *Emerging Biotechnologies* highlights the influences *on* researchers, and the influences *of* researchers that may shape the direction of research.

17 A major influence on the direction of research in emerging biotechnologies is pressure from research funders, whether public, commercial or charitable. Other

[5] Available at: http://www.unesco.org.uk/wp-content/uploads/2015/06/UK-National-Commission-for-UNESCO_Submission-to-the-Consultation-on-the-Recommendation-on-the-Status-of-Scientific-Researchers.pdf

influences include the need to address societal challenges, the 'impact agenda' prevalent in university funding systems in the UK, visions expressed in technology 'roadmaps', and public expectations.

18 Public systems for the allocation of research funding should be designed to avoid encouraging researchers to overstep the bounds of their competence when assessing the impacts of their research in non-research contexts.

19 When communicating the results of their work and hopes about where it may lead, researchers can create expectations that may inform decisions of policy makers. Researchers who take part in public discussion of research should take responsibility for the accuracy and completeness of the information they present, and should also strive to ensure that others represent the issues fully and correctly.

III. Initial education and training of scientific researchers

20 Fifty-eight per cent of our survey respondents were aware of scientists feeling tempted or under pressure to compromise on research integrity and standards (26% of respondents had themselves felt tempted), although evidence was not collected on any outcomes associated with this. A higher proportion of respondents aged under 35 years (33%) stated they had felt tempted or under pressure in comparison with those aged above 35 years (21%).

21 Research integrity came up frequently at the discussion events, and concerns that high levels of competition for scarce resources put scientists under immense pressure which means that scientists were "bound to behave less well". Participants noted the distinction between research misconduct, such as fraud and fabrication, and other kinds of poor practice, such as poor experimental design, and suggested they should be dealt with separately.

22 Sixty per cent of survey respondents think that initiatives that promote integrity in science in the UK, such as codes of conduct, help encourage the production of high quality science. We heard that *The Concordat to Support Research Integrity*[6] can be a helpful reminder of the importance of ethical values in scientific research, and websites such as *Retraction Watch*[7] help to expose cases of bad practice.

23 Suggestions for improving research integrity in the UK. For example, universities have a responsibility to create conditions to support ethical research conduct and

[6] Available at: www.universitiesuk.ac.uk/highereducation/Documents/2012/TheConcordatToSupportResearchIntegrity.pdf
[7] See: http://retractionwatch.com/

demonstrate clearly the consequences of poor research practice. Training in good research practice was thought to be important in this regard, particularly for PhD students, but time pressures on senior scientists might be preventing this from happening at the moment.

IV. Conditions for success

24 Scientists we spoke to told us that that they are motivated in their work by:
- Improving their knowledge and understanding
- Making scientific discoveries for the benefit of society
- Satisfying their curiosity

25 When survey respondents were asked to select five words from a list that best describe their understanding of high quality research, the five most frequently selected words were:
1. Rigorous
2. Accurate
3. Original
4. Honest
5. Transparent

26 During the project activities it emerged that several other components are thought to be particularly important in the production of high quality science: collaboration, multidisciplinarity, openness and creativity.

27 However, many felt that aspects of the culture of scientific research did not support these aims. For example, concerns about the challenges of career progression and heavy workloads were raised frequently during our project. Many believe that a culture of short-termism, high levels of stress, a lack of time to think and a loss of talented individuals from academia, which results in a loss of creativity and innovation, were affecting the production of high quality science.

28 The following areas are particularly relevant to UNESCO's call for advice:

- Many were concerned about an **over reliance on metrics**, such as journal impact factors and citations. The *Concordat to Support the Career Development of Researchers*[8] was highlighted as a positive development in the improvement in the way in which researchers are promoted and recruited. It commits signatories to fair, consistent selection processes where researchers are chosen primarily for their ability to advance research at an institution. The track record of researchers should be assessed broadly, for example by paying closer attention to and valuing the hard-to-measure and

[8] Available at: https://www.vitae.ac.uk/policy/vitae-concordat-vitae-2011.pdf

often invisible ways in which researchers contribute to the production of high quality science. This may include mentoring, training, teaching, peer review, university administration, public engagement and contributing to the work of national bodies and policy makers.

- Among early career researchers, there is high competition for jobs and there will not be a permanent job for everyone at the end. It is inevitable that a large number of people will leave for other sectors after their initial training, bringing their valuable expertise to non-academic professional roles. **Mentoring and career advice** was suggested as a possible way to help researchers be realistic about their prospects for a career in scientific research, to mitigate feelings of failure in those who transfer to other sectors, and to reduce the high levels of competition they currently experience.

- Participants noted that the number of women in science in the UK has increased and that the introduction of formalised research assessment systems may have helped to tackle gender biases which may have formerly influenced decisions about funding allocation and career progression. The *Athena SWAN Charter*,[9] a national scheme that recognises good employment practice for women working in science, was seen as having a positive influence on **diversity in science**.

[9] For more information see: http://www.ecu.ac.uk/equality-charters/athena-swan/