Heads of Department of Mathematical Sciences in the UK (HoDoMS)
Response to the DfES consultation on the future of the RAE

From the Chair
Professor Peter Giblin, Department of Mathematical Sciences, The University of Liverpool, L69 7ZL
email pjgiblin@liv.ac.uk

- I do not wish this response to be kept confidential.
- You may contact me in the future regarding this response
- If possible please acknowledge receipt of this response
- If possible please inform me when the consultation results are published

General comments:

The Committee of HoDoMS wishes to endorse the response to the DfES consultation which has been prepared by the Council for the Mathematical Sciences.

HoDoMS also wishes to make the following submission, the substance of which has been provided by Heads of Department of Mathematical Sciences, including Statistics, in the UK. These are practising mathematicians for whom excellence in research in their Department or School is a high priority and who are as a result very much concerned that any future RAE should measure excellence in a robust and cost-effective way: in the words of the consultation document, in a way that 'commands the confidence of all stakeholders'. Our assumption is that the RAE is to be a method for deciding the distribution of QR money based on an assessment of quality of research in mathematical sciences (UoA 20, 21, 22 currently).

(1) We are concerned that the following statement from *Science and innovation investment framework 2004-2014: next steps March 2006*
`http://www.dti.gov.uk/science/sciencefunding/framework/next_steps/page28988.html`
does not appear to have been considered in the DfES consultation document.

4.15 The Government is also aware that while the correlation between research income and QR is close when measured at an institutional level, this is largely driven by science, engineering and medicine. It is therefore not clear that a metric based on research income would fairly support excellent research in the arts and humanities and some other subjects, such as mathematics. It might therefore be the case that other options would need to be explored for these subjects.

The thrust of the present consultation appears to be that all 'STEM' subjects are the same (see e.g. the wording of Questions 3 and 4), which is in clear contradiction with the above quotation. The fact is surely that measures of excellence are highly discipline dependent, and can only meaningfully be determined by those with expert knowledge.

(2) Exclusive use of metrics, especially research grant income, to determine QR funding effectively replaces the current dual support system with a single one, based on the criteria used by research councils. It has been pointed out by people with extensive experience of both systems that the deliberations of research council panels are in fact very different from those of RAE panels (or journal editors)[1] and a vital element, judging the quality of published research, would be lost by a wholesale move to metrics. In addition, methods for allocation of funds differ considerably between research councils.

---

[1] This point is made, though in a very dilute form, in Section 4.2 of the Consultation: 'It is important to recognise, however, that in no case does the scope and purpose of the peer review activity in question [that exercised by research councils allocating grants] exactly duplicate that of the RAE.'

(3) Moving to a system where QR funding is based to a large extent on income would result in an unstable system, in particular to a huge increase in research council applications; as a result

(i) research councils would have to change their methods of operation;
(ii) effort would be diverted from research itself to the process of applying for funding;
(iii) awarding/not awarding grants would have an even great impact than it has now.

It is not always completely clear what 'research funding' means. Some sources of postdoctoral grants in the EU, for example, attach the funds to the research fellow and not to the UK staff member with whom s/he is working in the UK.

(4) Metrics (mostly) measure inputs, whereas it is quality of outputs that matter. These can only be judged by some form of peer review of outputs. Appropriate metrics can be used to provide additional information to the reviewers.

(5) Some research in mathematics attracts, and indeed relies on, significant external funding. However, as the RAE2008 criteria explicitly recognise, mathematical research can in some circumstances (and particularly in some areas of so-called 'pure mathematics' and the more theoretical areas of statistics) be carried out at a very high level with little or no external support in the form of research grants. Such high level researchers (who might work as individuals or in small groups) need the normal university QR funded infrastructure, PhD students and so on, but have minimal research costs beyond their salaries. As numerous examples show—for example the vital role of GCHQ in the nation's security, and the recent investment in the Heilbronn Institute—research in 'pure mathematics' is often, in the longer term, very highly relevant to the real world. The relevance of statistics is likewise very clear.

(6) Reducing the burden placed on institutions, researchers and panels in future research assessment is clearly a high priority—though not such a high priority as the existence of a system that commands the confidence of those most affected, namely the academic community of mathematicians. Suggestions which have been made for reducing the burden include:

(i) The RAE is intended to judge the quality of a departmental Unit of Assessment as a whole. Thus one way forward is to escape from descent to the individual, lifting the bar, say, to the departmental (or unit) level and requiring only the best outputs from this group. Clearly allowance would need to be made for small as against large departments. [A possible consequence which has been pointed out is that each department (or unit) would need a 'mini RAE panel' to choose the best outputs, which results in a greater exposure of individuals than the present system. However if the essential element of peer review is to be retained and the burden reduced, some way must be found to cut down the number of outputs which the panel has to assess.]

(ii) Remove entirely the narrative aspects of the RAE submission.

Question 1: Which, if any, of the RAE 2008 panels might adopt a greater or wholly metrics-based approach?

This submission relates exclusively to Mathematical Sciences, that is, Units of Assessment 20, 21, 22 under the current scheme. However, data presented by the CMS and provided by professional statisticians shows rather clearly that the correlation between grant income and quality of output as measured by RAE2001 is very weak in many subjects besides mathematics. Given that RAE2001 produced broadly fair results, this makes a heavy reliance on grant income in particular very dangerous. See also the general points made above.

Question 2: Have we identified all the important metrics? Bearing in mind the need to avoid increasing the overall burden of data collection on institutions, are there other indicators that we should consider?

The use of the word 'metrics' in this question suggests that only numerical indicators are being considered, whereas qualitative judgement is also needed. The word 'esteem' occurs nowhere in the consultation document but some measures of esteem are surely needed, such as prizes, awards, invited conference presentations and the like.

Bibliometric data needs to be used with care as it is heavily subject dependent, and for example mathematicians who work in interdisciplinary research are likely to score more highly than those working in 'pure' research. In addition, there is a possible time lapse problem with fundamental research which might exceed the length of time between research assessments. It has been suggested that a bibliometric 'score' could be obtained by grading journals into bands A, B, C and producing a weighted sum of all publications for a Unit of Assessment. This would allow for inter-disciplinary publications. Again this 'score' could only be a general guide to quality for peer reviewers.

Question 3: Which of the alternative models described in this chapter do you consider to be the most suitable for STEM subjects? Are there alternative models or refinements of these models that you would want to propose?

The models as they stand are simply not adequate for mathematics, being heavily weighted towards input measures, principally research income. It is not possible to reduce excellence to a series of input measures; there has to be an element of considered judgement of quality of output. As above (see (6)) there may well be ways in which the administrative and academic burdens could be reduced, but this would be a matter for negotiation with expert bodies.

Model A (Section 5.6) contains the following:

Subjects that receive a relatively small proportion of their income through project or programme grants would receive less QR funding under this method than under the current system. This could be problematic where subjects receive relatively little external research income because of the nature of research involved, but at the margins it is difficult to separate out this effect from the effect of some departments or institutions not being successful at competing for research projects and programmes because of the perceived quality or relevance of their research.

We trust that no-one in the DfES thinks that mathematical sciences, or 'pure mathematics' are 'at the margins'. The way to separate out the stated effect is to use some form of expert judgement of quality.

Model C has the relative merit of recognising the need to protect 'pot sizes' for different disciplines. It has been suggested that the pot sizes should be determined less by somewhat arbitrary formulae and more by national policy considerations.

Model D seems unworkable.

Question 4: What, in your view, would be an appropriate and workable basis for assessing and funding research in non-STEM subjects?

This response concerns only Mathematical Sciences.

Question 5: What are the possible undesirable behavioural consequences of the different models and how might the effects be mitigated?

Metrics will focus on certain quantifiable surrogates for 'desired output', which itself is unquantified. There is a danger that academics will attempt to optimize the measured variables to achieve rewards, instead of optimizing the desired outputs. Only human intervention by a group composed largely of peers can avoid this undesirable manipulation.

Question 6: In principle, do you believe that a metrics-based approach for assessment or funding can be used across all institutions?

No.

Question 7: Should the funding bodies receive and consider institutions' research plans as part of the assessment process?

Research plans at the institutional level are less likely to be useful that those at a more focused level, and the only way of evaluating these would be by a form of peer review.

Question 8: How important do you feel it is for there to continue to be an independent assessment of UK higher education research quality for benchmarking purposes? Are there other ways in which this could be accomplished?

If funding is to follow quality (surely a desirable aim) then presumably there must be an assessment of quality, where this means both proven quality and promise for the future. Mathematics (in the broad sense) is of such key importance that robust and transparent means must be used to assess this quality.