

# **IOP** Institute of Physics

## **Institute of Physics response to the Research Excellence Framework review**

### **Introduction**

The Institute of Physics (IOP) is a leading scientific society. We are a charitable organisation with a worldwide membership of more than 50,000, working together to advance physics education, research and application. We engage with policymakers and the general public to develop awareness and understanding of the value of physics and, through IOP Publishing, we are world leaders in professional scientific communications.

The IOP welcomes the opportunity to respond Lord Stern's review of the Research Excellence Framework. We have outlined below which areas we consider should be retained in any future exercise, and which areas could be improved to ensure that the REF can better achieve its aims.

### **Response to review questions**

1. What changes to existing processes could more efficiently or more accurately assess the outputs, impacts and contexts of research in order to allocate QR? Should the definition of impact be broadened or refined? Is there scope for more or different use of metrics in any areas?

*What changes to existing processes could more efficiently or more accurately assess the outputs, impacts and contexts of research in order to allocate QR?*

The Research Excellence Framework (REF), together with its predecessor Research Assessment Exercises, has had a significant impact on the UK research base. The importance of the exercise in driving the allocation of significant amounts of research funding, providing one side of the dual support system, and the prestige attached to a successful ranking, means that its design and outcomes have substantial impact on the behaviours of universities, departments and researchers.

For REF21 the process should be designed to ensure that departments and universities can be assessed and compared on an equal basis, and that the process should not favour those with more resources. The process should be based on peer review and be designed to ensure that the assessment process itself minimises the effects of unconscious bias and that all eligible staff are included in the assessment. The process should also be designed to ensure that research at the boundaries, intra and cross discipline research and impact is properly valued, along with longer-term research which may not result in primary outputs within the time period.

Any changes should be made within the existing process rather than through the development of a new one. The existing broad processes used by the REF to assess research excellence, including the measures of output, impact and environment, are now well understood by stakeholders, and any substantial change to this basis would increase workload and burden significantly.

### *Should the definition of impact be broadened or refined?*

The definitions of impact used in REF14 were heavily influenced by the makeup and decisions of the main panels and sub panels. This is appropriate and allows disciplines to be best assessed on their own merits.

The production of impact case studies does present a significant burden to both researchers and companies. Ideally this workload could be reduced, both for the researchers who produce them and for the panels reviewing them, by moving to a more consistent way of reporting, possibly through a more standardised pro-forma. These efforts should also consider how to reduce the advantage better resourced universities might be able to gain in getting support for the writing of impact case studies.<sup>1</sup>

Currently, departments must submit a minimum of 2 case studies, with further case studies for each additional 10 FTE staff submitted. **All eligible staff** should be submitted to REF21, our reasons for which are given in detail in response to Q6. This will increase the overall number of staff submitted to REF21, and as such affect the number of case studies determined for inclusion under the current mechanism. The way that the number of impact case studies departments are required to submit is determined may need to change to address this, taking into account any potential effect this will have on the burden of assessment.

The preparation of impact case studies can create a significant burden on SMEs which are referred to either as collaborators in the research, as spin-out companies from the research, or in other ways. This can be particularly challenging for SMEs as they are likely to have limited resources available to support evaluative exercises. Efforts should be made to ensure that the process of providing information reduces as much as possible both the burden on SMEs and other third party contributors as well, particularly when working with smaller universities or departments which may lack the resource to provide additional support.

There is also a need to reduce the requirements to provide information which may not be essential to assessing impact but that will result in a need to restrict access to the case studies. Around 4% of impact case studies in the last REF required redacting, and another 6% required partial redacting. This was for a number of reasons, such as a need to protect commercial confidentiality. Panel B, in which physics sits, had nearly twice the number of fully redacted case studies as all the other panels combined, and around the same number of partially redacted case studies as all the other panels combined.<sup>2</sup> This reduces the utility of impact case studies as public documents. Many more examples of impact may not have been submitted due to the efforts required in accessing information or because of worries about sharing sensitive information.

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<sup>1</sup> For example, companies such as Scriptoria offered their services to help “UK universities produce first class Research Excellence Framework (REF) impact case studies” stating that their “expert writers and trainers can help you to identify and clearly communicate your research impact in your institution’s case studies: <http://www.scriptoria.co.uk/REF2014/>

<sup>2</sup> King’s College London and Digital Science (2015). *The nature, scale and beneficiaries of research impact: An initial analysis of Research Excellence Framework (REF) 2014 impact case studies*: <http://www.kcl.ac.uk/sspp/policy-institute/publications/Analysis-of-REF-impact.pdf>

In the previous REF the time period of eligible research for impact case studies was from January 1993 to December 2013. Adjusting for intervening years, a similar time period for REF 2020, from 1999 – 2019, would be appropriate. It is conceivable that new or further impacts could have occurred from research submitted to the previous REF. As such research impacts submitted to the previous REF should not preclude the same research being submitted as an impact case study in the next REF. But case studies submitted to REF 2014 should not be able to be resubmitted.

*Is there scope for more or different use of metrics in any areas?*

Panels and peer review remain the most effective and the rigorous evaluation of work within each area and are the method most trusted within the academic community. Panels and peer review should remain the primary method of assessment.

The existing weightings for each measure – output (65%), impact (20%) and environment (15%) – should be retained to enable continuity, but within each of these divisions the scoring should be made more consistent. In REF14 physics (and in Panel B overall), the ranges of marks used for each measure were not the same. While for output a scale of 0-4 was used, in tandem with the star system, for impact and environment panels and sub-panels initially used a nine point scale for each piece of research or section.<sup>3</sup> In physics, while the percentage of 4\* outputs awarded to institutions ranged from 2% and 33%, with a median percentage of 22%, the range of 4\* impacts and environment ranged from 0% to over 80%, with median figures of 25% and 30%. There is a need in REF21 to provide more clarity in guidance in the way these measures, particularly impact, are scaled to ensure that the 65:20:15 weightings are just that.

The REF process would be more effective in taking into account areas that would be useful to Government and research funders if the panels that perform the assessment of research included members from a more diverse set of backgrounds – including a greater number of industry representatives and other users such as regulators, consumer advocates and civil servants. This greater diversity of experience and expertise would likely only be able to be utilised in assessing impact case studies. Guidance should be issued to those seeking to make nominations as well as those compiling panels. For the same reason, efforts should also be made, where possible, to ensure that those recruited to panels represent a greater diversity of demographics.

Any increased role of metrics in any future REF should be confined to informing existing processes only. Metrics are neither able to replicate nor replace the value that panels provide in conducting qualitative assessments of research. Any gains in efficiency from an increased use of metrics have to be measured against any fall in the accuracy and precision that panels of experts and peers within individual disciplines are able to provide.

2. If REF is mainly a tool to allocate QR at institutional level, what is the benefit of organising an exercise over as many Units of Assessment as in REF 2014, or in

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<sup>3</sup> HEFCE (2015). *Research Excellence Framework 2014: Overview report by Main Panel B and Sub-panels 7 to 15*:  
<http://www.ref.ac.uk/media/ref/content/expanel/member/Main%20Panel%20B%20overview%20report.pdf>

having returns linking outputs to particular investigators? Would there be advantages in reporting on some dimensions of the REF (e.g. impact and/or environment) at a more aggregate or institutional level?

*If REF is mainly a tool to allocate QR at institutional level, what is the benefit of organising an exercise over as many Units of Assessment as in REF 2014, or in having returns linking outputs to particular investigators?*

The existing units of assessment (UoA) used in REF14 should be retained. There may be arguments for extending UoAs in certain very independent sub-fields or well-defined interdisciplinary areas, but any attempt to do so should involve consultation with the specific research communities which are likely to be affected. Assessment performed by panels of researchers' peers provides expertise and experience to best judge the effectiveness of the research being reviewed. Doing so at a higher (or broader) level risks losing expertise: such panels would be less likely to include experts from all subjects.

Departments should be required to submit all eligible staff.

*Would there be advantages in reporting on some dimensions of the REF (e.g. impact and/or environment) at a more aggregate or institutional level?*

The UoAs used in REF14 are the logical places to assess the performance of departments, at least where UoAs are strongly connected to departments as is usually the case for physics. UoAs are more valuable as a judge of performance than assessment at institution level. Impacts can be tied back to outputs, and these have a much stronger relationship with departments than institutions. Similarly, improvements in environment will often be down to researchers within a specific department being successful in securing funding, and assessing their success is also more appropriate at the departmental level. While QR funding is currently allocated at the institutional level, simplifying or aggregating the REF process at the institution level would lose many of the secondary, or indirect, benefits of the REF. The results of the REF have been used by HEIs, researchers, analysts and students to assess the performance of university departments, and compare and contrast different subjects. The information of most value is at the level of the department and should be retained at this level.

3. What use is made of the information gathered through REF in decision making and strategic planning in your organisation? What information could be more useful? Does REF information duplicate or take priority over other management information?

*What use is made of the information gathered through REF in decision making and strategic planning in your organisation?*

The publishing and provision of easy access to REF data are used to present and assess the health of UK research. HEIs are able to use the data to benchmark against one another, as are departments at subject level, and to assess the research performance of departments and staff. Researchers and students can also use the data to assess the performance of a prospective employer or department in research.

The Institute of Physics and the Royal Society of Chemistry have made use of REF impact case studies to provide an overview of the work that their respective sectors perform to inform government.<sup>4,5</sup>

*What information could be more useful?*

The wide variation in the percentage of eligible staff submitted made the data significantly less useful than it otherwise could have been.

*Does REF information duplicate or take priority over other management information?*

If the REF did not exist, many of the functions undertaken by departments over the course of the REF assessment would likely still be performed as they play an important role in the management and accountability of institutions. As such, the REF may actually promote efficiency in the system. If the level of data resulting from the REF or published as a result of the REF were to be reduced, such as restricting data to the institutional level, many of these important benefits would be lost.

4. What data should REF collect to be of greater support to Government and research funders in driving research excellence and productivity?

No comment

5. How might the REF be further refined or used by Government to incentivise constructive and creative behaviours such as promoting interdisciplinary research, collaboration between universities, and/or collaboration between universities and other public or private sector bodies?

*Interdisciplinary research*

Feedback from REF14 suggests that there is a need to develop a mechanism to better cater for work that does not neatly fit into a single UoA. Much research in physics departments, for example, would be equally at home being submitted to panels for biological sciences, clinical medicine or chemistry panels. REF14 provided a mechanism for panels to refer research to a different panel, but for some researchers the initial decision on where to submit interdisciplinary research can be a cause for concern, particularly as the decision could affect resultant funding. There may also be reluctance on the part of some departments to submit research published in a non-standard journal (e.g. in physics, a 'non-physics' journal). Research based on REF14 data found a lower citation impact for the most interdisciplinary research submitted compared to the average for all REF submissions. This may help fuel

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<sup>4</sup> Institute of Physics (2015). *Inspirational Physics for a Modern Economy*.  
[http://www.iop.org/publications/iop/2015/file\\_65903.pdf](http://www.iop.org/publications/iop/2015/file_65903.pdf)

<sup>5</sup> Royal Society of Chemistry (2015). *Inspirational Chemistry for a Modern Economy*.  
<http://www.rsc.org/globalassets/04-campaigning-outreach/campaigning/campaign-for-government-science-support/inspirational-chemistry-for-a-modern-economy.pdf>

this reluctance<sup>6</sup> and create barriers to performing interdisciplinary research, or at the very least, make the process more stressful for those performing it.

Giving departments the explicit ability to submit research, where applicable, to more than one panel would be helpful. Researchers producing interdisciplinary research would then avoid the need to force their research to fit within one distinct discipline, and this measure would be seen as a positive move aimed at helping to facilitate and avoid discouraging interdisciplinary research. An additional concern is that if research is performed across departments within the same institution – for example a physics and biology department collaborating on biomaterials – then it is usually only able to be submitted by one department.<sup>7</sup> A mechanism should be created to allow for joint departmental submission, much as departments in two different institutions can submit research by the same individual(s), to avoid the creation of unnecessary and counterproductive intra-departmental competition. Such considerations take on even more importance when calculating the percentage of staff submitted in a particular department. A requirement for submission of all eligible staff would remove this additional complication.

### *Collaborative working*

Impact case studies and their importance to the current iteration of the REF serve in and of themselves as an incentive towards collaborative working. Many of the case studies submitted to REF14 focused on the success of collaborations with industry and with small business; to drive their growth and wider economic growth, to improve their business practices and manufacturing processes, and in the proliferation of university spin-out companies and start-ups. The guidance issued to researchers, departments and institutions in REF21 should make use of good practice from REF14 impact case studies, in particular in relation to collaborative practices across the full innovation landscape, including with other universities, catapults, business and government. This would serve to promote the value and importance of such collaborative practices.

6. In your view how does the REF process influence, positively or negatively, the choices of individual researchers and / or higher education institutions? What are the reasons for this and what are the effects? How do such effects of the REF compare with effects of other drivers in the system (e.g. success for individuals in international career markets, or for universities in global rankings)? What suggestions would you have to restrict gaming the system?

### *Workload*

REF14 placed a significant burden of workload on both researchers and departments that were submitted to it and those who conducted assessment panels. In particular, the requirements of putting together impact case studies placed huge pressure on individual researchers' time. Clearer guidance on consistency and the development of a systematised

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<sup>6</sup> Elsevier (2015). *Interdisciplinary Research in REF 2014 Submitted Publications*: [http://www.hefce.ac.uk/media/HEFCE,2014/Content/Pubs/Independentresearch/2015/Review,of,the,UKs,interdisciplinary,research/2015\\_interdisca.pdf](http://www.hefce.ac.uk/media/HEFCE,2014/Content/Pubs/Independentresearch/2015/Review,of,the,UKs,interdisciplinary,research/2015_interdisca.pdf)

<sup>7</sup> HEFCE (2012). *Assessment framework and guidance on submissions*: <http://www.ref.ac.uk/media/ref/content/pub/assessmentframeworkandguidanceonsubmissions/GOS%20including%20addendum.pdf> (Para 79 g.)

pro-forma to submit impact case studies would reduce the impact on workload and also limit the advantage well-resourced departments could gain in getting support for the writing of impact case studies.

Any changes to the REF should first take account of the likely impact that they would have on the workload of those organising submissions as well as assessment panels. Changes should be avoided that add to the administrative burden on researchers and departments. It would be beneficial to prioritise data and information which are already used regularly. Panels should be maintained as the main source of assessment, but efforts to ease their workload without reducing their rigour should be explored – perhaps by recruiting more panel members and providing *pro-forma* or further guidance to help universities create more standardised submissions to ease both data gathering and comparisons.

#### *Institution and researcher effects*

The current REF process does not require all staff to be submitted from every department and institutions can select which staff are submitted to the process. This means that departments can ‘game’ the system by choosing to submit a certain fraction of staff to try to increase the proportion of their research awarded the highest ratings (at the probable cost of a lower overall funding allocation). Such a system also has the potential to create biases against certain staff, unconsciously or otherwise. As such, departments’ choices can lead to some staff not receiving the same opportunities as those submitted to the REF, with existing unconscious biases within departments potentially accentuated by the selectivity of this system, and creating negative effects on career progression. As such, submission of all eligible staff over 0.2 FTE should be considered for REF21. Under such a system of full submission, there will be a need to take action to mitigate any incentive for departments to change the terms of staff contracts to make some ineligible for submission to the REF. This could be solved by requiring that departments submit staff based on their contract status at a certain point a year or so before the REF process, rather than at the time of the REF process itself.

7. In your view how does the REF process influence the development of academic disciplines or impact upon other areas of scholarly activity relative to other factors? What changes would create or sustain positive influences in the future?

*In your view how does the REF process influence the development of academic disciplines or impact upon other areas of scholarly activity relative to other factors?*

The significance of the outcomes of the REF and RAE has meant that the processes of REF and RAE have made an impact on research in UK universities over the past few years. The introduction of the impact stream of REF14 has driven a change in mindset with universities and departments with an effect on both the kinds of research supported and also the prioritisation of partnerships and collaborations with external parties.

*What changes would create or sustain positive influences in the future?*

A requirement for to submit all eligible staff submission to REF21 along with additional support for cross-panel submissions should have a positive impact on UK research and departmental cultures and career paths.

Additionally, REF21 may need to be clearer on the treatment of long-term projects, such as building new equipment, developing new techniques and on exploring new avenues of research. Such developments may require huge investments in time before results are obtained, and more investment still in producing impacts on society, the economy or elsewhere. For example, recent developments such as the discovery of the Higgs Boson and confirmation of gravitational waves took decades of research. To some extent this will be mitigated by the requirement to submit all eligible staff – all departments will be in the same boat, and researchers will clearly be producing output at interim stages of the work. However it would be useful to issue guidance on the best way to take account of such long-term projects. Such guidance should be put together with the involvement of relevant research communities.

An issue with some physics papers, shared with few other disciplines, is that large multi-author papers (of 500+ authors) can be quite common, for example in particle physics. In REF14 the physics sub-panel put together a system which ensured that authors submitting outputs with more than 10 authors had to specify their contribution with a statement of up to 100 words.<sup>8</sup> The panel suggested that “it would be desirable that any future REF exercise should have a uniform approach to this problem”. As such, there is cause to develop such a mechanism when papers of a certain threshold of authorship are submitted to better judge the individual researcher’s contribution, by providing a statement detailing their specific contribution to the project. This would likely also militate against the submission of such papers to the REF where an individual researcher’s contribution cannot be adequately detailed.

8. How can the REF better address the future plans of institutions and how they will utilise QR funding obtained through the exercise?

The existing method of allocating QR funding rewards those departments that produce the greatest proportion of world-leading and internationally excellent research. The benefit of QR funding is that departments are able to decide on their own priorities and plans. The REF assesses how universities have performed using this funding, including QR funding, during the previous time period. QR funding, as part of the dual-funding system, provides essential flexibility to universities and research institutes, enabling them to take risks, explore new avenues of research, and pursue excellence in line with their institution’s strengths. Due to the nature of QR funding, any analysis of how REF funds are used is best done, as now, at the end of the process, rather than beforehand.

9. Are there additional issues you would like to bring to the attention of the Review?

The Review is being taken forward under the view that the “primary purpose of the REF is to inform the allocation of quality-related research funding (QR)”. However HEFCE itself acknowledges that there are three primary objectives of the REF:

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<sup>8</sup> HEFCE (2015).

- The four higher education funding bodies will use the assessment outcomes to inform the selective allocation of their grant for research to the institutions which they fund, with effect from 2015-16.
- The assessment provides accountability for public investment in research and produces evidence of the benefits of this investment.
- The assessment outcomes provide benchmarking information and establish reputational yardsticks, for use within the higher education (HE) sector and for public information.<sup>9</sup>

Each of these purposes adds value to the REF. Alongside the secondary benefits the REF provides, such as the provision of data for internal and external assessment and evaluation, these purposes should be given equal consideration in any changes to the REF.

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<sup>9</sup> HEFCE. *About the REF*. <http://www.ref.ac.uk/about/>