

Review of research  
September 00/37  
Consultation  
Respond by 8 December 2000

## **Foreword**

This is the first review of research policy and funding to have been conducted by a funding council in England for many years. It represents a huge effort, in which many people have been involved. The main committee and its five sub-groups included nearly 50 people, and many hundreds more have been engaged in the 40 or so discussions and consultations during the course of the review. I am grateful to all who have contributed, some of whom have put in a great deal of work. As a result of this, we have produced a report which I believe is authoritative, comprehensive and above all is backed up by evidence. This report puts us in a good position to move forward with the consultation, and subsequently to decide policy for the future.

It is clear that we have an outstanding research base in this country. There is both internal and external evidence for this, which is set out clearly in the review. Original thought and research are activities in which this country excels some of the world's greatest thinkers and innovators have been British, through history to the present day. We have to ensure that the conditions are right for them to continue to flourish. The review provides some clear steers on future investment.

Past policies for the funding and assessment of research have provided an environment for our research base to thrive. However, there are issues which need to be addressed so that this continues to be the case: the environment is changing constantly, and we have to ensure that our policies evolve. This report has identified a number of such issues, and has made a number of radical proposals for change; there is, for example, a particular focus on research staff and students.

The report is now published for consultation. Through the autumn and early winter, we will arrange a number of consultation seminars and seek comments and views about the analysis and conclusions of the report from all interested parties. Following this, the HEFCE Board will decide on its future funding policies and, jointly with the other funding bodies, we will consider the future conduct of the Research Assessment Exercise, beyond the 2001 exercise.

We have established a dedicated web-site at <http://www.hefce.ac.uk/research> that hosts all the material generated as part of the review: sub-group reports, consultancy studies, and details of meetings and other working papers. It also hosts a library of other relevant material to help respondents formulate a reply to the recommendations that have been made. May I encourage you to participate in this consultation so that the recommendations made to the HEFCE Board early in 2001 do properly represent the experiences and expertise of those with whom we work.

Sir Brian Fender  
Chief Executive, HEFCE

## Review of research

To institutions	Heads of HEFCE-funded higher education
Of interest to those responsible for Reference	Research policy and funding 00/37
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### Executive summary

#### Introduction

1. The HEFCE's fundamental review of research policy and funding arose out of earlier plans to review the Research Assessment Exercise (RAE). After the 1996 RAE the four UK funding bodies consulted widely on whether the RAE continued to provide a sound basis for the distribution of research funds. It seemed to the funding bodies that, notwithstanding the very strong response in favour of the RAE, the rapidly changing research landscape, increasing globalisation of research and significant national and regional developments required that a more fundamental review should be carried out. It was agreed that each of the UK funding bodies should conduct their own wider ranging reviews of research policy and funding, before the question of the future of the RAE was addressed jointly. The HEFCE's review was overseen by a committee, whose membership is at Annex A. This report summarises the conclusions of the committee, who are referred to throughout this document as 'we'.
2. In some instances issues identified by the committee have been acknowledged in the Government's recent Spending Review. This has resulted in the investment of additional public and non-government funding on research infrastructure, research student stipends and measures to enhance innovation and knowledge transfer. While we welcome this very significant increase in funding, we consider there is a need for continued and coherent investment of this type in these and other key areas in order to sustain the competitiveness of the HE research base in the future.
3. The recommendations of this report are now the subject of consultation. Specific questions arising from the recommendations are listed at Annex M. In order to aid the preparation and submission of responses, a consultation web-site has been established at [www.hefce.ac.uk](http://www.hefce.ac.uk) under 'Research'. This includes electronic versions of all the reports prepared to inform the review, a library of related material, and a form for electronic submission of responses which will facilitate their analysis. Responses are invited by 8 December 2000.

#### Key findings

4. We believe that the HEFCE's guiding principles for research funding have helped to underpin the success of the country's academic researchers. On many measures UK academics remain among the best in the world. Where problems have arisen, this has been the result of the inadequate level of overall research expenditure rather than the organisation, or basis, of research funding. In our review of research policy and funding, we have therefore sought firm evidence of areas where improvements are needed before recommending any changes.

5. After reviewing and commissioning an extensive array of evidence, we have concluded that the HEFCE's present arrangements for research funding should stay broadly intact. We believe that funds should continue to be allocated selectively to higher education institutions (HEIs) on the basis of research quality ratings produced in the RAE.
6. But we also propose a number of radical reforms. These respond to the concerns and needs of stakeholders which have emerged over the 15 years since the current research funding framework was established.
  - a. We recommend that the policy priority ought to be to protect grants for top-rated departments, but a consequence of this is that additional funds will probably be needed after the 2001 RAE to allow improved departments to benefit from their enhanced performance.
  - b. We propose a new capability development fund to enable the Council, through institutions, to respond to strategic needs, including at the national, regional and local level.
  - c. We conclude that RAE peer review panels should recognise greater diversity in the characteristics of research excellence which distinguish different disciplines, and we propose measures to further encourage applicable research.
  - d. We propose that academic institutions should be required to meet agreed minimum standards for postgraduate training, and be required to provide staff development plans before receiving HEFCE research funds.
7. Taken together we believe that these proposals will create a new funding environment which will underpin the future success of the country's academic research community and its ability to meet the needs of other stakeholders.

#### Research funding

8. We believe that the HEFCE should continue to allocate research funds selectively, by subject, on the basis of the quality of research in that subject, and should not seek to concentrate funding in a limited number of institutions. We remain unconvinced by arguments for limiting research funds to a few research-intensive institutions. We have also concluded that considerations of 'critical mass' should play no part in decisions about allocations by the Council.
9. We found no convincing causal evidence to support the suggestion that the performance of the research base overall would be further improved if funding were provided only to top-rated departments. We conclude that the present levels of selectivity are about right, and lead to the appropriate spread of research funds between institutions to maintain dynamism and diversity. The current system allows world-class research to stay at the cutting edge and militates against complacency, but at the same time enables new subjects and new centres to flourish. The evidence shows that the UK system is more, not less, selective than that in the US.
10. However, unless there is extra money from the Government to reward any continuing general improvement in research ratings in the 2001 RAE, funding will have to be more selective in order to protect the resources of top-rated departments. If funding constraints force an increase in the gradient of selectivity, it would be at the expense of the enormous strengths shown in the rest of the sector. Such a move would choke off essential seed corn funds for developing research groups, developing research areas and collaborative research endeavours. We also propose

that high-performing departments are allocated specific funds to support formal collaborations with centres of excellence in other countries.

11. We recommend that there should be no more, but not significantly fewer, than the present number of subject areas (units of assessment) in the RAE. The HEFCE should also continue to allocate its research funds between subjects formulaically and should not seek to exercise policy judgements about this. But in determining subject budgets we propose that the Council should take account of the relatively lower level of project funds provided to the arts and humanities compared with other subjects. It is also time, we believe, for the HEFCE, with the other direct funders of the Arts and Humanities Research Board (AHRB), DfEE (as the ultimate source of much of its funding) and OST (as the major provider of public research project funding in other areas), to explore further the question of whether the AHRB should be formally established as a Research Council.

#### Research assessment

12. We recommend that there should continue to be a research assessment process, based on peer review, that builds on the solid and accepted foundations of the RAE.
13. We conclude that a number of criticisms of the RAE are based on false perceptions of various aspects of the exercise. Some academics continue to believe, for example, that the number of publications produced is an influential factor in determining RAE scores, despite the fact that panels are given no information about the number of publications produced by individuals or departments. And there remains a widespread view that interdisciplinary work is generally disadvantaged by the RAE processes, despite robust evidence to the contrary.
14. The HEFCE needs to make increasing efforts to provide information about the workings of the RAE, and to ensure that the sector understands the criteria used in making judgements in the exercise, and has confidence that these will be adhered to by the panels.
15. The RAE is sometimes criticised as an expensive exercise. Relatively speaking, it is not. A thorough review of the full costs of the RAE in one institution has been undertaken. If extrapolated to the sector as a whole, the cost amounts to 0.8 per cent of the total funds allocated on the basis of the assessment.
16. We recognise the concern in some quarters that the RAE promotes and distorts staff movement. However, having reviewed the evidence, including comparisons with other countries, other sectors and the period before the operation of the RAE, we do not believe that the RAE has created a major problem of staff movement. Indeed, the evidence indicates that the extent of movement overall is rather low, among all grades of staff in all types of institution, and possibly so low as to be inconsistent with maintaining dynamism in the sector. It is lower than that which occurs, for example, in the US or in some industrial research laboratories.
17. We believe it is right that one of the primary drivers of research funding should remain the quality of research, and that the RAE should continue to be solely concerned with quality. We do not accept that research should be marked up because it is deemed to be 'useful', or marked down because it is deemed not to have potential for application. However, there is no dichotomy between quality and applicability: what is required is for high quality research, in all its manifestations, to be recognised as such by the RAE panels in their criteria and assessment

processes. We consider that the HEFCE should consider further how to ensure that users are able to engage fully with the assessment process.

18. In addition, we propose that, in their submissions to the RAE, HEIs should be allowed to describe activities in terms that recognise the different characteristics of research excellence in different subject areas. This might mean that in physics or chemistry, for example, impact factors and citation information might play a part; whereas in history more attention might be paid to longer-term scholarly activities such as the editorship of dictionaries or bibliographies. We also recommend that where combinations of disciplines are judged to have given rise to a new discipline, which has achieved maturity, then consideration should be given to creating a new unit of assessment.

Impact on other activities: teaching, business links, capability development, research facilities

19. One criticism of the present funding arrangements is that they encourage academic staff to devote too much attention to research at the expense of other activities, such as teaching and the transfer of knowledge outside higher education.
20. We do not believe that the answer to maintaining motivation and reward for other activities is tinkering with the process of research funding or assessment: that would be to act on the wrong instrument. Rather, it is necessary to create other and parallel reward systems so that academic staff and their institutions see incentives to put their effort into activities other than research, in which they might have greater strengths or can add more value.
21. A key function of academic institutions is to conduct research which can be taken up by industry and the community and used to develop products and services. We recommend that the HEFCE should discontinue the generic research (GR) funding stream, provided to institutions in respect of their success in securing collaborative contracts from industry. An evaluation of GR funding suggests that it lacks the size and focus necessary to produce the benefits initially envisaged. We also urge a substantial and sustained boost in funds for the Higher Education Reach-out to Business and the Community (HEROBC) programme, intended to encourage knowledge transfer more generally, from the current level of £20 million per annum. The additional £80 million of funding announced in the Spending Review to support HEI-industry links over the financial years 2001-02 to 2003-04 is extremely welcome. But if it is to affect individual and institutional behaviour significantly it must become a sustained and credible alternative source of funds to support and embed this third mission as a core activity within HEIs.
22. If academics and academic managers are to make serious choices between the different activities open to them, then HEROBC will also need to be allocated in a more focused way, and we recommend that the HEFCE and its partner in the scheme, the Department of Trade and Industry, should consider this.
23. Most academics argue that good research is necessary for good teaching. However, there is a difference between academics being engaged in creating new knowledge themselves, and being alert to developments in their subject, including new discoveries, so that they can interpret and reinterpret the knowledge base of their subject to inform their teaching. Teaching needs scholarship and scholarship depends on, and is distinct from, research. What is required is for all teaching to be animated by scholarship and for scholarship in turn to be informed by research. We

propose that the HEFCE should make it clear that its funds for teaching include an element intended to support scholarship.

24. We also propose that the Council should create a new stream of funding to supplement the existing researcher-driven and user-driven funding streams. This 'capability-development' funding should be provided to institutions in response to their proposals for the strategic development of their research effort. The HEFCE can then, through institutions, respond to national, regional and local needs.
25. In recent years, there has been increasing concern about the deteriorating state of HEI's research facilities and buildings. We urge the Council to consider ways of modifying its funding method to remove incentives to recruit research staff and students at the expense of appropriate investment in research infrastructure. And we call for additional recurrent funding for research infrastructure, which should be earmarked for this purpose. The £1 billion of additional infrastructure funding announced in the Spending Review is extremely welcome and will build on the contribution of the Joint Infrastructure Fund (JIF) in providing a dedicated source of funding for investment in research facilities. However, we consider that a recurring stream of research capital funding needs to become a permanent feature of the funding landscape if the research base is to maintain its competitive advantage and not deteriorate in the future.
26. We recommend that the HEFCE should no longer include an element which recognises income from charities in calculating the allocations to each subject. Nor should it continue to quality weight funding allocated to institutions in recognition of work undertaken for charities. Instead, it should seek to agree an explicit basis of support which reflects the contribution that charities make to the direct costs associated with projects. The Council should also consider whether it is necessary to amend the funding model to explicitly recognise that grants and contracts from the EU do not meet the full costs of the activities they sponsor.

#### People issues

27. We paid particular attention to questions concerning the development needs of academic staff and research students. We endorse the conclusion of the 1996 Harris report that research students are entitled to work in a high quality research environment, supervised by experienced researchers, and with close attention paid to their career needs.
28. Given the importance of this issue for the sustainability of the research base, and for a continued flow of highly trained individuals to meet the demands of industry and society more generally, we propose that the HE funding bodies, with the Research Councils, industry, charities and other interested bodies, should develop minimum criteria for postgraduate research training. These would apply equally to all institutions, and be applied as a condition for the receipt of funding for research students. Adherence to these criteria would be judged in future RAEs after 2001.
29. Some academics have raised serious concerns that the RAE may provide disincentives to institutions to recruit staff without an established research record, in particular disadvantaging young academics, women who have taken a career break, and those who are embarking on academic life in mid-career.
30. As far as young people are concerned, the evidence provided by the analysis of staff returned to the last RAE suggests that, whatever the apparent disincentives, the recruitment behaviour of institutions has not discriminated against such staff.

31. However, we welcome the commitment of the HEFCE, and of the sub-group examining the development of research people, to investigate further the reasons behind the relative under-representation of women in the highest-rated departments revealed by this review.
32. A particular change to the RAE which we recommend is that institutions should be allowed to provide personal statements for staff who, for whatever reason, are unable to submit other evidence of the quality of their research, such as publications. This should be of particular benefit to, among others but not exclusively, women who have taken a career break and staff entering the academic profession either for the first time, or re-entering after a period pursuing an alternative career. Changes to the 2001 RAE, which permit explanation of staff circumstances should help in this respect, but the change we propose would go further to ensure equality of opportunity.
33. As stated above, we believe that research training is a key indicator of sustainability and therefore warrants more explicit recognition in the assessment process and funding model. Research training should be the subject of a separate assessment, but linked to the RAE, to establish whether agreed minimum standards have been reached. These would cover, for example, the facilities available and the quality of the environment in which the student works. As part of the assessment process, RAE panels would judge whether a department met the minimum criteria. Funding provided by the HEFCE for postgraduate research training should be calculated and identified separately from the funding provided for research activity, and could be withheld if the minimum standard was not reached.
34. Collaborative arrangements should be established to enable units to meet all aspects of the postgraduate training requirements where they might not be able to do so alone.
35. Another issue raised about postgraduate research training is the number of PhDs being awarded by HEIs. We propose that the capability-development stream of funding should seek to ensure adequate PhD output in subjects where there have been shortfalls in PhD recruitment. We welcome the increase in research student stipends announced in the Spending Review. However, if the brightest and best students are to continue to be attracted to acquire research skills, whether or not they subsequently pursue an academic career, we must also provide financial support to institutions to maintain and develop the quality of their provision.
36. We propose that all institutions should adopt staff development strategies so that the issues identified in this report, and human resources questions more generally, are addressed systematically. This aspect of research policy should feature prominently in the assessment and funding process. Institutions should be required to submit a staff development strategy as a precondition for the release of research funding.

## **Background**

### The review's beginnings

37. The HEFCE's fundamental review of research policy and funding arose out of earlier plans to review the Research Assessment Exercise (RAE). The RAE is the process jointly employed by the UK's four higher education funding bodies to determine the quality of research in academic departments. It is conducted every four to five years: the last exercise was in 1996, and the next one will be in 2001.

38. After the 1996 exercise, the four funding bodies consulted widely on whether the RAE continued to provide a sound basis for the distribution of research funds to universities and colleges. After 10 years in operation, it was believed to be time to consider whether the assessment should continue after 2001, or whether it had outlived its purpose.
39. The consultation revealed a very strong response in favour of continuing with the RAE. But in view of national and international changes in the research landscape, the funding bodies decided that a more fundamental and wide-ranging review of research policy and funding should be undertaken. The funding bodies agreed to undertake their own reviews of research policy and funding before the 2001 exercise, to ensure that views from higher education institutions (HEIs) and other stakeholders about potential changes were not operationally or philosophically constrained by plans for a future exercise. The HEFCE's review was undertaken by a committee, whose membership is at Annex A. This report summarises the conclusions of the committee, who are referred to throughout this document as 'we'.

#### Why should Government fund research?

40. Research is one of the key functions of HEIs, alongside teaching and scholarship, and knowledge transfer. The country needs high quality research to maintain its competitive edge and standing in a world where knowledge is changing rapidly. Much has been written about the knowledge economy, and we will not repeat it here. <sup>i</sup>
41. The case for public investment in research also seems to be clear. Government funding is needed for research which is unlikely to be funded by others, but which offers the possibility of creating new knowledge which is later made available to others to exploit. A study commissioned by the HEFCE and CVCP (the representative body for UK universities) suggests that the rate of return for public investment in research could be upwards of 25 per cent per annum. <sup>ii</sup>
42. Particularly important is the need to build on the success of academics in working alongside industry and commerce to produce research that contributes to the economic development of the country, and that is of interest to other users and partners to enhance the health and social development of the nation. One dimension of this positive relationship is illustrated in Figure C1 which shows that the correlation in the UK between public funding provided to institutions and investment by the private sector is high in absolute terms, and higher than in the US (Figure C2). This is not just a size phenomenon: as Figure C3 illustrates, in the UK industrial funding per member of staff returned to the RAE increases as total R&D funding increases. Figure C4 shows that there is generally a positive relationship between research quality (as judged by bibliometric impact) and industrial funding; this is particularly noticeable in the medical and biological sciences, engineering, chemistry, physics, and computer sciences and is also present in some of the social sciences.
43. The UK research base maintains a pool of knowledge and expertise on which the country can rapidly and effectively draw, and which provides access to the work of researchers overseas. The UK undertakes only 9 per cent of the world's research effort <sup>iii</sup> (funded by 4.5 per cent of the world's research expenditure <sup>iv</sup>), and access to the other 91 per cent requires credibility if overseas peers are to share knowledge with us.

44. There is other research, in the arts and humanities in particular, from which academics and others may develop a deeper understanding of the world and its culture, not directly utilitarian in its benefits, but nonetheless necessary in a civilised society.
45. Publicly-funded research is also vital to provide an environment in which individuals who subsequently leave academia to pursue careers outside HE can be trained in scientific and technological skills. In an increasingly knowledge-driven world, it is essential for the nation's competitive standing that it has a highly skilled workforce who are able to manage the increasing penetration of research and technology into all aspects of our lives, and the increasing speed to market of scientific discoveries. An important part of this report is devoted to proposals to change the basis on which public funding is provided for the training and career development of researchers.
46. The present arrangements for funding research have helped to create a research base which is highly successful in international terms. Research carried out for the review, as well as work done previously, bears witness to the depth and strength of this country's research effort. Whether measured in terms of the number of papers published, and the impact of the research (Table D2), international prizes won<sup>v</sup> or the gearing of private to public funding (Figure C3), the UK performs well on the international stage in a wide range of subjects.

#### Our definition of research

47. For the purposes of this review we have taken research to mean activity which pushes forward the frontiers of knowledge, whether it be in sciences, technology, arts, humanities or the social sciences. This will involve making new discoveries, but, particularly in the humanities, it may involve reinterpreting and developing fresh insights from existing knowledge. There are, of course, alternative definitions; but for the purposes of this review, which is concerned solely with the HEFCE's own research policy and funding, we believe that this succinct definition is appropriate.

#### The different sources of funding for research

48. Researchers have multiple sources of funding. The largest single source, but a minority of the total, is provided by the higher education funding bodies. In 2000-01 the HEFCE allocated £867 million through its quality-related research (QR) funding stream. The purpose of these funds is to allow academic institutions to build up their basic research infrastructure. This provides the bedrock from which academics can make choices over the direction of their research, including developing research to the point at which a proposal for support can be made to funders for specific research projects. HEFCE funds also support the training of postgraduate research students.
49. The Research Councils provided £466 million to universities and colleges in research project grants in 1998-99.<sup>vi</sup> In addition they provide other types of support to the HE research base more generally, totalling about £500 million if Medical Research Council units are included.<sup>vii</sup> In 1998-99 (the last year for which information is available) academic institutions secured £1,039 million for research from other sources, including charities, industry and government departments. For the most part this public and charitable funding is provided as grants to support specific proposals.<sup>viii</sup>

50. Funds from the private sector are generally provided to institutions as research contracts, primarily on a customer to contractor basis,<sup>ix</sup> for the conduct of research with specific outcomes sought by the customer. Some public funding is also provided on this basis, primarily research commissioned by government departments to meet particular needs.

#### The dual support system

51. Funds provided by the HEFCE and those provided by the Research Councils together comprise the 'dual support system' of public research funding for HEIs. As part of the review, we found that virtually all research funding systems in the world, including in the US and in corporate laboratories, involve a form of dual support.<sup>x</sup>
52. The two legs of the dual support system are very different in their purpose and philosophy, but complementary in their effect. The Research Councils have well developed missions and identified national priorities for deploying research funds. In part, research proposals will be sought and assessed against these priorities and policies, subject always to the over-riding consideration of the quality of the research.
53. Grants are provided by the HEFCE on an entirely different basis, without strings or explicit goals in mind, other than to support high quality research. These are funds allocated not to individual researchers or research groups, but to the institution, to be used at its discretion. Institutions use these funds to build up their capability in the areas which will enable them to win grants and contracts from Research Councils, industry and other research users.
54. A key feature of the HEFCE's research funding method is that it does not determine the nature of research activity. These are judgements for institutions and individual academics to make; it is clear that much of the success of the UK research base is due to the targeted investment of resources by institutions in pursuit of well thought out strategies. In this report we make proposals to help institutions to build research capability where there has been 'market failure'.
55. There is a complementarity and synergy in the dual support approach which has served the country well. National and industrial priorities are set by Research Councils, government departments, charities and industry. HEIs receive grants from the HEFCE allowing them to build up capability in areas prioritised by these project funders, which they must do if they wish to secure the majority of the funds available for research. Nevertheless, there is scope for them to exercise their judgements and set their own strategic priorities, and to undertake speculative research which has not yet been developed to a point where it can be supported, or even described as a proposal. The present arrangements provide a plurality of decision and funding points, which is a source of great strength.

#### **Current research funding method**

##### Determining the amount provided for each subject

56. The majority of the HEFCE's research funds are provided as QR funding divided between 69 subject areas, or units of assessment (it will be 68 for the 2001 RAE).<sup>11</sup> In 1998-99, QR funding was £804 million, 97.6 per cent of total HEFCE research funds. Each subject is assigned to one of three cost weights and these are multiplied

by the volume of research activity in each subject to work out the total funding for that subject<sup>xi</sup>.

57. The three cost weights are:
- |   |  |     |
|---|--|-----|
| A | high cost laboratory and clinical subjects | 1.7 |
| B | intermediate cost subjects                 | 1.3 |
| C | others                                     | 1.0 |
58. The volume of research in each unit of assessment is calculated using five separate components. These volume components are weighted as follows:
- research active academic staff- 1 x number of full-time equivalent (FTE) research active academic staff funded from general funds in departments rated 3b or above, selected by institutions for assessment in the RAE,
  - research assistants- 0.1 x number of FTE research assistants
  - research fellows- 0.1 x number of FTE research fellows
  - postgraduate research students- 0.15 x weighted number of postgraduate research students in their second and third years of full-time study, or third to sixth years of part-time study
  - research income from charities- each £100,000 of income from charities is treated as equivalent to an FTE research active member of staff.
58. The number of research active academic staff is the most significant volume element; it accounts for about two-thirds of the total.

Distribution of the subject totals between institutions

60. The volume of research for each institution in each subject is measured using the same indicators as above. The subject totals are distributed to institutions in proportion to the amount or volume of research, multiplied by the quality of research in that subject for each institution. Funding is therefore proportional to volume x quality.
61. The quality of research is assessed by peer review in a Research Assessment Exercise (RAE) conducted every four or five years. The last RAE was conducted in 1996 and will inform funding decisions until 2001-02. The next assessment will be in 2001. The RAE is the largest single research assessment exercise in the world, involving over 55,000 academics, around 3,000 departments and almost 200 institutions.
62. In the last RAE, each institution was awarded a rating, on a scale of 1 to 5\* (five star), for the quality of its research in each unit of assessment in which it made a submission. The table below shows how these ratings relate to the HEFCE funding provided. Ratings 1 and 2 attract no funding, and from 3b upwards each rating attracts 50 per cent more funding than the one below, except 5\* which attracts 20 per cent more funding than a 5 rating. This means that a unit with a 5\* rating attracts approximately four times as much funding as one with a rating of 3b for the same volume of research activity. As a result, funding of research is highly selective. In 1998-99, 75 per cent of HEFCE research funds went to 26 HEIs.

Rating	Weight
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3b	1
3a	1.5
4	2.25
5	3.35
5*	4.05

### The review

63. The committee for the review began meeting in June 1999 and initially established four sub-groups to look at particular issues.
64. The groups covered:
- the role of selectivity and the characteristics of excellence
  - the nature and purpose of HEFCE funding
  - the role of quality assurance and evaluation
  - the relationship between teaching, research and other activities.
65. A fifth committee was subsequently established specifically to address 'people', or human resources, issues such as equal opportunities.
66. The main committee and its sub-groups met regularly until early summer 2000, when a report to the HEFCE Board was prepared. That report forms the basis of this consultation document. The consultation exercise will run until 8 December 2000 and will involve HEIs, industrial and other commercial organisations, charities, government departments and other stakeholders. There will, subsequently, be a group jointly established by all the UK funding bodies to review the future of the RAE.
67. The HEFCE review has been wide-ranging and evidence-based, with a variety of methods employed to engage fully with HEIs, learned societies, industry and other users, and other stakeholders. In September 1999 a call for evidence was issued to interested parties and the responses informed the review committee and its sub-groups in making their proposals.
68. A series of 30 meetings was also conducted with a variety of stakeholder groups, and research studies were commissioned in the following areas:
- resource allocation and research performance: the assessment of research
  - assessment and the changing nature of research
  - how the Research Assessment Exercise has changed the research base
  - international approaches to research policy and funding
  - regionality
  - collaborative approaches to research
  - the role of selectivity and the characteristics of excellence
  - the interface between teaching, research and other activities.

Details of the sub-group reports and consultancy studies are given in Annex B.

69. Responses to the call for evidence, details of stakeholder meetings, final reports of the consultancy studies and a library of other on-line material relating to issues addressed by the review can be found on the HEFCE web-site [www.hefce.ac.uk](http://www.hefce.ac.uk) under 'Research'.

70. The review's main conclusions are given in the executive summary above. The bases for the conclusions and recommendations are elaborated below under the following headings:

- principles and purposes of funding research
- the Research Assessment Exercise
- the impacts on other activities
- people issues.

71. A summary of all the recommendations arising from the review is shown at Annex M, along with the consultation questions.

72. A more discursive account of the thinking underpinning the conclusions and recommendations of the committee can be found in the report presented to the HEFCE Board at its meeting on 15 June 2000. This, along with the reports from each of the four sub-groups established at the beginning of the review can also be found on the web at [www.hefce.ac.uk](http://www.hefce.ac.uk) under 'Research'.

#### Next steps

73. The consultation period will run until 8 December 2000. The consultation web-site contains links to relevant evidence and a template for responses. We believe it is in the interests of the HEFCE and respondents that views on the recommendations in our report are articulated clearly and coherently in order that they may best inform the development of future policy. Respondents may therefore wish to take advantage of this facility.

#### **Principles and purposes of funding research**

74. On many measures, UK researchers remain among the best in the world. As illustrated in Table D2, they rank first in the world, for example, in terms of the numbers of publications and citations generated per million dollars spent on research. In terms of the numbers of papers produced per researcher, they are among the top five nations.

75. The review has reinforced our view that the HEFCE's guiding principles for research funding have contributed to this success. Where problems have arisen, they have been caused by low levels of overall research expenditure rather than by the organisation, or basis, of research funding (see Table D1). We have therefore sought firm evidence of areas where improvements are needed before recommending any changes.

76. At the same time, there is no room for complacency. The global research base is becoming increasingly competitive; globalisation has prompted many UK-based companies to move their headquarters to other countries; and, as shown in Table C1, UK industry invests a lower proportion of its income on in-house research than industry in most other OECD countries, thus reducing its ability to 'pull' from the research base. Also, despite improvement in recent years, knowledge transfer activities vary in effectiveness across the HE sector.<sup>xii</sup>

#### Selectivity and concentration

77. A key objective of the HEFCE is to promote excellence in research. In doing so it seeks to strike a balance between the twin aims of continuing to support established research excellence, and encouraging dynamism in the sector, allowing both new subjects and new centres to develop.
78. Under the present arrangements, all HEIs may compete for research funding, which is allocated on the basis of the quality of research. This means that virtually all institutions receive some funds for research, but those with research strengths in a large number of subjects receive the lion's share, as illustrated in Figure E1. Although many institutions receive relatively small amounts, this may have a major impact on them.<sup>xiii</sup> The principle which underpins research funding is that of selectivity based on quality, not explicit concentration in a selected number of institutions.
79. Some have suggested that the HEFCE should adopt a policy of concentration. Limiting research funds to a few research-intensive institutions would focus finite research funds in universities and colleges where high quality research permeates the institution. It might encourage the development of higher quality research: as Figures E2 and E3 demonstrate, large high-output departments tend to be collected together in large high-output institutions, and Figure E6 shows that high research ratings, at least in the sciences and some social sciences, are associated with size.
80. However, we found no convincing causal evidence to suggest that a policy of concentrating research funding in a limited number of institutions would lead to an improvement in research quality overall. The RAE has revealed high quality research in a very large number of institutions: 59 institutions have one or more 5\* rated departments, and 87 have a department rated at least 5. In some cases, these are isolated pockets of excellence in institutions that do not otherwise have overall research strength. Clearly, if research funding were to be much more limited, it would choke off significant amounts of current and future world-class research.
81. Lower-rated departments may also include some groups of international standing. Our research shows that some lower-rated departments attract similar levels of external funding per research active member of staff as highly-rated departments, though the average overall is lower. As Figure C3 shows, the leverage effect of small amounts of public funding is considerable.
82. Concentration would produce only modest financial gains for top-rated researchers. If research funding for the year 2000-01 were limited to, say, 50 institutions, the funds released by the other 80 would only amount to £65 million, adding just 8 per cent to the funding of the top 50. And there would be high risks associated with the withdrawal of funding from some institutions. Not only is high quality research extremely widespread, its emergence is not predictable. Also, small amounts of research funding can have a large impact on an institution: it can bring about transformation in the culture, attitude and motivation of the staff that has spin-off benefits for teaching and other activities throughout the organisation. Table F1 details three types of potential benefit for teaching from research.
83. Research funds are already highly skewed to the research elite. As shown in Table G5, the degree of selectivity, and the consequent concentration of funding, in the allocation of research funds in the UK has increased in recent years. This contrasts with the US where the trend has been in the opposite direction.

84. We thus conclude that all institutions should continue to be able to compete for research funding, and that the HEFCE should continue to allocate research funds selectively by subject, on the basis of the quality of research.

**Recommendation:** The HEFCE should continue to allocate research funds selectively, by subject, on the basis of the quality of research, and should not seek to concentrate funding in a limited number of institutions.

#### Selectivity - more or less?

85. At present, the HEFCE does not fund departments rated 1 or 2 in the RAE. Funding for each subsequent point on the RAE rating scale increases in 50 per cent steps, with a final 20 per cent jump between the 5 and 5\* grades. At present, a 5\* grade is weighted at 4.05, compared with a 3b weighted at 1.
86. Although funds are allocated selectively within subjects, the objective is to calculate the appropriate level of block grant to be provided to an institution. The effect of different degrees of selectivity is therefore best illustrated by observing the changes in overall research funding to institutions. The results of two of the scenarios that were modelled are shown in Figures G1 a and b and G2 a and b. It is clear from this analysis that a large reduction in selectivity would lead to a flow of funds out of world-class research-led universities. On the other hand, a significant increase in selectivity would reduce the number of research-intensive institutions to a level that we consider too small to provide a vibrant UK research base, and would greatly reduce research provision in some regions, benefiting only the South-East and London.
87. For instance, under the most selective scenario explored, the five institutions currently receiving the largest amounts of research funds would gain over £55 million in total, while the following 15 would together lose £30 million: in some instances the individual reductions approach £5 million. These losses are large recurrent reductions in core funding and would dramatically affect the research capability of these institutions.
88. An increase in selectivity would also see considerably steeper steps in the levels of funding associated with each of the quality ratings. This would increase the financial turbulence associated with the RAE, and could make it difficult for institutions to bolster low-scoring departments, as the loss of funding would be so great and the investment required to re-establish them proportionately greater.
89. We have therefore concluded that the present level of selectivity is about right, and leads to an appropriate spread of research funds between institutions.

**Recommendation:** The degree of selectivity should aim to balance the need to enable world-class research to flourish, with the need to enable new subjects and new areas of excellence to develop.

#### Critical mass

90. Figure E6 illustrates our finding that there is a generally positive relationship between high research quality (as measured by bibliometric impact) and size. Figures E4 and E5 show that this holds both in the UK and in the US. However, this does not necessarily point to a policy of requiring, or even deliberately seeking, a critical mass of research activity. It is just as likely that quality produces size, rather than the reverse: that high quality research leads to increased funding which in turn

leads to the recruitment of additional staff and growth in the volume of research activity.

91. We do not believe that the HEFCE should take into account critical mass when making funding decisions. There is no theoretical or empirical reason to suggest that high quality research cannot be conducted in units of all sizes. In fact, Figure E7 shows that there are numerous research groups functioning at the highest levels which are not large.
92. Whatever the relationship or its cause, the present funding arrangements have enabled the largest units to develop where there is high quality, and have enabled most funds to be directed to the largest units. Concentration and critical mass are already occurring as a natural consequence of powerful funding drivers and, as illustrated by Table G4, institutions have shown the ability to respond and improve research without central direction.

**Recommendation:** Considerations of 'critical mass' should not play a part in decisions about allocations by the HEFCE.

#### Maintaining support for top-rated departments

93. We propose that the current balance between supporting established and emerging excellence should be maintained. This is not a simple affirmation of the status quo, and has far-reaching implications. Sophisticated modelling has been carried out, making different assumptions about changes in ratings and the volume of research recorded at the next RAE. If there is a continuing improvement in grades at the same rate as in the past, and an increase in the number of staff submitted, almost £60 million of extra resources will need to be found after the 2001 RAE, both to satisfy those departments which have improved to a 5/5\* rating, and to maintain the level of funding for those departments which continue to be 5 or 5\* rated.
94. If additional funding is not provided and the gradient of the selectivity curve remains the same, the four HEIs currently receiving the largest amounts of HEFCE funding could, between them, lose as much as £5.5 million.
95. However, we have said that our priority is to protect top-rated units. Therefore unless there is extra money from the Government to reward the improvement that is expected to be demonstrated in the 2001 RAE, funding will have to be even more selective. The gradient of selectivity will need to be steeper to protect the funding of top-rated departments. This would reduce the unit of resource for other departments with a substantial component of world-class research, with the risk of seriously demotivating them. Such a move would also be at the expense of the enormous strengths shown in the rest of the sector as it would choke off essential seed corn funds for developing research groups, developing research areas and collaborative research endeavours - compromising the development of the potential top-rated departments of the future.

**Recommendation:** The HEFCE should aim to increase the amount of research funding available for distribution as QR, in order to allow improving departments to benefit and the funding for 5 and 5\* departments to be maintained. If this should prove impossible, then the Council should pitch the degree of selectivity to protect the funding of top-rated departments.

96. While we consider that priority should be given to maintaining the funding of the highest-rated submissions, we believe that funding for 3b and 3a rated departments

should continue. These contain significant amounts of good research and, with modest amounts of research funding, support new endeavours and motivate academic staff.

**Recommendation:** Funding should be retained for 3a and 3b rated submissions.

97. There is no formal process in the current funding approach to identify 'centres of excellence', and Table G2 illustrates our finding that people usually think in terms of exemplars when defining a centre of excellence. On the other hand, the identification of 5\* and 5 rated departments goes a long way towards this. In this, England differs from a number of other national systems, and from the European Commission, which is actively considering developing research funding policies based on centres of excellence.
98. In many ways, the funding benefits which might flow to designated centres of excellence already exist in the English system, with the very high funding differentials provided to top-rated departments. We do not see any particular merit in developing policies to focus support further to such departments, except in one respect - international collaboration.
98. As shown by Tables H1 and H2, the extent of collaboration between individual academics is high: a considerable number of research papers are produced collaboratively, including with researchers overseas as shown by Table H3. However, more formal collaborations between departments can be costly to establish and maintain. The HEFCE could set aside specific funds for collaboration with centres of excellence in other countries. Selection might be under the following criteria:
- high quality research over a number of years
  - coverage of the whole spectrum of a subject area
  - significant size for the subject concerned, to enable effective collaborations
  - opportunities for interdisciplinary and multidisciplinary work
  - a significant postgraduate population, and possibly a graduate school.
100. One danger is that this would encourage an even stronger focus on departments which have proved themselves to be outstanding, at the expense of pockets of genuine excellence in less highly-rated departments. However, we believe that this is a proposal worth considering. Research Councils already support specific centres, such as the Interdisciplinary Research Centres. Our concern is to ensure that units or departments, as opposed to individuals or research groups, are also appropriately funded to work with their international peers.

**Recommendation:** Consideration should be given to providing specific funding to high performing units in English HEIs to enable collaboration with centres of excellence overseas.

#### Number of units for funding

101. At present, both the RAE and the associated funding model are based on discipline based 'units of assessment' (72 in 1992, 69 in 1996, 68 in 2001). It has been suggested that a smaller number of units would be preferable. It would also be possible to have more units for assessment than for funding, with assessment outputs aggregated into larger units for funding.

102. A smaller number of funding units would make the funding method simpler, and funds would be calculated in a less specific way. The benefits might also include better assessment of interdisciplinary research, though some research would continue to cross subject boundaries.
103. However, a disadvantage of fewer, larger, units is that morale, leadership and management in an HEI is not at the level of such large groupings. Moreover, the smaller the number of funding units, the greater the perturbation caused to an institution by changes in the scores of its departments.
104. The destabilising effects of such changes to large units has already been seen in the case of clinical medicine. In the 1996 RAE a fall in ratings in this discipline caused one university to lose almost £1 million in funding. If funding were collapsed into, say, 15-20 units then funding shifts on this scale would happen more often. Our modelling reveals that moving to 12 'super-units' of assessment (detailed in Table G3), would cause a considerable increase in financial turbulence.<sup>xiv</sup>
105. Setting on one side the practical but not insuperable problem of combining different scores in the RAE into a single overall score, we believe that the extreme funding consequences of larger units outweigh the potential benefits of a simpler funding model.

**Recommendation:** We recommend that there should be no more, but not significantly fewer, than the present number of units of assessment.

#### Treatment of different subjects

106. The HEFCE's research funds are provided to institutions as a block grant. Indeed, the funds are not strictly 'for' research, but are 'calculated on research-based criteria'. How they are spent by institutions need not bear any relation to how they are calculated, and the relative crudeness of the method is predicated on the fact that institutions will not simply mirror the calculations in their own internal allocations. The method is, however, considerably less crude than in many other countries where funding is based essentially on student numbers without regard to the cost of activities (see Table I3).<sup>xv</sup>
107. Therefore, the fact that sciences often need expensive equipment and the humanities generally do not is not strictly relevant to the question of how funds should be allocated. It would be relevant if funds were expected to be spent strictly or even largely as they are allocated. But they are not. It is a block grant that is being calculated, not a cost or expenditure mechanism.
108. On the other hand, institutions which do not use resources wisely may find that their research performance suffers, and future research assessments will penalise them. If an institution uses resources provided as a result of the funding calculation in respect of one subject on another, then they run the risk of losing resources following the next assessment, unless the beneficiary of the funding has performed strongly. The expectation is that in developing a coherent and effective strategy, institutions will invest in their areas of strength, where they have won funding, but will also seek to develop new areas, or bolster critical but failing areas. It is this effective institutional decision making that the RAE and the associated funding model seek to promote.
109. For these reasons, therefore, discussion of whether different selectivity regimes should be applied to the funding of different subjects is not strictly relevant.

### Basis for dividing research funds between subjects

110. At present, the distribution of funding for research between subjects does not include any explicit consideration of policy, nor any judgements about the desirability of spending more in some areas and less in others. Distribution is formulaic, based on the relative costs of different subjects and the amount of research carried out, or volume.
111. In 1998 the HEFCE commissioned a study to inform a consultation<sup>xvi</sup> on whether funding to inform a consultation on whether funding to different subjects should remain determined effectively by decisions made by institutions about the recruitment of academic staff in different subjects – which itself is largely determined by student demand. Should the fact that more students are coming forward in, say, art and design necessarily lead to an increase in grant for research in art and design? The consultation also sought views on whether HEFCE could, or should, prioritise allocations to particular subjects.
112. Responses overwhelmingly indicated that there was no case for an explicit policy judgement to determine the size of subject budgets. We believe that this remains the correct conclusion. Subjects which are newly popular among students should benefit from increases in research funding. In general, an expanding subject requires an expanding research base.
113. Also, the Council's grant is allocated as a block grant, and institutions exercise their own judgements about the use of the research grant, if only at the margins. The basis for its calculation should not dictate the way it is deployed.
114. HEFCE funds represent around one-third of the total funds for research allocated to academic institutions. They also are distinguished from other more targeted funds, by being 'non-directed', used in any way which the institution sees fit, unlike funds from Research Councils, government departments, charities, and industry which are closely directed.
115. The Research Councils establish priority areas for research funding. Similarly, industry will provide funds for research in areas which have direct and more immediate benefit. To win resources from these other sources, institutions have to build up capabilities in the areas in which these funds are provided. When the HEFCE calculates the research volume in different subjects, this will reflect the priority attached to different subjects by other funders and will lead to increased HEFCE funding for those areas.
116. The mechanisms therefore already exist to steer resources to different subjects according to the priorities and policies of project funders, but they are indirect and relatively subtle. Since the HEFCE's research funding is allocated as a block grant, there is scope for institutions to exercise their own judgements about investment and follow their own strategic priorities for the future. The present arrangements allow a variety of judgements to be exercised about these matters, but there are strong drivers for institutions to reflect nationally determined priorities, and for these to be reflected back through the institutional allocation of funding from the HEFCE.

**Recommendation:** The HEFCE should continue to allocate QR funding between subjects formulaically and should not seek to exercise policy judgements about this.

117. However, we believe there are some aspects of the subject funding allocations which need to be reassessed regularly. The formula for allocating funds between subjects is based on two factors: quantity (volume) and relative cost. There may be a degree of circularity here, with institutions' returns on how much they have spent simply reflecting how much they have received in respect of each subject. The HEFCE should therefore periodically review the relative costs of different subjects, not only on the basis of returns made by institutions, but on the basis of all the available evidence.

**Recommendation:** The HEFCE should regularly review the relative costs of different subjects, and make any necessary adjustments to the price bands in the funding method.

118. In addition, it should be noted that in paragraphs 176-186 below, we propose the creation of a new strategic fund, to encourage the development of new areas of research which might require additional stimulus and which might not develop appropriately under the existing method.

119. Another area that needs further examination is the funding of arts and humanities subjects. We welcome the creation of the Arts and Humanities Research Board (AHRB), and applaud the HEFCE for taking this initiative. But while other subjects are able to benefit from large Research Council budgets, the project funds available through the AHRB do not provide equivalent levels of funding for arts and humanities subjects. We propose that the HEFCE take this into account in determining the total funding for each subject.

**Recommendation:** The HEFCE should take into account in determining subject budgets the relatively lower level of project funds provided to arts and humanities subjects by the AHRB, compared with the grants from Research Councils to other subjects.

120. We believe that the AHRB has over the past 18 months demonstrated its efficiency and effectiveness, and shown the benefits of providing dual-support funding across the research landscape. We recognise that in its plans to become a company limited by guarantee it will reduce its dependence on its parent organisations. We believe that it is now timely for the HEFCE, with the other direct funders of the AHRB, DfEE (as the ultimate source of much of its funding) and the Office of Science and Technology (OST) (as the major provider of public research project funding in other areas), to explore further the question of whether the AHRB should be formally established as a Research Council.

**Recommendation:** Further consideration should be given to whether the AHRB should be formally established as a Research Council.

### Collaboration

121. Collaboration is essential to research. There is wide consensus about this, and there is ample evidence of the extent of collaborative work among researchers. In 1994 for example, 46 per cent of all UK academic papers had two or more authors in different institutions, and the trend is increasing (see Table H2). There is also wide agreement that there are significant dangers in trying to engineer collaboration between researchers through funding incentives. The European Commission has attracted widespread criticism for its attempts to do this through its research funding programmes. Fruitful academic collaborations will generally arise spontaneously and where academic benefits can be achieved.<sup>xvii</sup>

122. We do need to ensure that impediments are not created which might inhibit collaborations. Such impediments could include assessment and funding methods. However, we believe that there is little advantage in creating explicit funding drivers to encourage collaboration.
123. Further, there may be some activities which would benefit from frameworks to enable collaboration, and where more formal funding arrangements may be appropriate. In paragraphs 97-100 we proposed such mechanisms to encourage international collaboration between high performing units in English HEIs and overseas centres of research excellence. In paragraphs 217-218 below, we propose schemes to support collaboration in the delivery of research training to improve the experience for students.

**Recommendation:** The HEFCE should ensure that its funding and assessment processes do not inhibit collaboration between researchers, and should consider whether to provide support for specific research networks; but there is no case for explicit funding for collaborative research activity in general.

### **The Research Assessment Exercise (RAE)**

124. To fund selectively, a basis is required to discriminate between high and low performance. The RAE provides this judgement. Within a subject, HEFCE funding is allocated between institutions on the basis of just two factors: the volume of research conducted in that subject by each institution, and the quality of its research, as measured by the RAE.
125. Although primarily intended to inform the selective funding of research, the RAE has a significance well beyond this. RAE ratings are sometimes used by research students (particularly from overseas) seeking the best research training opportunities. Most HEIs make use of RAE ratings for public relations purposes, while Research Councils use RAE results as a proxy for general resourcing and infrastructure funds, and take them indirectly into account in their assessment procedures. A number of research-led industrial companies also use RAE ratings as a guide to the selection of academic research collaborators and recruits.
126. Introduced in 1986, the RAE has developed into a sophisticated process. One of the most striking features of the exercise, and of the associated research funding method, is the degree of acceptance which they command in the sector. Whatever system is put in place must retain this strength.
127. Assuming that there should continue to be a selective allocation of research funds, the question arises whether a process similar to the RAE remains the best way of exercising judgements about research quality. We commissioned research to identify alternative systems in use around the world, and considered completely new, and radical, alternatives. A summary of some of these and their advantages and disadvantages is presented at Table I1.
128. We believe that although the RAE should be modified in some significant ways over and above those already planned for the 2001 exercise (see Table I2), its advantages outweigh those of the alternatives. We propose that there should continue to be research assessment, based on a peer review process, that builds on the solid and accepted foundations of the RAE.

129. The Higher Education Policy Unit (HEPU) study (op cit) demonstrated that the improvement in grades in successive RAEs shown in Tables J2 and J3 has been associated with real improvement in the quality of the research base. However, in order to ensure that research assessment continues to provide a credible benchmark, there must be confidence that improvements in grades reflect real changes in performance.
130. For the 2001 RAE the UK funding bodies are establishing umbrella groups of panel chairs in cognate areas to ensure that panel judgements reflect consistent assessment against the published criteria. Subsequently, international experts will be asked to peer review submissions provisionally identified as meriting the highest ratings, to ensure that the standards deemed by the panels to represent international excellence are appropriate. We believe that these changes will help to assure the quality of the assessment process and that the HEFCE should consider how this additional, partly external, quality assurance could be developed for any subsequent assessment exercise.

**Recommendation:** There should continue to be a research assessment process, based on peer review, that builds on the solid and accepted foundations of the RAE.

#### Misconceptions about the RAE

131. There are aspects of the RAE which some regard as unsatisfactory. It is said to distort the behaviour of individuals and institutions. However, after close inspection, we conclude that a number of these criticisms are based on false perceptions of the RAE process.
132. One example is the belief that the number of publications produced is an influential factor in determining RAE scores - despite the fact that panels are given no information about the number of publications produced. Table J5 shows that, in the opinion of international journal editors, there is little evidence that the RAE has a significant distorting effect on publication behaviour.
133. In addition, there continues to be a widespread view that interdisciplinary work is generally at a disadvantage in the RAE process, despite robust evidence to the contrary (see paragraphs 141-142).
134. Although false, such misconceptions could be damaging, because academic staff are likely to act according to their beliefs. It is important that greater efforts are made to address these misconceptions by providing information, both to academics and more generally, about the workings of the RAE.

**Recommendation:** Efforts should be made at all levels to provide information about the workings of the RAE.

135. More difficult to address is the mistaken belief that, in making their judgements, panels use criteria over and above their published criteria. The requirement in the 2001 exercise that panels should publish and debate their criteria in draft before finalising them has improved things. It is essential for the continued credibility and acceptability of the RAE for the HEFCE to ensure that the sector understands the criteria used in making judgements, and has confidence that these criteria will be adhered to by the panels.

Recommendation: The HEFCE should work to ensure that the sector understands the criteria used in making judgements in the RAE, and has confidence that these will be adhered to by the panels.

### **Costs of the RAE**

136. The RAE is sometimes criticised as an expensive exercise. Relatively speaking, it is not. Returns from all institutions after the last exercise suggest that it cost slightly under £30 million. A more in-depth analysis of costs in one institution extrapolated to the sector as a whole suggests an upper limit for the cost of the RAE of £37.5 million, including opportunity costs.<sup>xviii</sup> This represents just 0.8 per cent of the total funds allocated on the basis of the results of the exercise.
137. A further criticism levelled at the RAE is that it is a substantial undertaking which does not result in much change to the amount of money distributed to institutions.
138. It has been suggested that changes in funding following RAEs are not great, and that the financial and administrative cost of the RAE process is therefore disproportionate to the change it produces. While it is true, at a gross level, that relative changes in funding are fairly modest, in many instances institutional changes are around 10 per cent - sufficient for the HEFCE to moderate the changes over time. It is also clear that changes within an institution offset each other, and at the subject level changes are much more substantial, with something like 20 per cent of funds moving between departments following the 1996 RAE. In addition, some 5 per cent of funds were withdrawn from units rated 1 and 2, adding to the overall level of movement. As shown in Table J1, if one includes changes related to the RAE but not derived directly from it, the level of movement is much higher.

### Equal opportunities

139. In paragraphs 201-205 below, we discuss the serious concern that the RAE may provide disincentives to institutions to recruit staff without an established research record, thereby, in particular, disadvantaging young academics, women who have taken a career break, and those who are seeking to embark upon an academic career having previously pursued a different career path. As far as young people are concerned, evidence provided by an analysis of staff returned to the last RAE (shown in Figure J1) suggests that whatever the apparent disincentives, the recruitment behaviour of institutions has not discriminated against such staff.
140. The sub-group considering the development of research people is currently steering a study to collect new evidence which will inform an ongoing review of the causes of gender and ethnic imbalances within the sector, and the specific contribution to equity which could be made by changes in research policy and/or its implementation.

### Interdisciplinary research

141. Figure H1 provides clear evidence that a considerable amount of the research undertaken in academic institutions is interdisciplinary or multidisciplinary. Despite this, it is sometimes suggested that the RAE inhibits interdisciplinary research because a subject-based assessment process must be biased against it. We have found no evidence that interdisciplinary and multidisciplinary research are inappropriately assessed by the RAE. This was also a central conclusion of an analysis in 1998.<sup>xix</sup> Figure H2, extracted from that report, shows no relationship

between the extent to which individuals engaged in interdisciplinary or multidisciplinary work and the RAE rating of the submission of which they were a part.

142. However, this does not mean that the HEFCE can be complacent; we welcome the recognition of potential problem areas and changes for the 2001 RAE detailed in Tables H4 and H5. In particular, the establishment of umbrella panels, and the requirement that assessors should respond to requests that a submission to one panel is also considered by other panels, should reassure researchers that interdisciplinary and multidisciplinary research will be properly addressed.

#### Staff movement

143. Concern has been expressed that the RAE has encouraged an academic transfer market, with institutions trying to increase their chances of high ratings in the short term by recruiting staff with an outstanding research record shortly before an RAE.
144. We are aware of the difficulties sometimes caused when key members of staff move on, but we do not believe that the movement in the UK is a major problem. Indeed, the evidence, summarised in Table J6, indicates that the extent of movement overall is rather low, among all grades of staff in all types of institution, and possibly so low as to be inconsistent with maintaining dynamism in the sector. It is also lower than that which occurs, for example, in the US or in some industrial research laboratories.<sup>xx</sup>
145. The timing of appointments may be influenced by the RAE, but the evidence indicates that the exercise alone has relatively little influence on the decision to appoint. Nevertheless, we believe that the change to the RAE in 2001, whereby staff who move in the year prior to the RAE may be cited by both the exporting and importing institutions, is a helpful measure and should be repeated in any subsequent exercise.

#### Applicable research

146. Up to now the quality of research, along with volume, have been the sole drivers influencing the allocation of research funds. The rules for the RAE are written in terms only of the quality of work: it is not intended to take account of any other factors. We believe that this remains the right approach. We do recommend an increased recognition of the different characteristics of excellence in different disciplines (paragraphs 148-151). But we do not accept, for example, that research should be rated more highly by the panels because it is deemed to be 'useful', or marked down because it is deemed not to have potential for application. Not least because it is difficult to assess the potential utility of much research, though it subsequently has a decisive impact. However, neither do we consider that there is any dichotomy between applicability and quality, and we recognise that collaboration with users and impact outside the discipline may be indicators of research quality. It is important that high quality research in all its manifestations should be recognised as such by the panels in their criteria and assessment processes. We consider that this is the most powerful way in which applicable research can be further encouraged, as it should be in order to ensure that HE can continue to make its essential contribution to economic and social development.
147. It is vital that people considering lines of research to pursue should be in no doubt that the quality of their work will be fairly assessed, whatever its nature. In both the 1996 and 2001 RAEs, assessment panels have been instructed to attach equal

weight to all research, whatever its type or purpose. Furthermore, in the 2001 exercise, 73 per cent of panels include users of research, who will assist in judgements about applicable research.<sup>xxi</sup> We welcome these developments. However, in constructing future assessment exercises, there needs to be recognition that users and other non-academics may find it difficult to devote as much time and effort to the RAE process as the present arrangements require. The HEFCE should consider how the RAE can further evolve to ensure that users are able to engage fully with the assessment process.

**Recommendation:** The quality of research should continue to be the sole basis for assessment in the RAE, but the HEFCE should continue to consider means to ensure that applicable research is fairly assessed.

#### Characteristics of excellence

148. Up to now the RAE has been conducted on a more or less common basis across units of assessment. In general, the information provided within RAE submissions has been the same, and subject panels have had to exercise their judgements in a similar fashion. Subject panels are free to adopt their own criteria for determining excellence, based on the characteristics of their subject. This has produced some significant variations between subjects in the criteria, but within a fairly constrained framework.
149. By and large, we believe that this has been the right approach and has led to some considerable confidence in the consistency and legitimacy of ratings. But we also feel that there should be more scope for explicitly acknowledging the different characteristics of excellence across subjects in the

RAE (see Table G1).

150. Submissions must be allowed to describe research in terms that recognise the different characteristics of excellence, and subject panels must take these characteristics into account in making their judgements. This may mean different information being provided for different subjects, or more likely clusters of subjects. We recognise that this increase in sophistication may increase the complexity of the RAE, but we believe that it will make the exercise more robust and respected by the academic community and external audiences.
151. We do not attempt here to define the different characteristics of excellence of different subjects; that is a matter for the peer review panels in the different subjects. But it might mean that in physics or chemistry, for example, impact factors and citation information might play a part (see Figure I1); whereas in history more attention might be paid to longer-term scholarly activities such as the editorship of dictionaries or bibliographies.

**Recommendation:** The RAE process should recognise that different disciplines have different characteristics of excellence, and panels should be able to make their judgements drawing on evidence provided specifically for their discipline. The criteria adopted should continue to be transparent.

#### New units of assessment

152. The RAE is a discipline-based exercise, and is sometimes criticised for being insufficiently responsive to the changing taxonomy of the research landscape (common themes emerging from an analysis of the changing research landscape are shown at Table H6). In particular, there is pressure from emerging areas, which often arise by combining one or more existing disciplines, to create new units of assessment. Two recent examples are development studies and gender studies.
153. There is a balance to be struck between providing separate units of assessment for the almost limitless combinations of subjects which may come together for the purpose of conducting research, and the need to have a manageable number of units to which institutions may choose to submit. We consider that if an area reaches a certain level of stability and maturity, and there can be confidence that this is so, then effectively a new discipline has been created, and a new unit of assessment may be appropriate.
154. Even in these circumstances, the provision of a separate unit of assessment may not follow automatically. There are some well established disciplines which are subsumed in larger groupings because they are too small for a separate unit of assessment to be appropriate. Nevertheless, we believe that where a new area is judged to have emerged, and is stable, consideration should be given to whether a new unit of assessment is appropriate. As in the past, this must remain essentially an academic judgement.

**Recommendation:** Where combinations of disciplines are judged to have given rise to a new area, and it has achieved maturity, then consideration should be given to creating a new unit of assessment.

#### Impacts on other activities

#### **Relationship between research, teaching, scholarship and other activities**

155. One criticism sometimes voiced about the present funding arrangements is that they encourage academic staff to devote too much attention to research at the expense of other activities, such as teaching and the transfer of knowledge outside academic institutions.
156. Although the blame for this is levelled at the RAE in particular, it is at least in part a consequence of funding research selectively in the absence of equivalent incentives to undertake other activities. If the rewards for outstanding research are great (and the penalties for reductions in RAE ratings severe), and there are no equivalent rewards and penalties for teaching or for other forms of activity, then it is not surprising that there is so much focus on research.
157. We do not believe that the answer to maintaining motivation and improving the delivery of other activities is to tinker with the process of research funding or assessment: that would be to act on the wrong instrument. Rather, the solution is to create other and parallel reward systems so that academic staff and their host institutions see incentives to put their effort into other activities, where they are likely to add more value than in undertaking research.
158. Notwithstanding our view that parallel reward systems are needed, it would be offensive to academics, and wrong, to believe that they have no motivations to deliver high quality teaching other than funding incentives. There is ample evidence that the quality of teaching in universities and colleges in this country is high, and that concern with teaching has increased, in part because of recent efforts by the Council.<sup>xxii</sup>

#### **More support for knowledge transfer**

159. A key function of HEIs is to conduct research which can be taken up by industry (to develop products and services), and by other users in the community and those delivering public services. This has always been so, but the emphasis on this aspect of research activity has grown in recent years. We have heard concerns that institutions are not in all cases as responsive as they should be to the needs of industry and other users.
160. The higher education environment has been transformed in recent years, and institutions, and individual academics, are far readier than previously to collaborate with users of research. This trend needs to continue, and grow, and a number of our later recommendations - for example creating a new capability-development funding stream - are intended to support this objective.
161. The HEFCE already has in place a number of programmes which aim to encourage such activity. In particular, the generic research (GR) funding stream is provided to HEIs in recognition of their success in securing collaborative contracts from industry; and the Higher Education Reach-out to Business and the Community (HEROBC) Fund encourages knowledge transfer and seeks to embed this activity within HEIs as a third core activity, alongside teaching and research. Although such schemes are intended to stimulate responses from institutions, the most potent stimulus for research which is taken up by industry is the income which flows from such contracts.
162. We think that HEROBC, which encourages capacity building to enable institutions to engage in knowledge transfer, is a valuable use of HEFCE funds. It is also important that the RAE, which has a considerable influence over the behaviour of academics,

should not inhibit such activity. We made recommendations about this in paragraphs 146-147 above.

163. GR has not been as successful as had been hoped. Apart from anything else, the sum involved (£20 million a year) is too small to influence behaviour - a conclusion reached by a study conducted for the HEFCE.<sup>xxiii</sup> We therefore recommend that the scheme be wound up, and the funds used to contribute to the capability-development stream of funding.

**Recommendation:** The HEFCE should discontinue GR and should build on HEROBC to encourage higher education institutions to engage with industry.

164. As stated above, at present, there is little reason to divert effort from research into other activities, if the rewards for other activities flow regardless of the effort that is put in, or do not exist at all. If activities other than research are to have parity of esteem and engage the attention of academics to an equivalent extent, better financial incentives will be needed. The Council recognises this, which was one of the reasons for introducing the HEROBC fund.
165. The Council has said that this should develop into a permanent third stream of funding for knowledge transfer, alongside funding for teaching and research. We consider that this is an important development, and note the growing consensus that the HEROBC fund will need to increase substantially from the current level of £20 million per annum if it is to be a credible alternative source of funds and thereby affect individual and institutional behaviour significantly. We therefore welcome the additional £80 million of funding announced in the Spending Review to support HEI-industry links over the financial years 2001-02 to 2003-04. However, if this third mission is to become embedded in HEIs as a core activity this must become a recurrent funding stream of sufficient size to support and promote institutional knowledge transfer activities in the longer term.
166. In addition, if academics and institutional managers are to make serious choices between the different activities open to them, then funding will need to be focused on institutions to a greater extent. The HEFCE and the Department of Trade and Industry (DTI) will need to consider the basis of funding and the information needed to achieve this.

**Recommendation:** The funds provided by the HEFCE and the DTI for HEROBC should be increased substantially on a sustainable basis, and mechanisms established for the selective distribution of these funds.

167. The increase in HEROBC funding will complement the measures proposed in this report to increase the effectiveness of the research base in undertaking collaborative activities with industry, and with the wider community of research users. These measures, which include better approaches to the assessment of applicable research and greater recognition of the different dimensions of excellence, build on the changes introduced in the 2001 RAE.

#### Teaching and research

168. We commissioned research to establish whether, and to what extent, funding policies for research, and in particular selective funding, might impinge upon teaching. Most academics argue that good research is necessary for good teaching.<sup>xxiv</sup>

169. However, there is a difference between academics being engaged in creating new knowledge themselves, and being alert to developments in their subject, including new discoveries, so that they can interpret and reinterpret the knowledge base of their subject to inform their teaching.
170. This latter activity has been called scholarship,<sup>xxv</sup> and we consider that this is a useful and necessary concept, distinguished from research, and essential for all academics. This is particularly the case in the UK higher education system, where academics have to teach disciplinary areas well beyond their specialism. Teaching needs scholarship and scholarship depends on, and is distinct from, research. What is required is for all teaching to be animated by scholarship and for scholarship in turn to be informed by research.

**Recommendation:** Scholarship is an activity which is distinct from research and should be required of all academics who teach.

171. The evidence we have received suggests a strong relationship between good research and good teaching.<sup>xxvi</sup> This relationship is not simple or uniform: it is not true to say that there is no good teaching without good research, nor that good research is always accompanied by good teaching. But in general, over the sector as a whole, such a synergistic relationship does exist.
172. However, during the review, no evidence emerged as to the precise mechanism underpinning the relationship. One suggestion is that because of selective funding, good research leads to higher rates of funding for institutions, and this funding is used by institutions to develop laboratories, equipment and libraries, and to recruit academic staff. All of this is intended for research, but it may provide greater flexibility and the opportunity to share staff and resources between teaching and research in a way which is not available to institutions with less research funding. However, it is clear from the fact that good teaching may take place without good research, and vice-versa, that this simple proposition does not provide a satisfactory answer.
173. It is also clear that the ability to do research is for many academics a strong motivating factor in their decision to join the profession in the first place. A number of institutions responding to our call for evidence said that access to small amounts of research funding had enabled them to transform the culture of their organisations, by legitimising and recognising the research work and aspirations of staff. This affects the functioning of individuals as academics.
174. The review was able to reflect on some preliminary results arising from the Transparency Review (a review of the costs of research and other activities in HEIs). Although these early data are provisional, it seems that institutions are subsidising both publicly-funded teaching and publicly-funded research. This 'subsidy' may come from income provided for the institutions' other activities, the running down of capital, or by additional unpaid hours worked by staff. There has also been a real-terms decline in the pay of academic staff which in effect represents an additional subsidy for research.
175. Despite the evidence of a synergistic relationship between teaching and research, we make no recommendation about this: it would be wrong to allow teaching issues to influence the allocation of funds for research. The Government provides funds to the HEFCE to promote and advance research, and the Council would be rightly criticised if part of this money were allocated not on the basis of research interests, but because it might improve the quality of teaching. But given the imperative for all

staff to engage in scholarship in order to animate their teaching, we believe it should be made clear that funds for teaching include an element to support scholarship. Recommendation: The HEFCE should make it clear that its funds for teaching include an element intended to enable staff to engage in scholarship.

#### A new strategic funding stream to support capability development

176. While we consider that it is right that most research funds should continue to be provided through the block grant as QR for institutions to spend at their discretion, we believe that a modest proportion should be provided so that the HEFCE can, through institutions, respond to national, regional and local needs.
177. Under this capability-development stream of funding, the HEFCE would calculate an entitlement for each institution, and would state, for the sector as a whole, the broad areas to which these funds should be devoted. Funds would be released once institutions had provided satisfactory strategic proposals for their use. The areas where these funds might be focused include:
- - new and emerging subjects, where there might otherwise be some time lag in institutions taking them up
  - - subjects where PhD provision across the country is inadequate
  - - projects responding to local, regional and national needs.
178. The fund would aim to address a number of weaknesses in the HEFCE's current funding arrangements, discussed below:
- a. Given the relatively small amount of money flowing to 3b and 3a rated departments, there is a risk of these funds being spread too thinly. Institutions that receive small amounts of money may not be able to concentrate them sufficiently to build capability in key areas of relative strength.
- b. The present arrangements, and in particular the policy of selectivity and the RAE which underpin them, provide substantial incentives to institutions and individual academics to conduct basic research, and research at the leading edge, perhaps at the cost of research which is locally, regionally or nationally relevant. One complaint heard is that users of research (not only industry, but users of academic expertise more generally) sometimes find it hard to interest academics in taking up commissions which divert them from such leading-edge research.
- c. With assessment and allocation methods based on existing disciplines, it is often difficult for new and emerging subjects to secure funding. Although the HEFCE allocates a block grant to HEIs, and the basis on which money is allocated need not determine the way it is spent, there remains a strong suspicion that the system inhibits the development of new areas of research. The problem is not new, but it is accelerating with the increasing pace of developments in knowledge.<sup>xxvii</sup>
- d. Given the drive for international excellence in research, the needs of local, regional or national users of research may not be sufficiently taken into account.
179. This last point is a subtle issue. Research is by its nature an international activity: research findings are disseminated and exploited internationally; research conducted in one country takes account of research findings produced in another. Judgements about the excellence of research transcend national boundaries, and much research is carried out in collaboration across geographical frontiers.

180. Nevertheless, not all research needs to be at the forefront of international thinking in order to be valuable. Smaller scale or more modest research activity is essential, particularly to meet the needs of industry and other users, and to enable international research to be accessed locally and regionally.<sup>xxviii</sup> Firms often look locally or regionally for help in resolving their problems and it is essential that universities and colleges are ready and able to work with them. It is important that the HEFCE ensures that mechanisms are in place to encourage and enable research at all levels. Different drivers and incentives may be needed to achieve this.

**Recommendation:** The HEFCE should ensure that its funding mechanisms encourage research not only at international levels of excellence, but also at local, regional and national levels.

181. This analysis suggests that institutions could benefit from three distinct research funding streams:

- researcher-driven funding, which would continue to be allocated on the basis of quality guided by
- departmental RAE ratings
- user-driven funding, consisting mostly of funding provided by research users, but including HEFCE programmes to support knowledge transfer
- capability-development funding, where the Council focuses research funding in directions which are of strategic importance to an institution or its region, or to the nation as a whole.

182. Of these three streams, the first two exist in the form of QR and HEROBC respectively, but the introduction of a capability-development stream would be an innovation. The purpose of this fund would not be to support specific areas of research over the long term, but rather to provide institutions or units with a better basis on which to develop more effective strategies for evolving their

## Research activity.

183. In particular, this funding stream would help HEIs work with users to undertake applicable research. Such a funding stream would have a different purpose from HEROBC, which catalyses a broad range of interactions with industry and the community, but does not generally fund research activity directly.
184. Initially, modest sums would be available, drawn from the funds provided for the current generic (GR) and collaborative (CollR) research streams - so it would not be financed by top-slicing QR (in 1998-99 the combined value of CollR and GR was £36 million). But additional funds should be sought to enable this to become an important funding driver. It could become a significant lever in drawing in funds from users - for example, government departments with an interest in research to assist policy development - to establish a proper basis of support for these new areas.
185. The precise mechanism for distributing this stream of funding would need to be worked out, but we envisage something along the following lines. The HEFCE would identify priority areas for investment: new and emerging subjects, for example. These might be based on priorities identified by other national or regional funding bodies; the Government's Foresight programme, where industry has also made a substantial contribution to defining the objectives; or research users such as the Department of Health and the Home Office.
186. The HEFCE would calculate by formula the amount available to each institution, and the funds would be released to institutions in response to specific proposals for their use, taking account of the priorities established by the Council in consultation with others. This would require institutions to develop explicit policies and management strategies for the development of research, and they might be expected to focus their effort in particular areas of strength. Proposals might be encouraged to develop research of particular relevance to an institution's local or regional industry or community. Such funds would be a particularly important source of research funds for institutions which do not generally receive large amounts of QR funding, but which have certain research strengths.

**Recommendation:** The HEFCE should create a new stream of funding to supplement the existing researcher-driven and user-driven funds. This 'capability-development' funding should be provided to Institutions in response to proposals for their use.

## Supporting research infrastructure

187. In recent years, there has been increasing concern about the deteriorating state of the research infrastructure in HEIs. The HEFCE commissioned a survey, published in 1996, which confirmed that there were serious grounds for concern.<sup>xxix</sup> The study has recently been repeated<sup>xxx</sup> and revealed continuing problems.
188. The Joint Research Equipment Initiative, funded by the HEFCE jointly with the OST, and the HEFCE laboratory refurbishment scheme, were responses to this concern about the imbalance between project and infrastructure funding illustrated in Table K1. An even more substantial response was the £750 million Joint Infrastructure Fund, jointly funded by the OST, the Wellcome Trust and the HEFCE, which has injected a significant and badly needed amount of research capital into the system.

189. It is essential that the run-down in research infrastructure should not be allowed to persist. We have identified two main drivers, both of which are within the power of the Council or institutions themselves to address.
190. In calculating the funding provided to institutions, the HEFCE relates its grant to quality and to a measure of volume of research in a department. The number of research staff and research students are dominant influences on this, but investment in infrastructure plays no part. Essentially, the more research active staff or students that are recruited, the more grant an institution receives. This provides an incentive to increase the volume of research without an equivalent investment in the infrastructure.

**Recommendation:** The HEFCE should consider ways of modifying its funding method to remove incentives to recruit research staff and students at the expense of appropriate investment in research infrastructure.

191. A further recommendation relates to the treatment of income which HEIs receive from charities. At present, uniquely among external sources of income, income from charities is taken into account in the volume measure, both for establishing the budgets for subject areas, and for determining the volume of research in each department. This is a recognition of the distinct nature of funding from charities, and enables the Council to make a contribution towards the costs incurred by institutions when carrying out research sponsored by charities. Around £75 million is allocated to institutions each year according to the weighting factor for charity income in the HEFCE research funding method (see Tables K2 and K3).
192. We believe that it is right that the Council's grant should recognise that not all the costs of research sponsored by charities are covered by the project grants institutions win from them, as charities make a substantial and valuable contribution to the national research effort. However, the extent of this additional support should clearly be related to the contribution that charities do make to the projects' direct costs. A solid foundation for an agreed approach, that does not provide incentives to inflate volume, will be provided by information emerging from the Transparency Review, and a study being commissioned by the HEFCE, mapping relationships between institutions and charities.
193. Concerns also persist about the extent to which funding from the European Union (EU) meets the costs of the research projects it sponsors. Although it is possible to obtain grants of up to 50 per cent of allowable costs for research and technological development projects under the EU's Framework Policy 5, no UK university is currently in a position to meet the stringent costing requirements to identify full costs on the basis defined by the EU. Research activity sponsored in UK HEIs is therefore funded by the EU on a marginal basis. One of the outcomes of the Transparency Review should be to enable institutions to meet UK government and EU costing requirements in order to secure full cost recovery.
194. Some institutions should have the basic data required to meet these requirements by the summer of 2001. However, it is unclear when after that time institutions could be confident of receiving EU funding on the 'full cost' basis. This provides 50 per cent of allowable costs, so even then much of the activity that the EU sponsors will remain 'unfunded'. We therefore propose that the HEFCE should consider whether it is necessary to amend the funding model to explicitly recognise that funding provided as EU grants and contracts does not cover all the costs associated with the project.

**Recommendation:** The HEFCE should no longer include an element which recognises income from charities in calculating the total funding for each subject, but should instead agree an explicit basis of support that reflects the contribution by charities to the direct costs associated with projects.

**Recommendation:** The HEFCE should consider whether it is necessary to amend the funding model to explicitly recognise that funding provided as EU grants and contracts does not cover all the costs associated with the project.

195. The second driver contributing to the deterioration of research infrastructure arises from the frequent failure of institutions to secure the full costs of contract research for industry, Government and other third party funders. The Transparency Review will shed light on the true costs of carrying out such contract research, and it is essential that institutions reflect these true costs in the amounts they charge for their services. It is, of course, legitimate for less than the full cost to be charged where a piece of work done under contract has strategic importance for an institution. But in general it should be the case, and it is in an institution's long-term interest, that the cost of such work is charged to the beneficiary. In particular, institutions should avoid competing with each other to such an extent that they offer unwarranted discounts.

**Recommendation:** In general, institutions should charge prices which cover at least the full cost of research which they carry out under contract.

196. We consider that, as a general principle, the HEFCE's funds are best provided as a block grant, as this enables institutions to optimise support for the many activities they are engaged in. However, the research infrastructure must not be permitted to deteriorate again to such an extent. For this reason, we recommend that funds for research capital should be earmarked and provided separately by the Government to the HEFCE, over and above funds provided for the conduct of research.

197. The £1 billion of additional infrastructure funding announced in the Spending Review is extremely welcome and will build on the contribution of JIF in providing a dedicated source of funding (though this time allocated by formula) for investment in research facilities. However, we consider that a recurring stream of research capital funding needs to become a permanent feature of the funding landscape if the research base is to maintain its competitive advantage and not to deteriorate in the future.

**Recommendation:** Additional funds should be provided annually by the Government for research infrastructure, and these should be earmarked for this purpose when allocated by the HEFCE to institutions.

198. The Council should also consider, regardless of additional funding from the Government, earmarking a proportion of QR funding specifically for infrastructure investment. This could include appropriate support staff who are skilled in the development and use of specialised equipment or experimental techniques, and therefore vital in advancing research programmes.

**Recommendation:** The HEFCE should consider earmarking specifically for infrastructure investment a proportion of QR funding provided to institutions.

#### People issues

199. We paid particular attention to questions concerning the needs of researchers and research students. We endorse the conclusion of the 1996 Harris report<sup>xxxi</sup> that

research students are entitled to work in a high quality research environment, supervised by experienced researchers, and with close attention paid to their career needs.

200. There is now an even more pressing need that research training and opportunities for career development of those recently embarked on a research career are of the highest standard. Given the importance of this for the sustainability of the research base, and a continued flow of highly trained individuals to meet the demands of industry and society more generally, we propose that the HE funding bodies with the Research Councils and other stakeholders such as industry and charities, should move rapidly to develop minimum criteria for research training. These minimum criteria would apply equally to all institutions, and be a condition for the receipt of HEFCE funding for training of research students. The extent to which institutions met these minimum criteria would be judged in future RAEs after 2001.

## Equal opportunities

201. Concern has been expressed in the past that the RAE may provide disincentives to institutions to recruit staff without an established research record, in particular disadvantaging young academics, women who have taken a career break, and those seeking to embark upon an academic career after having previously pursued a different career.
202. As far as young people are concerned, Figure J1, which provides an analysis of staff returned to the last RAE, demonstrates that - whatever the apparent disincentives - the recruitment behaviour of institutions has not discriminated against such staff. The proportion of young staff in the academic system as a whole, and those in the top-rated departments in particular, appears to have increased in the 20 years since the last survey in 1982, well before the introduction of the RAE. Indeed, Table J4 shows that the recent behaviour of research-intensive departments is to recruit a slightly higher proportion of young staff. Nevertheless, this concern has raised the issue of whether the present arrangements provide a sufficient basis for peer review panels to assess the contribution made by staff who for good reasons have not produced demonstrable research outputs.
203. The same concern arises over the treatment of women in the RAE, particularly those who have taken a career break. We believe that the workings of the RAE are even-handed between men and women. Also, women account for 20 per cent of RAE panel members in the 2001 exercise, even though they represent only 10 per cent of senior academic staff. But we are struck by the analysis we commissioned, illustrated in Figure J2, which demonstrated that women are not proportionately represented in the highest scoring departments. The reasons behind this may be complex, and may not necessarily be related to the RAE. For example, the barriers which women encounter may be at the point of entry into postgraduate study, or may relate to choices of discipline or to internal staff development policies.
204. Whatever the reasons, this is a serious issue, both from the point of view of the individuals concerned and the health of the research base. If there is any suggestion that significant numbers of individuals are failing to realise their full potential, including women and those from ethnic minorities, for whatever reason, this needs to be rapidly explored and addressed.
205. This area will be addressed by the sub-group examining issues related to human resources as part of a wider commitment to improve equal opportunities in the academic sector. This sub-group will continue to meet for a further 12 months to advise on the early implementation of measures to enhance research training and equal opportunities, to oversee further evidence gathering on equal opportunities, and to ensure that an integrated approach to these issues is adopted with the Equal Opportunities Action Group recently established jointly by the HE funding bodies and the sector's representative bodies (CVCP and SCOP).
- Recommendation:** The HEFCE should consider, initially through the human resources sub-group, the relative under-representation of women in the highest-rated departments and whether there are other groups who appear not to be realising their full research potential.
206. In the 1996 RAE, institutions were able to describe why some members of staff might not have produced submissible research outputs that were indicative of the quality of their work. We believe that this should be formalised further. We propose institutions should be able to provide personal statements on behalf of staff for

whom, for whatever reason, a normal contribution to the standard form of submission is not appropriate. Typically, but not exclusively, this will include those who are at the beginning of their academic careers or who have taken a career break.

207. The practicalities of this proposal need to be considered further. Even if the personal statements are limited to two or three pages, this may lead to significant additional reading for panel members. On the other hand, it will allow a fuller and more comprehensive account of the achievements and potential of the staff concerned, and undoubtedly improve the exercise.

**Recommendation:** Submissions to the RAE should be allowed to include personal statements in respect of staff for whom, for whatever reason, a normal contribution to the standard form of submission is not appropriate.

### Research training and career development

208. One of the principal outputs of the research base is a supply of trained researchers. These individuals may go on to pursue academic careers, but increasingly their skills and knowledge are valued by society more widely, and by industry in particular. However, the supply and development of such individuals, including postgraduate and post-doctoral researchers, is not directly addressed by the current RAE process, and there is evidence that current postgraduate training and career development is in many ways failing to meet the needs of research students.<sup>xxxii</sup>

209. In the 2001 RAE, panels have been encouraged to place more emphasis on assessing research culture, including factors related to postgraduate training.<sup>xxxiii</sup> But we believe that research training is a key indicator of sustainability and therefore it warrants more explicit recognition in the assessment process. We recommend that research training be the subject of a separate, but linked, assessment process to the RAE. We also recommend that funding provided by the HEFCE in respect of research training should be calculated and identified separately from the funding provided for research.

**Recommendation:** Research training should be the subject of a separate, but linked, assessment process to the RAE.

**Recommendation:** Funding provided by the HEFCE for the training of research students should be calculated and identified separately from the funding provided for research.

210. We believe that further more profound moves may be needed to ensure the best possible environment and experiences for postgraduate research students. We have considered whether postgraduate research support should be allocated more selectively. Our consultation indicated little support for the deliberate concentration of research funding, but there was support for concentration of research training: almost half of the 90 responses on this issue suggested that research trainees would benefit from some form of concentration.

211. The 1996 Harris report argued that research students are entitled to be supervised by academic staff who are talented researchers, and to work in an environment of the highest research standards. More particularly, the range of skills to which a postgraduate research student needs access are unlikely to be provided by a single academic supervisor. A student is more likely to succeed in a research-intensive department with a well developed research infrastructure, and an appropriate

breadth and depth of supervisory expertise. For these reasons, the HEFCE now only funds research students in departments rated 3b and above.

212. But does this go far enough? If the research assessment process were to assess research training explicitly, funding for research training could be concentrated in those departments able to demonstrate excellence in the field.
213. We are conscious that postgraduate research training is a key element in the development of the research effort of institutions, and a move towards greater concentration might undermine the ability of lower-rated departments to improve the quality of their research. There is a dilemma here between the need to protect the interests of research students, and the need to recognise the legitimate aspirations of institutions and their staff to develop their research profile.
214. We are aware that some will be concerned by the suggestion that research training should be concentrated and there are good reasons why we should temper excessive concentration of provision for research students, for example:
- the US experience suggests that over-concentration of research training can be as problematic as over-dispersion<sup>xxxiv</sup>
  - in larger departments, for example, there may be some outstanding researchers able to provide supervision of the highest standards, although the department overall may be low-scoring in the RAE
  - in many subjects, particularly in the humanities, the quality of support depends very largely on the individual supervising the student's work.
215. We conclude, therefore, that it would be wrong to further restrict funding for research students simply according to RAE scores. Nevertheless, it is important to protect the interests of postgraduate students by ensuring that they have access to supervision of an appropriate standard, and a research environment that will provide a high quality research training experience.

#### Postgraduate research training criteria

216. Instead we propose that a department wishing to receive funding for postgraduate research training should meet a number of specified criteria. These would cover, for example, the facilities and the quality of the environment in which the student works. As part of the assessment process, RAE panels would judge whether a department met the criteria. Only then would funding be released.
217. The criteria should be rigorous, and we think it likely that many departments currently receiving postgraduate funding would not be able to satisfy all the requirements alone – for example the requirement to provide exposure to a research environment of international quality. We therefore propose that collaborative arrangements should be established (see Tables F4, F5). These might be physical or virtual, and might be organised on a discipline or geographical basis. They would allow lower-scoring departments to train postgraduate research students, but ensure that students received training that at least met an agreed minimum standard.
218. We do not make recommendations here about the details of such arrangements, which need not in any case be uniform (see Table F6), but we urge the Council to accept the principle of minimum training requirements, and to work up the practicalities. This should be a joint activity between the HEFCE, Research Councils

and others, both because the funding of postgraduate research students has multiple sources, and because expertise about these matters is widespread across the sector.

**Recommendation:** The HEFCE, together with the Research Councils and other stakeholders such as industry and charities, should develop minimum requirements which departments would need to satisfy in order to be eligible for HEFCE funding for postgraduate research student training. The research assessment process should be extended to establish whether departments comply with these minimum standards.

**Recommendation:** Collaborative arrangements should be established to enable units to meet all aspects of the postgraduate research training requirements, where they might not be able to do so alone. The HEFCE should separately work up the practical arrangements to implement this recommendation.

219. Although the assessment of research training in this explicit way would not occur until a subsequent exercise after 2001, we consider that the issue is so important that measures should be put in place at an early stage.  
Numbers of PhD students
220. Another issue concerning postgraduate research training is the number of PhDs being produced. We consider that an advanced modern society needs an appropriate number of students with higher degrees. Such graduates are needed to underpin teaching in universities and colleges, particularly for third year work at bachelors level and for postgraduate programmes, and it is from PhD students that the next generation of academic staff are drawn. They are also, of course, needed to carry out and develop research in HEIs, industry and the wider economy.
221. In 1997-98, the UK produced 258,800 first degree graduates and 11,000 doctorates. There were 54,000 other higher degrees awarded. On average, 4.2 PhDs were awarded for every 100 students graduating with a first degree.<sup>xxxv</sup> Overall, this is well in excess of the 1 per cent of students going on to study for a PhD that we estimate is needed for replenishment of the academic profession, although relatively poor academic salaries and conditions of service provide cause for concern about whether this level of uptake will continue. However, for some disciplines which compete head on with outside professions there is a serious shortfall of individuals going on to undertake research training. We have identified a significant number of subjects, some with significant student demand at first degree level, with hardly any PhD output at all. For all these reasons we propose that the HEFCE should deploy some funds strategically to address shortfalls in PhD numbers and therefore research capacity.

**Recommendation:** The proposed capability-development stream of funding should be employed to ensure adequate PhD output in all subjects.

#### **Human resource management and career development**

222. As we have observed above (paragraph 173), the opportunity to conduct research is a key motivation for many academic staff. This is undoubtedly why, despite relatively poor pay prospects, some of the best graduates continue to be attracted into the academic profession.
223. We welcome the increase in research student stipends announced in the Spending Review. However, if the brightest and best students are to continue to be attracted to

acquire research skills, whether or not they subsequently chose pursue an academic career, we must provide sufficient financial support.

224. We welcome the additional £50 million provided in the Spending Review to recruit and retain top-quality academic staff. However, if pay more generally continues to lag behind that in other professions and there continues to be an associated, insidious, decline in the status of academic staff, the sustainability of the research base, and its contribution to the economy and society more generally, will be threatened.
225. For those who choose a research career, the main issue often centres round the question of personal and career development. Too often new staff are given little or no remission from teaching and administrative activities, and little or no support in establishing their research. Often they are obliged to develop new courses and to learn how to integrate the other duties of academic staff without assistance. When staff are required to supervise research students they often have to do so without any training.<sup>xxxvi</sup>
226. A further concern centres on the number of research staff on fixed-term contracts. Statistics for 1997-98 suggest that some 34 per cent of all academic staff are on fixed-term contracts. More specifically, some 17 per cent of research active staff are on fixed term contracts.<sup>xxxvii</sup> We note that the Research Careers Initiative (RCI) has developed metrics to assess the quality of training and development of such staff, and that the Research Councils support this initiative.<sup>xxxviii</sup> We consider that these principles should be embraced as policy proposals are developed.
227. Many of these career development issues can be addressed through measures that ensure proper year PhD students should be treated as members of staff in this regard). We propose that all institutions should adopt staff development strategies so that the issues identified in this review, and human resources questions more generally, are addressed systematically. This aspect of research policy should feature prominently in the assessment and funding process.
- Recommendation:** Institutions should be required to submit a staff development strategy as a precondition for the release of research funding.
228. We need to be careful though. Increased support for career development, which requires departments to develop explicit staff development strategies, might have unintended consequences. If institutions were obliged to employ people on a longer-term basis it might simply reduce the opportunities provided by temporary academic positions. This might lead to many good researchers leaving the profession. We therefore suggest that the implications of any proposed changes are considered in detail, and we have asked the sub-group looking at human resources issues to consider these matters further.

#### Footnotes

1. Salter A, DEste P, Martin B, Geuna A, Scott A, Pavitt K, Patel P, Nightingale P, 2000, *The Impact of Publicly Funded Research on Innovation in the UK*, Science and Technology Policy Research, University of Sussex (SPRU).
2. Op Cit.
3. ISI Data. The figures reflect the UK share of all global research output.

- 4 Figures from UNESCO and Eurostat.
- 5 Office of Science and Technology (OST), 1997, *The Quality of the UK Science Base*, Department of Trade and Industry.
- 6 HESA, 2000, *Resources of Higher Education Institutions 1998/99*.
- 7 Expenditure over and above this £466 million includes: postgraduate studentships £145 million, fellowships £28 million, national facilities £98 million and international facilities £130 million.
- 8 This form of funding, although it may be the subject of a contract, is generally collaborative in nature, supporting research for the public good.
- 9 It is recognised that the customer-contractor relationship is changing, and increasingly involves greater partnership and collaborative activity, and is not one dimensional.
- 10 Nature and purpose sub-group report paragraphs 26-27. See also Millar, J and Senker J, 2000, *International Approaches to Research Policy and Funding: University Research Policy in Different National Contexts*, SPRU/HEFCE.
- 11 HEFCE 4/97, Funding method for research from 1997-98.
- 12 HEFCE 98/70, Industry-academic links in the UK.
- 13 Some *responses to the call for evidence* have been mounted on the web at [www.hefce.ac.uk](http://www.hefce.ac.uk), under Research. See also JM Consulting Ltd; CHES, Institute of Education, University of London; Commonwealth Higher Education Management Service; Higher Education Consultancy Group, 2000, *Interactions between Research, Teaching and Other Academic Activities*, HEFCE.
- 14 Selectivity sub-group report paragraphs 44-50.
- 15 Geuna A, Hidayat D, Martin B, 1999, *Resource Allocation and Research Performance: the Assessment of Research*, SPRU/HEFCE.
- 16 HEFCE 98/54, *Research funding: introduction of a policy factor*.
- 17 Katz J and Smith D, 2000, *Collaborative Approaches to Research*, Higher Education Policy Unit University of Leeds (HEPU/SPRU/HEFCE).
- 18 HEFCE 00/36, *Better accountability for higher education: a review for the HEFCE by PA Consulting*.
- 19 RAE 1/99, *Interdisciplinary Research and the Research Assessment Exercise*.
- 20 Quality assurance sub-group report paragraphs 45-46.
- 21 RAE 2/99, *Guidance on Submissions*, p2. See also Report of the work of the Joint Funding Bodies/CBI Task Group on User/Industrial Participation in the RAE 2001, available at [www.rae.ac.uk](http://www.rae.ac.uk), under Publications.
- 22 JM Consulting et al, *Interactions*, p13.

- 23 Forthcoming, *Review of Generic Research*, KPMG/HEFCE.
- 24 JM Consulting et al, *Interactions*, p19.
- 25 We emphasise that we are not talking here about *scholarship* in the sense that it is sometimes used, particularly in the humanities and social sciences, to indicate original work which extends knowledge and understanding in the subject. Here, we are using it in the narrower sense of keeping abreast of ones subject, which may imply some degree of reinterpretation of existing knowledge, but which is essentially a different and more limited activity.
- 26 JM Consulting et al, *Interactions*, Annex B, pp17-18.
- 27 Policy Research in Engineering, Science and Technology, University of Manchester (PREST), 2000, *The Impact of the Research Assessment Exercise and the Future of Quality Assurance in the Light of Changes to the Research Landscape*, PREST/HEFCE.
- 28 Segal Quince Wicksteed Ltd (SQW), 2000, *Regionality*, SQW/HEFCE, chapter 5.
- 29 Geoghiou I, Halfpenny P, Nedeva M, Evans J, Hinder S, 1996, *Survey of Research Equipment in United Kingdom Universities*, PREST/Centre for Applied Social Research (CASR).
- 30 Flanagan K, Geoghiou L, Evans J, Croasdale P, 2000, *Research Equipment Needs in UK Universities, Snapshot Study*, PREST/CASR.
- 31 Harris M, 1996, *Review of Postgraduate Education*, HEFCE/CVCP/SCOP.
- 32 JM Consulting et al, *Interactions*
- 33 RAE 5/99 *Assessment panels criteria and working methods*
- 34 Bowen W and Rudenstine N, 1991, *In pursuit of the PhD*, Princeton University Press.
- 35 Nature and purpose sub-group report, paragraph 57.
- 36 JM Consulting et al, *Interactions*, Annex E.
- 37 HEFCE Analytical Services Group, 2000, *Characteristics of Research Active Staff*, available at [www.hefce.ac.uk](http://www.hefce.ac.uk), under *Research*.
- 38 RCI, 2000, *Research Careers Initiative: Second Report*, available at [www.cvcpc.ac.uk](http://www.cvcpc.ac.uk) under *Linked Activities*.

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