

view from the top mike hulme

Break moulds to recognise value of interdisciplinary research

"The government is keen to ensure that excellent research of all types is rewarded, including user-focused and interdisciplinary research." Not my words, but those of the government in the latest installation of its 10-year investment framework for science and innovation, *Next Steps*, released in March. As a demonstration of flexible thinking, Research Councils UK announced last month that adjustments to its review process for multi-disciplinary grants would "end double jeopardy for cross-council grants", that is where proposals that need funding from two research councils have twice the chance of being rejected. [RF 11/10/06, p1].

Such attitude and change are welcome but they alone are not enough. Significant institutional and cultural barriers to the funding, executing and evaluating of

interdisciplinary research persist in the UK. I know because I led the interdisciplinary Tyndall Centre for Climate Change Research during 2004 and 2005 through the tortuous experience of seeking renewal of its core funding from three councils: the Natural Environment Research Council, the Engineering and Physical Sciences Research Council and the Economic and Social Research Council.

Interdisciplinarity is a response to the recognition that many environmental, social or technological policy-driven research challenges need to deal with the complexity and interdependency of the real world of nature and humanity. Avoiding dangerous climate change is an obvious example of such a problem, as is securing a sustainable energy system, or sustaining the rural economy. It is likely that in the future many more such contemporary problems will need interdisciplinary research to inform policy. In contrast to reductionist approaches that tend to dominate disciplinary or multidisciplinary research, interdisciplinary research needs

to adopt a "whole-systems" approach to framing, and hence to analysing, a particular genre of problems.

Yet interdisciplinary research in policy sensitive areas remains difficult to fund, difficult to do and to evaluate. It raises issues of learning and interactivity, of capacity building, of working within conventional academic and funding structures designed for a different era and for different sets of objectives, and of finding powerful and appropriate performance measures (for purposes of accountability). The potential contribution of interdisciplinary research to the development of evidence-based policy requires that these difficulties be overcome.

Three interrelated problems exist within the research culture of Britain's funding establishment, RCUK: first, inappropriate procedures for reviewing interdisciplinary proposals and programmes; second, a failure to recognise the "overhead" cost of capacity-building for interdisciplinarity; and third, an instinctive preference for traditional performance measures to gauge output.

Moves to curtail the risk of double jeopardy in grant applications is a step in the right direction but bigger problems emerge when more than two councils pool substantial funds for a significant interdisciplinary programme. In such cases three things must be ensured.

First, a single decision-making process must be authorised (delegated) by each of the contributing councils and informed by a single set of recommendations from an expert review panel.

Second, the expert review panel should consist, in the majority, of relevant interdisciplinary experts, rather than, at present, a majority of disciplinary experts (even if drawn from different disciplines). Multidisciplinary research and interdisciplinary research are not the same thing and review panels should reflect this difference.

Third, there must be one set of agreed goals that all parties abide by and the criteria of which are used consistently throughout the decision-making process. Too often, different councils or different disciplinary experts end up reverting to their respective traditional criteria for evaluating excellence or relevance. For a problem-oriented interdisciplinary programme these may look very different.

The executing of interdisciplinary research programmes is structurally different to that of conventional research grants. There are

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ground rules

triple jeopardy

- * There is a well-recognised need in the UK to fund high quality interdisciplinary research targeted at understanding complex environmental and social problems, and informing policy responses.
- * Such research programmes will usually require funding from more than one research council and pooled budgets should be delegated to a single joint-decision-making body for allocation.
- * External review panels for interdisciplinary proposals and programme evaluations should consist predominantly of experts in interdisciplinarity rather than mixes of disciplinary experts.
- * Capacity building and learning is a key part of interdisciplinary research and adequate resources must be reserved for such interactive activities.
- * Interdisciplinary research budgets may also need to be much more flexible than conventional grants, allowing mid-course adjustments or re-directions in order to benefit from shared learning with users.
- * New measures for monitoring the performance of interdisciplinary investments are needed; these are likely to be different, or weighted differently, to conventional output performance measures.

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distracted by obligations to a constituency, as other conscientious ministers are.

Beyond all this, David has the considerable advantage of having lived his life in the larger world. This is rare in the present government, where most ministers have spent their lives encapsulated in political processes and activities. The Civil Service, like any other profession or trade, has some superb people and some duffers, and everything in between. But they all tend to be embedded in a culture that, with interesting exceptions, has more respect for process than product. Although most are more committed to the job than is acknowledged, their culture is especially good at filling the day with meetings and other activities (so that it always seems more people are needed, without actually asking whether what is being done is really useful). *Yes Minister* is a documentary, not a sitcom. And one conspicuous manifestation of all this is that ministers find their diaries chock-a-block with engagements. You want to see a minister, or talk on the phone, you make an appointment, usually weeks ahead.

David cut through all this like a knife. In my experience, he was most unusual in being totally in control of his agenda, leaving flexible time free for thought or to meet the unexpected. When, as CSA or later as President of the Royal Society, I wanted to see him or speak on the telephone, it was rarely not accomplished on the same day. Put simply, he was used to running a business, and as a minister he still ran a business he understood. And his "Private Office" (Civil Service speak for the staff in his outer office) was one of the best and happiest I knew.

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two elements here, both of which must be recognised by those allocating resources and evaluating proposals and by those evaluating performance and outcomes. First, developing effective interpersonal relationships in research teams or programmes, which must transcend disciplinary communities that are used to working together, carries an overhead of time and resource. This can often make interdisciplinary proposals appear more expensive. It may also mean they take longer to mature. Second, the requirement for such research to be truly stakeholder-responsive requires much greater flexibility on the part of researchers, funders and evaluators if it is to deliver on its promise. Defining the deliverables and outputs from before the start a fixed three or five-year programme is not commensurate with the goals of being "solutions-oriented" and responsive to user needs.

Standard Output Performance Measures (OPMs) and evaluation criteria are not well suited to the evaluation of policy-related interdisciplinary research. Such research investments need to demonstrate both quality and impact. Conventional quality measures are gener-

It would have been desirable to darken this account with some faults, if only minor ones, to highlight the good things. Within the domain of his responsibility, I simply saw none. Maybe a superhero could have done more to hold back the bureaucracy masquerading as accountability that has grown in the higher education funding councils and in universities, as funding for research and incentives for innovation have grown, and HE more generally has expanded. But this would have involved a major restructuring of government departments. Superman could deal with his arch-enemy Lothar, but he never confronted a hydra-headed bureaucracy.

Many of you who are reading this will have met David on one or more occasions. I think you will have been impressed not just with his warmth, but by his lack of self-importance. In my experience, he conformed to George Bernard Shaw's definition of good manners: the same for everyone.

He could have been Australian (my highest accolade).

In summary, David Sainsbury cannot claim sole responsibility for increased funding of science, nor for the many initiatives that provide incentives for knowledge transfer or address market failures, such as the University Challenge programmes, and their like. But he did play a major part in their conception, and in making the arguments for their implementation. He gave much time and thought to questions about science in society, and to creating government machinery to address the issues; this is a field in which the UK is widely seen as world leader, and much of the credit goes to David Sainsbury. Above all, he was a tireless advocate for the basic values of Enlightenment science.

ally biased against interdisciplinary research, as such research is expected to meet (several) disciplinary quality criteria simultaneously, rather than achieving top quality for interdisciplinary research.

Impact measures are often not requested and/or are not given sufficient weight in the evaluation. New thinking is needed about how quality and impact can be assessed appropriately, and what weight they should each be given in the decision and evaluation process. This has a bearing on the debate about the use of metrics in future RAE rounds—are there metrics that reveal the impact of (interdisciplinary) research other than standard citation statistics; for example, are there ways of measuring the use of science in policy-making?

Consideration should be given to an independent review/audit of the processes used by RCUK and/or individual councils to fund interdisciplinary research.

If this is really such a high priority for the Office of Science and Innovation—and the UK science base—then a clearer basis of accountability for such funding decisions is needed. This is still new territory for research councils and mechanisms for review and learning are needed.