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What are universities for?

For centuries, they were vocational -- preparing students for the church, law and medicine. In the 1850s Newman's 'Idea of the University' was a manifesto for disseminating knowledge for its own sake. The first real 'research university', with the overt aim of seeking new knowledge, was founded in 1810, by Humboldt in Berlin. Newman however didn't like that concept. He argued that 'To discover and to teach are distinct functions; they are also distinct gifts, and are not commonly found united in the same person'

Today, these arguments continue. The 'research university' model generally prevails, at least as an aspiration, but the world's universities now span all the options. Some do mainly research; conversely, there are outstanding liberal arts colleges in the US where no graduate work is done.

The university sector -- its cost, scale, and participation level -- has immensely expanded. The contribution of universities to society has never been greater. So the the question 'what are universities for?' has a wider resonance today. That's why it's a daunting topic to address, even in the UK context on which I'll focus this evening -- especially in front of an audience that includes some of the people who did most to mould our present system

First I'd like to advertise an ambitious study that Royal Society is undertaking -- it's addressing whether UK higher education will be fit for purpose in 2015. Our call for evidence has already yielded an outstanding response. The study will take a year. It will address the change in student numbers and in the 14-19 curriculum; the issue of general versus specialised degrees; the implications of more mature students; the significance of the Bologna process; the impact of international movements both of students and of professional scientists; and the needs of employers and the wider economy. It's being chaired by Professor Judith Howard, of Durham University -- we should wish her well with this challenging task.

As a preliminary, the committee needed reliable statistics. So it commissioned, jointly with OSI, a special run on the data base of the Higher Education Statistics Agency. The aim was to clarify actual trends in different subjects -- this isn't straightforward, because the data cover a period where so much of higher education has been relabelled.

Trends in individual subjects are masked when subjects are classified into groups; also, in 2003 there was a change in the way students on split degree courses were categorised.

For example the number of graduates per year in 'biological sciences' has gone up. But straight 'biology' hasn't -- only 4000 or so. Much the largest subject in the 'biological sciences' group is psychology -- The second largest, with over 5000 graduates a year, is sports science.

And the proportion of physical sciences degrees that are in chemistry has dropped from 29 to 21 percent since 1992, whereas forensic and archeological science have gone up from 2 to 8 percent of the physical sciences category. Also, it's interesting that because of the expansion of medical, dental and veterinary sciences, these subjects soak up an increasing fraction of the best A level chemists.

The analysis highlights the growing mismatch between what university entrants have actually learn at school, and the prior knowledge required by university departments if students are to attain degree standard within 3 years -- specially troubling is the lack of adequate fluency in basic maths.

This pilot study, entitled 'A degree of concern: UK first degrees in science, technology and mathematics.' is just today published on the web -- there's a hard copy 4-page summary (available now).

One important postscript, however: The figures in the report relate to those who've already graduated. Three years downstream, among those now entering university, there are some encouraging trends. The latest UCAS figures show a rise in applications in physics, chemistry and mathematics -- 'green shoots', one hopes, signalling that the educational initiatives of recent years are starting to pay off.

The rest of my comments will be personal views -- not necessarily those of the Royal Society.

There's another data set that gets public attention -- the international rankings of universities by the Times Higher, Shanghai Jaio Tong, and other bodies.

Cynicism is in order about the precision of these league tables, and indeed about the actual criteria they're based on. The weighting factors they give to the various things that 'universities are for' are debatable and subjective. They also involve time-lags.

But there's no gainsaying one gratifying feature of all these league tables. We're the only country outside the US with several universities in the 'first division' . In the most recent table, the UK had 3 in the top 10, 4 in the top 20. In contrast, there are very few in the rest of the EU even in the top 50.

Despite all the strains on our university system -- we're in better shape than mainland Europe. Nick Butler and Richard Lambert recently published an excellent pamphlet on Europe's university system and recipes for its

improvement: I hope Nick will say a bit about this when he speaks.

Stretching across Europe there are 17 million students in 4000 institutions. But the system within each country is more homogeneous than ours. There's less diversity of funding, and universities have less even less autonomy than ours -- both in governance, and in controlling the admission of students.

There's another difference too.. In mainland Europe fewer of the best researchers are in universities. In Germany they're in Max Planck Institutes, many of which are world class. And in France, most researchers are in CNRS -- which has pockets of excellence.

This "hiving off" of the best researchers into separate institutions is a major drag on efforts to improve the French and German universities, especially with regard to graduate-level education. There are now, in Germany, efforts to designate a small number of 'elite' universities.

We in this country are fortunate to have evolved the 'research university' model and should cherish it. Most of the UK's best research teams are in universities; researchers are kept in touch with students; the atmosphere is more conducive to cross-disciplinary dialogue than free-standing labs are.

We owe our advantage over mainland Europe to a funding system that's more diverse and also more selective. At least some income comes from student fees; there are several public funding streams; and substantial non-governmental channels for research support, especially in biomedical fields (Wellcome Trust, the cancer charities, etc ).

One distinctive feature of our system is the way funds are allocated by the Higher Education Funding Councils -- QR, the RAE and so forth.

American colleagues I meet are bemused by our 'dual support' system. I tell them that, for all its problems, it's better than the US system where professors need to hustle for grants in order to meet even basic academic needs.

If we want to retain 'dual support', but to foster research excellence within a diverse university system largely dependent on public funds, then there must be selectivity. The RAE, or something like it, is a necessary evil --as a discriminatory tool for distributing scarce resources that underpin research.

Despite all the gripes about the RAE, its net effects since the 1980s have surely been positive. It has encouraged early recognition of academic talent, enhanced mobility, and sustained some universities high in the international league. It at least aims to allocate funds by the right criteria: quality of output. And improvements have been introduced in the 2008 round--- especially the profiling that eliminates the 'cliff edges' --

the severe penalties of just failing to achieve a particular research rating boundary.

But the RAE still looms too large in university planning and strategy, and distorts the work patterns of individual academics. That's why many welcome the fact that the Treasury stirred up the pot earlier this year .

Some of us have had further concerns. First, there has been undue emphasis on academic publications rather than applied work. That's now widely recognised.

Second, no real credit is given for popular writing and outreach; heads of science departments consequently discourage staff from such engagement with the public -- essential though it is if the country is to apply science wisely.

And third, the system under-rates something that is surely part of a university teacher's remit: broad learning and scholarship. Some of us are old enough to remember the classic Robbins report, which led to the cluster of new universities established in the 1960s. Robbins said university staff had three duties: teaching, research and 'reflective enquiry'. We shouldn't forget that reflective enquiry is worthwhile for its own sake, as well as for the way it enriches both teaching and research. Traditional scholarship is just one aspect of it -- for applied or social scientists it might entail deepening contacts and expertise outside academia

If we endorse the need for selectivity - the rationale for the RAE -- we must accept that there's no easy fix. There's plainly a tradeoff: simple procedures for assessing excellence are crude; any scheme that offers refined discrimination will be burdensome. A fair picture of the research being undertaken in any institution cannot be achieved by just plugging numbers into a formula. We need a subject-based approach based on peer review and supported by a more targeted set of indicators -- a system with a 'lighter touch' .

It's gratifying that the responses from learned societies and universities to the recent consultation reveal a substantial consensus on these issues. David Eastwood's challenge is to develop a more efficient and streamlined process. The present RAE should determine allocations for several years after 2008 so there's plenty of time to get its replacement right -- and hopefully to maintain the genuine benefits of a dual support system.

Whatever system we adopt to assess quality, it's a separate policy decision to decide how steep the 'differentials' should be. How much more should a really strong department get than a fairly strong one? How far to we want to diverge from the uniformity of mainland Europe?

We know that a few universities attract the lion's share of research funding -- from all sources. That's likely to be true whatever system prevails. But despite the trend towards concentration, there's at least one

top-rated department in more than 50 of our universities. I think it's crucial to avoid formalising the 'pecking order', and to retain a system that allows excellence to sprout and bloom anywhere in the university system.

Let me give an example. Leicester University, where I'm a visiting professor, is world-class in genetics and in space science. That wasn't planned. Outstanding young lecturers in these two fields happened to have jobs there 30 years ago, and both had the enterprise to build up a major research group. The system that then prevailed allowed that to happen.

It's important that selectivity shouldn't be so harsh that such opportunities are choked off in less favoured universities. It's a real aid to recruitment in any university if dynamic researchers know they can in principle build up a world-class group.

As we all know, there has in recent years been welcome real-term growth in public funding of university research. High on the agenda of universities and research councils, especially in the months leading up to the Comprehensive Spending Review, are efforts to show it's been good value for money - to quantify as far as possible the benefits that have accrued from this increase.

An interesting recent report on behalf of RCUK, chaired by Peter Wharry, has tried to address the 'economic impact' of the research councils. The focus is on 'knowledge transfer' -- the report cites specific examples where research had led to a direct spin-off. But, as the report's authors are aware, that analysis captures only a small part of the benefit of university research.

Another recent analysis, by Martin and Tang at SPRU in Sussex, has identified seven channels of benefit from publicly-funded research -- direct 'spinoff' is just one of these channels. Martin and Tang argue that, taking all seven together, university research offers an uncontroversial benefit to the economy and to society, but that there is (I quote) 'A danger that a focus on the more easily measurable exploitation channels ..... may distort science policy, to the detriment of longer term benefits'.

'Research universities' benefit society partly through direct knowledge transfer from university labs to industry, but their indirect benefit, harder to quantify, could be even more important. The dynamic knowledge base within them is a crucial resource for the nation.

We must optimise the transfer and exploitation of academic research. But we must be mindful that we don't dilute or divert from the core mission, which is to produce outstanding graduates -- graduates who'll spread through society, and be able to absorb the world's knowledge and run with it.

And we should surely loudly proclaim, in the style of latter-day Cardinal

Newmans, that learning is worthwhile for its own sake -- we're a better nation if we're an educated nation.

How well the students are taught depends on the quality of the faculty. The traditional 'compact' which attracts outstanding faculty is that in return for their teaching, they can devote a fraction of their time to curiosity driven research; also, that they will have reasonable prospects of the necessary support, and reasonable security. This has manifestly paid off in places like Harvard, Berkeley, and Michigan -- each an immense assets to the US and a magnet for mobile talent. We must ensure that we don't jeopardise the strength of the UK's counterparts by putting this 'compact' is under threat.

It's imperative to recruit adequate talent into academia. I'm worried about whether we are -- it's a less alluring career than it used to be. One deterrent is the increasingly pervasive 'audit culture', of which the RAE and TQA and so forth are symptomatic. This culture has emerged, in other professions as well as in academia, through the best of intentions -- to raise standards and enhance accountability. But its actual consequences are often the reverse --- to obstruct the proper aims of professional practice and reduce trust. Nobody has expressed such concerns more eloquently than Onora O'Neill, in her 2002 Reith lectures. It's good that Onora is the new President of the British Academy.

Some people will become academic scientists come what may -- the nerdish element (I'm one myself). But academia can't survive just on these wierdos. It must attract its share of ambitious people with flexible talent --- the kind who have a choice of career paths, who are mindful of the himalayan salaries offered in the city, and who might feel that being an academic is imposing undue financial sacrifices on their family.

The standing of our universities depends on their remaining attractive to versatile talent, from overseas as well as the UK. Reputations are fragile. Even subtle shifts can be serious. Downward trends -amplified by perceptions -- can be hard to reverse.

The most -publicised league tables are weighted in favour of the 'heavy hitters' in research. But the ordering would be different if teaching quality were the dominant criterion; many post 1992 universities would rate much higher.

Now that the our overall enrolment is rising towards 50 percent we must learn from the exceedingly broad and diverse university and college system in America. This has developed organically --- with liberal arts colleges, 4 year junior colleges and the rest.

Our system is still in transition towards that diversity. We must keep debating issues like: the graduate/undergraduate balance. local catchment versus national, part time versus full time, e-learning versus traditional teaching, and so forth.

As Tessa Blackstone has emphasised, the teaching quality in all universities is crucial not only for the proper education of our own students, but because of the overseas students attracted to the UK. We have a real competitive advantage, but this will backfire if the tens of thousands of students from Far East, paying high fees, feel they aren't getting value for money.

The 50 percent target in higher education is a worthy goal, but traditional courses aren't going to suit all students. Many will embark on a university course, and then decide it's not really what they want.

In this context, I'd like to venture a heretical opinion. I think there's an undue focus on so called 'wastage'. Universities are too defensive about drop-out rates. An American will say 'I had two years of college', and will often rightly regard the experience as positive. It's surely better to take risks on admission, give students the chance -- let some leave after two years with some 'credits' --- without necessarily being typecast as failures: and without the universities feeling pressured to see unwilling students through to graduation.

Back to international comparisons. Even if we have an utterly optimal system for evaluating and supporting our universities, they won't fulfil their potential for the nation unless their funds -- from all sources -- allow us to compete with the US, and the Far East. OECD figures show that our public spending on higher education is comparable with the rest of Europe -- 1.1 percent of GDP.

The contrast is stark with the US, where total funding for higher education is 2.5 percent of GDP (and the GDP per head is also of course higher). Much of that is private, of course. But what's not well recognised is that public funding of higher education in the US is higher than here -- 1.2 percent, as against 1.1 percent here.

In a recent speech, Chris Patten highlighted these figures and said: "It's ironic that we should be condescending about US culture when that country spends twice as much on the acquisition of knowledge and its transmission to students. It would be tragic if research universities declined in the countries where they originated -- at a time of unparalleled prosperity"

It's in our interests to ensure that, on the contrary, we build on our strengths. We can surely afford it.