



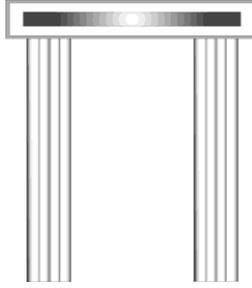
Martin Rees

**University Diversity**

Freedom, Excellence and Funding  
for a Global Future

**POLITEIA**

A FORUM FOR SOCIAL AND ECONOMIC THINKING



# POLITEIA

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# University Diversity

Freedom, Excellence and Funding  
for a Global Future

Martin Rees

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His scholarly work is on astrophysics and cosmology and his papers include contributions to research on the origin of cosmic microwave background radiation, the distribution of quasars and galaxy clustering and formation. His books include *New Perspectives in Astrophysical Cosmology* (Cambridge, 1995), *From Here to Infinity: Scientific Horizons* (Profile Books, 2011) and the forthcoming *What We Still Don't Know* (Penguin, 2013).

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# Foreword

## Sheila Lawlor

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Universities in the UK face an uncertain future. Public funding is constrained under current economic conditions and the ever-greater regulation of university life may undermine the potential of UK universities to lead and compete internationally. Meanwhile the US continues to act as a magnet for research and excellence while competitors are also emerging in China and elsewhere. Are British institutions in danger of being surpassed by rivals who can attract the brightest talents and the highest levels of public and private funding?

In this essay Martin Rees, one of the UK's most eminent academics, puts forward some major concerns about policy for the universities. A scientist of international standing and Astronomer Royal, Lord Rees has led two of the country's most distinguished academic institutions, as President of the Royal Society and Master of Trinity College, Cambridge. Here he explains the changing nature of universities globally; considers the constraints which bind UK institutions and the strengths to which they can play; and suggests how to approach the future.

In particular, he warns that for research and centres of excellence, there must be the atmosphere of freedom and encouragement for scholars and scientists to follow 'hunches', without official demands to meet implausible measures of success. He reminds us that such freedom has been fundamental to the UK's long-standing ability to attract the most talented people to our universities. The success stories have been many, but they certainly could not have been predicted at the time. By whittling away freedom – a danger now compounded by an immigration policy which our competitors do not follow – we risk losing potential talent

Rees emphasises that universities globally are characterised by diversity. They range from those offering highly specialised and intensely academic courses to those which benefit less academic students; from liberal arts courses and specialist institutions offering online learning to those which specialise in professional or postgraduate qualifications. Already a diverse range of institutions exists in the UK, but there is scope for greater diversity, especially in the length and content of courses.

And widening access? The problem is fundamentally that of the failure of schools – and changing schools will take time. Meanwhile interim measures to widen access could include facilitating the transfer of able students to the more academic institutions from the less competitive ones, as happens in California, often with generous funding. Over the longer term we need to tackle the fundamental problem of improving England's schools.

If universities are to flourish they will also need money. Already the UK spends less as a proportion of GDP on its universities than other countries – nearly 40 per cent below the EU average and less than the United States. Though the US is known to spend proportionately more private money, it also spends a higher proportion publicly.

Lord Rees explains why all of these matter – freedom, diversity and funding – and outlines what direction change should take. Much will depend on politicians, much on the universities.

I am most grateful to Martin Rees for this serious and thoughtful analysis. It will strike a chord with many of the UK's academics whose dedication to scholarship, teaching and academic values has contributed to the UK's historic position. We are also grateful to BPP University College for supporting our universities programme and welcome its new status as a university as reflecting some movement towards much needed diversity.

Sheila Lawlor  
Director, Politeia

# I

## Introduction

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How should Britain's universities respond to current turbulence and adjust to our more networked world? And what course should the politicians follow so that they can do so successfully? Cynicism is in order about the precision of the various league tables, and the criteria on which they are based. But there is no gainsaying their consistent message that we are the only country outside the US with several universities in the 'first division'. Indeed, our higher education system is highly regarded internationally. Scientific research, in particular, is a British success story: we are, by most measures, second only to the US in its quality and impact. And this success has been achieved despite a smaller investment – public and private – than other nations. We rank high in 'brain per buck'. But will we retain this standing? And can we ensure that our higher education system, overall, meets our changing needs and expectations?

## II

# Scholarly Research and its Purpose

### Intellectual Enquiry, Research and Impact

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This is not the first time that scientists have worried about things getting worse. In 1831, Charles Babbage, the polymath and computer pioneer, wrote a book entitled *Reflections on the Decline of Science in England*. He deplores ‘the gradual decline of mathematical, and... physical science, from the days of Newton to the present’. (His book is mainly, by the way, a diatribe against the futility and corruption of the Royal Society, of which I was recently President – and so others must judge if it has redeemed itself since the 19<sup>th</sup> century.)

There is also nothing new in the debate about whether science is being productively applied. To quote Babbage again:

‘In science, truths which are at one period remote from all useful application, become in the next age the bases of profound physical inquiries, and in the succeeding one ... furnish ready and daily aid to the artist and the sailor ... It is important to the country that abstract principles should be applied to practical use’.

We now recognise that the so-called ‘linear model’ of innovation that Babbage implicitly assumed, is naive. There is actually a two-way interaction between science and technology. Science depends on improved instruments as well as underlying their design. Advances in my own field, astronomy, for example, are due largely to better technology and computers. Arm-chair theory alone can achieve little. It has been said that there are two kinds of science: applied and not yet applied.

So the word ‘science’ is also used here to embrace technology. ‘Problem solving’ motivates us all – whether one is an engineer facing a novel design challenge or an astronomer probing the remote cosmos. There is as much intellectual challenge in the applications as in the science itself – a point neatly made by an old *New Yorker* cartoon showing two beavers looking up at a huge hydroelectric dam. One beaver says ‘I didn’t actually build it, but it’s based on my idea’.

**Measuring Success** Science and technology develop in symbiosis. Although our official paymasters focus on the spin-offs from pure research, let us not forget the intrinsic value. It is a cultural deprivation to be unaware of Darwinism, DNA and the basic chain of events that led to the emergence of the cosmos, life and our biosphere. Indeed science is the most universal culture, shared by all nations and all faiths.

As President of the Royal Society I found myself involved in the recent national debates on universities and research, making common cause with my 'humanistic' counterpart at the British Academy, Sir Adam Roberts. Indeed, I have more affinity with humanistic scholars than the average scientist because my own research fields – astronomy and cosmology – are pursued more for intellectual reasons than in expectation of short-term economic spin-offs.

The humanities and social science should engage us as human beings. But as scientists we have a special reason for supporting their continuing prominence in our universities. These subjects sensitise and guide the public in choosing how science should be applied. There's an ever-widening gap between what science allows us to do and what it is prudent or ethical actually to do. We must confront widely-held anxieties that genetics, brain science and artificial intelligence may 'run away' too fast – that our imprint on the global environment could be irreversibly damaging. Answers to such dilemmas cannot come from within natural science itself.

There is now far more evidence than in Babbage's time that the fruits of research immensely benefit our welfare – and not just in economic terms. That is true not only in science. A British Academy report published in 2010, *Past, Present and Future: the Public Value of the Humanities and Social Sciences*, argued compellingly that the spin-off from research in the social sciences and humanities is impressive and diverse.

All researchers will surely be delighted if their work has a social or economic impact outside academia. But it is not always recognised how unpredictable, diffuse and long-term such outcomes are. Even in targeted medical research, new drugs take up to 20 years to develop. And the 'family tree' of innovations in other fields stretches back even further in time, and is more diversely multi-branched. The inventors of lasers in the 1960s used ideas that Einstein developed 40 years earlier and could not foresee that their invention would be used in eye surgery and in DVDs.

So there is, quite rightly, scepticism about attempts to assess impact in a way that is 'fine grained' and short-term enough to be used in the forthcoming Research Excellence Framework (REF) as a determinant of funding allocations. The REF is an official system which aims to assess the quality of research in UK higher education institutions; it is accepted by many academics as a 'necessary evil' – unavoidable if we wish funding to be preferentially directed to high-quality departments. But the inclusion of 'impact' as an assessment criterion has been controversial.

It is even less feasible to assess impact at the proposal stage. The Engineering and Physical Science Research Council (EPSRC) recently issued guidance to grant applicants enjoining them 'clearly [to] identify the importance of their research over a

10-50 year time-frame'. This will surely flummox applicants – and indeed foster conventional thinking over boldness and thereby have a negative effect.

Even the wizards of venture capital have a hard job assessing the commercial impact of a discovery. To expect a researcher, or a research council committee, to make any worthwhile judgement – and make it before the work has even been done – is surely absurd.

**Judgement and Freedom** The difference in eventual impact between the very best research and the merely good is, by any measure, thousands of per cent. But of course, who will make the great advances, and when, cannot be predicted. Moreover, one individual never deserves all the credit – any more than a win at football is due solely to the team members who actually score goals. So what matters most, even from a narrow accounting perspective, is not the few per cent savings that might be scooped up by improving efficiency in the 'office management' sense. It is by enabling committed and talented individuals to back their own judgement that funding agencies will best sustain high-quality universities and optimise the prospects for discoveries.

When academics argue like this – and extol 'free wheeling' research – they risk being accused of an ivory tower arrogance that disregards their obligations to the public. But they should strongly counter such allegations. Choices of research project are anything but frivolous: what is at stake is a big chunk of our lives, and our professional reputation; more than money is being staked.

The traditional 'compact' which attracts academic specialists to our universities is that in return for their teaching, they can devote part of their time to research in fields of their own choice, and have reasonable prospects of the necessary support. This has manifestly paid off in places like Harvard, Berkeley, and Stanford – each an immense asset to the US. We must not jeopardise our local counterparts of these great institutions by putting this 'compact' under threat here.

The ambience is crucial. Whether in science, the arts, or entrepreneurial activity, confidence and high morale are crucial drivers of creativity, innovation and risk-taking.

The best university departments foster such an atmosphere: I am lucky to have spent many years in one, in Cambridge. But coffee-time conversations are increasingly about grants, the REF, job security, and suchlike. Prospects of breakthroughs will plummet if such concerns prey unduly on the minds of even the very best young researchers.

And it would be bad news if talent were not attracted towards academia at all – if young people developed a negative perception of the profession. Charles Babbage had words about this too:

‘Let us now look at the prospects of a young man impelled to devote himself to the abstruser sciences [no women mentioned, even though Lady Lovelace was his most discerning collaborator]. What are his prospects? Can even the glowing pencil of enthusiasm add colour to the blank before him? ... What can he reply to the entreaties of his friends, to betake himself to some business, or to choose some profession like the law in which his talents may produce for him their fair reward?’

We have these tensions today. In my college I asked a group of final-year engineering students what their career plans were. All but one were heading for finance or management consultancy.

Some people will become researchers come what may – the nerdish element (of which I am one). But a world-class university cannot survive just on these. It must attract a share of ambitious young people with flexible talent – the kind who are savvy about their options, and may associate academia with uncertain prospects and undue financial sacrifices.

The winners of the 2010 Nobel Physics Prize, Andrei Geim and Kostya Novoselov, are important exemplars. Working at Manchester University, they discovered that carbon atoms can form a lattice just one atom thick – a new material, graphene, with extraordinary strength and electrical properties, and the potential to trigger a transformative technology. Their clinching experiment involved a piece of Sellotape. It was archetype ‘small science’. But it did need intellectual freedom, time and the supportive environment that their university provided. (These two men also exemplified the mobility of academics. They were both Russians who came to this country via the Netherlands – in the 1990s. Today, the visa restrictions might have discouraged them. We must nurture such people, in an environment where they feel free to take intellectual risks, and ensure that they continue to perceive the UK as a place where the best cutting-edge research can be done.)

**Audits or Incentives?** The pervasive ‘audit culture’ and the deployment of ever more detailed ‘performance indicators’ to quantify our ‘outputs’, has emerged through the best of intentions – to raise standards and enhance accountability. But its actual consequences are often the reverse – to impede professional practice and reduce trust. Nobody has expressed such concerns more insistently than Onora O’Neill, President of the British Academy until 2009. In a recent lecture in Cambridge, Baroness O’Neill

highlighted the folly of assessments that fail to measure what is actually important, and offer perverse incentives.<sup>1</sup>

This issue is so important – and not just in academia – that we should make no apologies for emphasising it, to keep our concern high on the government's agenda.

And another point: the current incentive system under-rates something that is surely part of an academic's remit: broad learning and scholarship. The Robbins Report – a manifesto for university expansion in the 1960s, which had a literacy and depth sadly lacking from its later counterparts – stated that an academic had three duties: teaching, research, and 'reflective enquiry'. 'Reflective enquiry' is now being squeezed out. It is important for its own sake, as well as for the way it enriches both teaching and research.

Science and humanities embody the same scholarly values – they are both 'wissenschaft' – but they are perceived differently by the public. When a scientist addresses a general audience, what he or she says is manifestly very different from a specialised talk – and the audience generally recognises that it is underpinned by a lot of unstated technicalities and expertise. But eminent historians or political scientists do not need to adopt a grossly different style of discourse when addressing a general audience: scholarly output in these fields is not completely incomprehensible to the rest of us. For this reason there is a risk that outsiders cannot readily differentiate really excellent and original work from the output of more 'routine' authors – and fail to appreciate the underpinning that is essential for serious research in the humanities.

I'll inject here a fogleyish though not an entirely frivolous footnote. Two of the most valuable pieces of intellectual property to come from Oxford did not come from scientists or engineers – but from Professors of Renaissance Literature and of Anglo Saxon. I refer of course to C.S. Lewis and J.R.R. Tolkien – whose works now, decades later, earn billions for the so-called creative industries. These two distinguished scholars – both, in style and attitudes, archetype old-style Oxford dons – would feel disaffected aliens in today's world of REF, line management, and the audit culture. Their values were the traditional ones: commitment to an institution, and to scholarship and learning for their own sake.

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<sup>1</sup> Onora O'Neill, 'University and Diversity', lecture given at the Centre for Research into the Arts, Social Sciences and Humanities, University of Cambridge, 18 October 2011.

### III

## The International Context

### Collaboration, Competition and Mobility

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**Science and the Changing International Balance** Much of the best scholarship in all fields is international. Indeed, in some ‘big sciences’, collaboration involving several countries is essential. Particle physics is the most extreme example: it requires a quasi-industrial team effort. At CERN (the European Organization for Nuclear Research) in Geneva about 30 countries have committed 20 years worth of funding to one huge machine – the Large Hadron Collider, launched with great razzmatazz a couple of years ago. It is destined to be the world’s leading facility in particle physics for the next 15 years. CERN, which was established in the 1950s, was one of the first formal trans-European institutions, and remains the finest sustained exemplar of international scientific cooperation.

Universities too from all European nations co-operate well in astronomy and space science. The European Southern Observatory now has the world’s best ground-based telescopes.

These capital-intensive specialisms are not typical of research. But they are good precedents – they show that Europe can fully match the US if its research community collaborates optimally.

What about European research in general? Here the trends are positive too. As a young researcher more than 30 years ago I met my counterparts from mainland Europe in the USA – that is where we all went to gain postdoctoral experience. Now things are better. Young scientists are more likely to migrate within Europe. The EU fellowships and network programmes have been an effective stimulus and catalyst. But academic networking needs to go further. Even ‘small sciences’ which are not impelled by resource limitations to collaborate internationally, require a ‘critical mass’ of people. To increase the number of peaks of excellence in Europe we need more intra-European collaboration. The EU can help here. Much of its expenditure on research has been committed to large-scale programmes of questionable efficiency, with a focus on specific ‘applied’ areas. But there has been a general welcome for the European Research Council. This body offers grants to outstanding individuals, on the basis of stringent peer review; it has got off to a positive start and deserves a greater share of the research budget under the ‘Horizon 2020’ programme now being formulated by the EU.

However, there are tectonic shifts in the international balance. It is now Asia, not Europe, to which the US looks with a mixture of hope and apprehension, and where the world's intellectual capital will be concentrated by mid-century. The Chinese have adopted the 'research university' model and their leading institutions are surging towards the premier league.

**Technology and Teaching** People everywhere in the world are immersed in a cyberspace that is ever more information-rich and sophisticated. Moreover, students or scholars will be able to access large datasets – from a 'virtual observatory' or from a library of genome data. They will not need to go to a central archive, any more than scholars will actually need to visit a great library.

Research has become a more participatory enterprise. The involvement of amateurs has been traditional in sciences like botany. But the scope for 'citizen scientists' is now far wider. An example from astronomy is the Galaxy Zoo project – where tens of thousands of amateurs have been able to study the images of millions of galaxies, and classify them – a task that would be too daunting for the far smaller number of professionals, but where machines cannot match the pattern-recognition skills of the human eye and brain.

More surprisingly, wiki-style activity is now catching on in mathematics. On Professor Tim Gowers' website there has been genuine collaboration in proving theorems. Maths used to be solitary. But advances can now be cooperative, like completing a jigsaw – or improving open-source software.

Electronic communication is also leapfrogging the traditional channels for publishing original research – and may soon supercede them.

**Off- or On- line? Journals or Blogs?** The Royal Society's journal *Philosophical Transactions* was founded by Henry Oldenberg in 1665. It was the prototype for the tens of thousands of refereed journals that exist today. Printed journals were a real advance in the 1660s. But they are now anachronistic – so indeed are expensive hard-cover monographs.

Putting journals on line is cheaper and it offers greater ease in tracking references and data through keywords, links, and so on. But ideally scientific information and ideas should be freely available. We're closer to the ideal in some subjects than in others.

Most researchers in physics and astronomy across the world post papers on a web archive established by Paul Ginsparg, now at Cornell University – and read it daily.

The papers later appear in traditional journals; but that is for accreditation, not to get more readers.

In the humanities, JSTOR has been a boon, but lone scholars still have to pay for it.<sup>2</sup> It's rather sad that thanks to Paul Ginsparg<sup>3</sup> the educated public can read everything on superstring theory – which will not enlighten them much – but cannot freely access all comprehensible writings in the humanities.

Going further, it is unclear whether the scientific paper will remain the preeminent 'publishable unit' for much longer. It is surely constricting that the career prospects of young academics depend on a single monograph, or on the bibliometric scores of a few papers. It is even worse if there is an 'institutionalised' pecking order of journals and they have to struggle for acceptance in a top-ranked journal. One of the most deplorable remarks I heard recently was a professor responding to the question 'how do you decide on whether a paper is good?' with the reply 'By the journal it's in'. Moreover, it is sad if there is pressure to publish in American journals simply to score higher citations.

Even the refereeing role of journals may one day be trumped by more informal systems of quality rating. Blogs and wikis will play a bigger role in critiquing and codifying science. The legacies of Gutenberg and Oldenberg are not optimal in the age of Zuckerberg.

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<sup>2</sup> JSTOR, Journal Storage, [www.jstor.org](http://www.jstor.org)

<sup>3</sup> The website set up by Paul Ginsparg, known as 'arxiv', is at [www.arxiv.org](http://www.arxiv.org).

## IV

# Universities are Changing

## The Shape of Things to Come

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**Technology and Teaching** What about the impact of new technology on teaching? Distance learning cannot replace the personal mentoring by academic specialists that happens in the better universities. But it may well erode demand for the traditional ‘mass university’, of which there are many on mainland Europe and in India, where students are offered little more than a passive role as part of a large audience in lectures (generally of mediocre quality) with minimal feedback. Instead, the internet will offer access to an ever growing menu of outstanding lectures and courses (MIT, the Massachusetts Institute of Technology, was the pioneer here). Our own Open University will extend globally.

Star lecturers can have a global reach. And the same opportunity is now open to the best classroom teachers too.

For instance a scientifically-educated financier called Salman Khan – a Bangladeshi working in America – has created the Khan Academy with several thousand videos, each just 5-10 minutes long, explaining key concepts in maths and other subjects. This is an amazingly cost-effective way to supplement the efforts of teachers and enrich the regular curriculum of millions, especially in the developing world.

Other institutions are already following MIT’s lead in posting videos of lecture courses online. Stanford recently went a step further. It web-streamed a popular course on artificial intelligence given by two eminent professors, Peter Norvig and Sebastian Thrun. Anyone could sign up to view the twice-weekly lectures ‘live’. Over 190,000 people, worldwide, did so. The online students were given interactive quizzes which led to a certificate, though not regular Stanford ‘credits’; and 20,000 completed the course successfully.

**Clustering and Research** But, however much communications improve, there will still be an incentive for real proximity. Entrepreneurs cluster in Silicon Valley; academics likewise cluster into leading universities. Talent attracts talent; success breeds success.

Strong research universities are major assets to their host nations because of their attraction for global talent, the collective expertise of their faculty, and the consequent quality of the graduates they feed into all walks of life. Each is embedded in a ‘cluster’

of research laboratories, small companies, NGOs, and so forth – to symbiotic benefit. This is true of the leading universities in the UK, as in the US.

Indeed, despite its problems our higher education system is in better shape than that, for instance, in France, Germany or Italy, and we shape up very strongly compared to the US when we allow for their six-fold larger population. In the rest of Europe, universities have even less diversity of funding; and even less autonomy over admissions of students, and governance. But our ascendancy in research is narrower than would be suggested by the university league tables. That is because in mainland Europe the best research scholars and scientists are not in universities. In France, they are in CNRS, which has pockets of excellence; in Germany they are in Max Planck Institutes, many of which are world class. Indeed it is ironic the research university concept was pioneered in Germany, by Humboldt, but that German universities are today handicapped because researchers are hived off separately.

But current upheavals risk jeopardising Britain's competitive edge in higher education – indeed the reports in the foreign press of what is happening here are already a disincentive to international recruitment of both students and faculty. Our system has become a political football, subjected to changes that were not properly thought through – changes driven by a 'managerial' and 'instrumental' view of education. The new mantra is that 'money should follow the student'. It is unclear that market-driven student choices will actually drive up teaching standards, rather than favouring 'soft' and cheap options. That could lead to a perverse incentive to expand places available on poor quality courses. Choosing a university is a key life-choice – it is not like choosing a restaurant meal. It is a public good as well as a private benefit that enough of our brightest young people should receive a rigorous education and some key subjects, such as foreign languages and some of the physical sciences, are vulnerable.

**Diversity and Change** Our system needs greater diversity. But it is an implausible act of faith to believe that the inconstant preferences of poorly-informed and financially pressured students will lead to an optimum restructuring – especially in a time of anxiety and rapid change. Moreover, the current system is anything but a free market: fees are, in practice, narrowly constrained; there are quotas (inconstantly applied); and the degree of central regulation, and the 'strings' attached to public funding, are eroding autonomy.

The backdrop of course is that enrollment has risen from less than ten per cent of each age-group in the 1960s to around 40 per cent today. This expansion is surely welcome. It has naturally resulted in public funding being more thinly spread but that trend is aggravated because we invest less in universities than most other countries: 30 per

cent below the OECD average in public investment in tertiary education and nearly 40 per cent below the EU average. Higher education in the US receives far more private money than does ours. But what is less well known is that the public funding in the US is also more generous than ours: as a percentage of GDP it is 1.2 as against 1.1 per cent.

**What Models for the Future?** There is much we can learn from the United States. It has several thousand institutions of higher education: there are junior and regional colleges, liberal arts colleges which offer top-quality undergraduate education but no graduate-level work, huge 'state universities' (many world-class) and the Ivy League [of] private universities.

Oxford and Cambridge are routinely compared to the Ivy League, but that is a bit misleading. These institutions are independent charitable foundations with their own charters but are not technically private. Indeed, their balance of public and private funding is closer to the top state universities in the US – Berkeley, Michigan or Texas. Besides, there are aspects of the Ivy League that we would not countenance here, for instance, admissions procedures that give an inside track to the offspring of alumni or benefactors.

A more relevant model for Britain as a whole is the Californian system established in the 1950s under the visionary leadership of Clark Kerr. Its three-level structure of colleges embodies an enviable combination of excellence, outreach and flexibility (or did, at least, until the Californian budget crisis). A substantial fraction of those who attend the 'elite' universities in the system such as Berkeley and UCLA have come not directly from high school but via a 'lower tier' institution.

Our universities obviously vary in quality, but the main systemic weakness is that their missions are not sufficiently varied. They nearly all focus on 3-4 year degrees; they nearly all offer at least some postgraduate degrees. That is why the system needs restructuring – a more diverse 'ecology', and indeed a blurring between 'higher' and 'further' education, and more concentration and collaboration between institutions.

Our traditional honours degree is not appropriate for 40 per cent of the age-group – indeed I personally think it's too specialised for almost all students including many in Oxbridge (where some of the best courses – Classics leading to 'Greats' and PPE in Oxford, Natural Sciences in Cambridge – are among the broadest).

In this context, I'd like to venture a heretical opinion. I think the less selective universities are too defensive and acquiescent when berated about drop-out rates and

so called 'wastage'. An American will say 'I had two years of college', generally regarding the experience as positive: 'college credits', even if they are not sufficient for graduation, are accepted as a qualification. It's surely better to take risks on admission, give students a chance, and let some leave after two years with a 'credit', without necessarily being typecast as failures: and without the universities feeling pressured to see unwilling students through to graduation. Some students would return later; many others may pursue part-time distance learning; others may take vocational or professional courses offered by a number of providers, such as BPP.

Because distance learning will erode the benefits of the traditional 'mass university' there will be a deepening bifurcation between the institutions that offer personal mentoring and tuition on the one hand and the Open University model on the other. Now that we are living longer, in a faster-changing environment, the importance of mature students, part time courses and distance learning will surely grow.

The internet and distance learning will never replicate the experience of attending a collegiate university. Britain should have some 'liberal arts colleges' which can match Oxbridge in their level of teaching and pastoral care – these could develop from some existing universities which might chose to focus on undergraduates, for which the private University of Buckingham is already a model, albeit with a restricted coverage of subjects. (That is also the aim of the embryonic New College of the Humanities – the private 'Grayling college'. I admit to scepticism about this particular venture. An institution that is prepared to pay itinerant 'star professors' so much for so few lectures and still make a profit seems unlikely to offer good value to its students.)

Sustaining teaching quality and a student work ethic are crucial in all universities – not only for the proper education of our own people, 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 the Far East, paying high fees, feel they are not getting value for money or if UK qualifications fail to sustain a reputation for rigour and quality.

The Open University's well-tried model of distance learning supplemented by a network of local tutors and so forth has vastly more potential in the era of the internet and smartphone than when it was founded in the age of black and white television. The OU has a world lead – and is riding high, especially as some of its US counterparts in the for-profit sector have suffered reputational damage recently.

**Graduate Schools for the Future** And what about graduate-level education? In the US, a minority of universities have strong graduate schools. That is a model we should move towards here. Even though many universities may offer masters courses in

specific subjects, we should concentrate graduate education at the PhD level and encourage alliances and clustering in specialised areas. Many academics bridle at this suggestion, so in making it it is important to emphasise that concentration of graduate education need not, especially in the humanities, entail an equivalent concentration of research – that is a distinction that is often conflated. Many who teach in the best American liberal arts colleges are productive researchers and scholars, but if they have graduate students, these are based in another university.

The key point is that in some fields at least a researcher can do distinguished work alone. But a student aspiring to a PhD needs more than just a good supervisor. He or she needs to be in a graduate school where courses are offered over a wider range. Without this second component, a newly minted British PhD will not necessarily have flexibility and range that is needed for their later career.

We know that a few universities attract the lion's share of research funding – and will have graduate schools spanning all faculties. That is likely to be true whatever system prevails. But despite the trend towards concentration, I think it is crucial to avoid formalising the hierarchy, and to retain a system that allows excellence and new graduate schools to sprout and bloom anywhere in the system.

Let me give an example. Leicester University is world-class in genetics and in space science. That was not planned. Outstanding young researchers in these two fields happened to have jobs there and had the enterprise to build up major research groups. The system that prevailed in the 1970s allowed that to happen. And one could quote other examples where groups that are now well-established owed their impetus to one or two individuals. It is important that selectivity should not be so harsh that such opportunities are choked off in less favoured universities.

**Oxford and Cambridge: Access, Funding and Difficult Questions** Finally, a few parochial comments about my own University, and its specific challenges.

To a typical business consultant, the organogram of Cambridge (and, even more, of Oxford) looks nightmarish – an intricate matrix of colleges and departments. This has its downsides. But it has genuine advantages over a ‘cleaner’ system of line management. Academics feel less ‘pushed around’. As their careers develop they can find a niche, an optimum individual mix of teaching, research and administration.

Universities need to be businesslike; so does a hospital, so even does a church. But that does not mean they should be like a business – indeed the inchoate ‘partnership’ model we have here is remarkably cost-effective. It is through this flexibility that

Cambridge retains the dedicated institutional loyalty of hundreds of highly able (and opinionated) people despite very un-stratospheric financial rewards.

A key challenge is to ensure that Oxford and Cambridge remain accessible, without financial hardship, to those who can benefit from them most and to those who will, through their education, serve society best in their future careers. In the US, the top private universities can provide sufficiently generous means-tested support to ensure that students can attend without undue financial hardship. The funds come either from endowments, or via the partial recycling of very high fees charged to students from wealthier backgrounds. This is helped by a culture of voluntary giving and a system which supports it. Endowment of bursaries should be a priority in Oxbridge's fundraising. It is right that we are under pressure to widen our pool of applicants. We all know of people who could certainly have got into Oxbridge but were discouraged by their teachers from aiming high enough, or inhibited by misperceptions about the student experience in these universities.

But these efforts are not enough to lead to a socially just system. The killer fact, and the most intractable, in the access agenda is that half the UK's young people do not receive the quality of teaching at school that allows them to qualify for the most competitive university courses. It is imperative to remedy this disparity. But it will be a long slog and in the meantime we should select some fraction of our intake from those who have taken foundation degrees or earned some 'credits' from elsewhere. This would be reversion to an earlier system. For instance, over a hundred years ago J.J. Thomson came from Owens College, Manchester to read mathematics in Cambridge.<sup>4</sup> Indeed for those who initially did not gain entry to a Russell Group university because of disadvantaged schooling, it could become a common practice to transfer after one or two years at a less selective institution.

Our higher education system must encourage and foster what Robbins identified as the big three, teaching, reflective enquiry and research. All universities will benefit if academic staff engage in the latter; however, only some will become specialized centres for research, attracting graduate students and scholars in a given area. Higher education is a 'driver' of social mobility, but this will be inhibited until high-quality teaching at school is available across the full geographical and social spectrum – and that will take time. In the meantime, the most distinguished academic institutions could widen access by admitting able students who have earned their spurs in the less competitive institutions – indeed we should strive for greater mobility and flexibility, and a wider range of opportunities for acquiring 'credit'.

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<sup>4</sup> J.J. Thomson, born in 1856, attended Owens College until 1876, when he won a scholarship to Trinity College, Cambridge. Owens College, founded in 1851, was the precursor of Manchester University, which received its Royal Charter in 1880.

There are other policy issues that merit wide debate. How much more ‘global’ should Oxford and Cambridge become? At the faculty level we are in a global market and are making more academic appointments from abroad – and that is surely good. Our post-graduate student body is already highly international and graduates are a rising proportion of our overall student body. A welcome development in my own college is an increased proportion of well-schooled undergraduates from the enlarged EU, from Poland, Hungary, the Czech Republic etc. The rules allow virement between home and EU students.

But Oxbridge’s undergraduates are still primarily from this country – and the non-EU fraction is currently ‘capped’. Do these universities have an obligation to keep things that way because of their traditional role in British society? Or should we be relaxed about what might be called the ‘Wimbledonisation’ of Oxbridge: fully opening up to foreign students (as the LSE, for instance, has done) thereby recouping higher fee income, and achieving higher academic standards by attracting worldwide talent to the student body as well as the faculty, and accepting that the Brits might end up being relegated to maintaining the infrastructure facilities?

Be that as it may, we must recognise that our leading universities are among the institutions in the UK (the BBC is another) which are widely admired and worth protecting. And we must also recognize that we are part of a higher education system that needs to evolve, where modern technology offers huge opportunities but where restructuring must be carefully planned rather than hurriedly implemented.

There are all too few areas where this country is as high as number two in the world; we surely should not jeopardise any that remain. Indeed, Oxford and Cambridge would rank even higher in international comparisons if the ‘league tables’ gave proper weightings to teaching and the student experience, rather than having a focus on research, especially in science. Even to retain our international competitiveness, we need to raise our game. Instead, we are spending a smaller fraction of our GDP on higher education than other comparable countries – and less than Korea and other emerging economies. Our universities should be a springboard to the nation’s long-term prosperity and social harmony. We can surely afford to sustain them – indeed we cannot afford not to. As President Obama said in another context, ‘when a plane is struggling to gain height, it does not make sense to throw out an engine’.



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