

UNIVERSITIES IN THE UNITED KINGDOM by Michael Green

University research and teaching in the UK have been in a state of change for many years and this will continue into the foreseeable future. The number of universities and the number of students have increased enormously and all universities have been under great scrutiny. "Quality measures" have become too many to count. Funding mechanisms for teaching and research have changed and a significant increase in funding is in progress. This, together with the introduction of the concept of sustainability, provides some hope for the system for the first time for many years.

INTRODUCTION

This article provides a personal view of the UK university scene in the recent past, the present and the near future. I am not an expert in the field, merely a physicist who has worked as an academic researcher and teacher in the University of London since gaining my PhD in Particle Physics in 1970. From 2000 to 2005 I was Dean of Science at Royal Holloway, one of the constituent Colleges of the University of London, and it is probably this period that was most influential in forming the views presented here.

In reading this article you should be aware that the United Kingdom comprises four countries: England, Wales, Scotland and Northern Ireland. Differences in aspects of the government of these countries have increased in recent years, particularly in Scotland, where the Scottish Parliament was re-established in 1999 after nearly 300 years, and to a lesser extent in Wales with the establishment of the Welsh National Assembly in the same year. Thus while much of what I say in this article applies to the UK as a whole, aspects of the way universities are controlled and funded in the four countries are changing, as will be apparent in some of the discussion. Each country has a separate body responsible for distributing government funds for universities, for example the Higher Education Funding Council for England (HEFCE).

The UK has about ninety universities with power to award their own degrees (115 if the constituent colleges of the University of London and the University of Wales are counted separately). They differ enormously, particularly in size, age, mix of disciplines and mission. They are independent, self-governing institutions, employing their own staff and awarding their own degrees. There are in addition about fifty higher education

colleges that do some teaching to degree level, although not all award their own degrees. Total funding is currently about £16 billion (about €24 billion¹) provided from a number of sources, about 60% of it by central government.

In the UK school education is compulsory to the age of 16, although about 80% of pupils continue their secondary education until the age of 18. Apart from Scotland, education is very narrow during those last two years. Most students study a maximum of four subjects (A-levels), frequently heavily biased towards the sciences or the arts. Thus students have greatly narrowed their choice of subject for study at university and their future career by the age of 16. In Scotland students follow a broader programme, somewhat similar to the International Baccalaureate, and go to university at the age of 17.

On leaving school about 35% of students move immediately or after a "gap year"² to a full-time university course. This percentage has increased enormously in recent years. Traditionally universities in the United Kingdom were elitist institutions and only a very small fraction of young people even considered higher education as an option. Sixty years ago about 2% went to university. This increased through a series of government initiated and funded expansions, particularly in the 1950s and 1960s, when many new universities were founded, and again in the six years from about 1988 when it doubled from 15% to 30%.

¹ After this example I express money only in pounds; a conversion factor to euros of 1.5 should provide adequate accuracy for the approximate numbers generally used.

² I use quotation marks to indicate a technical or jargon expression that is widely understood in the UK. I will only explain such expressions if I think that their meaning will not be obvious to a non-British reader.

There are still striking differences in the social backgrounds of students; about 50% of the children of non-manual workers go to university compared to about 20% of those of manual workers. Thus when Tony Blair's Labour government came to power in 1997 it set a target of a 50% participation rate by 2010 and an associated aim to increase the number in the latter group. This target has been accompanied by a redefinition of participation and now includes part-time and mature students (the latter being those who enter university after the age of 21), two groups that have increased significantly in number in recent years. In parallel a strenuous effort has been made to raise the aspirations of young people from families who have not traditionally gone to university. The drive to increase the number of these students is known as "widening participation". The current, newly-defined, participation rate is about 45% but it appears unlikely that the 50% target will be achieved.

The way in which UK students gain entry to university is strikingly different from other countries. By January of their last year at school students apply through a central body to five universities of their choice, specifying the course they wish to take. Universities normally interview each applicant and decide whether or not to offer a place based on the interview and the student's predicted examination performance by his/her teachers. The number of offers a student receives therefore depends not only on how good they are but also on the popularity of both the subject and the university they have chosen, since each university has the number of students it can take strictly controlled (in England by HEFCE). Thus, for example, difficult subjects to get a place in include medicine and veterinary science, while difficult universities to get into include Oxford and Cambridge. Students therefore choose both the subjects and universities to apply for on their perception of their ability and their aspirations. A significant number of "qualified" students (usually defined as having passes in two A-level subjects) fail to get a place each year.

Perhaps it is worth remarking at this point that the male/female student ratio has changed remarkably in recent years, as in other countries. Forty years ago very few females went to university but since then the ratio has risen steadily, reaching 50% in 1995. It is now 56%. The current concern is how to increase the aspirations and educational performance of boys and young men, which

seem to diminish around the time they become teenagers.

"OLD" AND "NEW" UNIVERSITIES

The large increase in the number of students attending university has been accompanied by many other changes. Particularly significant was the doubling of the number of universities in 1992 when the polytechnics became universities. The polytechnics were generally in the "inner cities", often spread over several sites. They catered for locally-based, often mature, students and taught more vocationally oriented and part-time courses. Their students were generally less well qualified. They carried out little research. They are now referred to as the *post-1992* or *new universities*.

In contrast the *pre-1992*, or *old universities* mainly taught full-time courses to students who started at 18. All academic staff were expected to carry out research. Many are sited on large and pleasant campuses and most of their students live in halls of residence on campus or rent accommodation nearby.

When the polytechnics became universities there was a perception by their staff that they would rapidly change to become similar to the old universities. In practice this happened in only a few cases and more recently a sensible discussion has taken place over "institutional mission".

UNIVERSITY MISSIONS

HEFCE currently demands that universities define their mission carefully and expects it to be some mix of research, teaching, widening participation and knowledge transfer. The last of these reflects a widely held perception that Britain is good at fundamental research but poor at exploiting that research. Knowledge transfer is therefore defined to mean the transfer of university research output to industry, business, etc., for exploitation. Again it was the Blair government that determined that it would tackle this issue and it has provided a lot of funding to do so, for example £238 million over two years in 2006-7. Thus most universities now have well-staffed and well-funded offices charged both with identifying applications of research being carried out in their institution and with seeking industrial problems for academics to work on.

Many staff have embraced this activity with great enthusiasm and a few, working in areas such as chemistry, biosciences, engineering and business studies, have made a lot of money for themselves as well as their university. The policy is generally regarded as a great success (particularly by those who have made a lot of money). When the policy was being developed, the new universities believed that much of the additional funding for this activity would be targeted at them since, although they did relatively little research, much of what they did was carried out in collaboration with local industry. However in practice it has been the research output of large teams, concentrated in the old universities, that has been most attractive to industry.

I didn't mention earlier that HEFCE has declared that widening participation is not an option: all universities must do it. Equally no university would consider teaching as optional, although universities do have considerable choice over what subjects they teach and how they teach them. As just discussed, how much knowledge transfer a university can carry out is strongly influenced by its research areas. Thus in practice a university's mission is influenced more than anything else by its research and I now turn to this topic in more depth.

RESEARCH

Academic freedom, the right of an academic to carry out and publish research in an area of their choice, was once paramount. We were free to challenge received wisdom, within the law, whether or not it was consistent with institutional or government policy. Moreover once appointed to an academic post we could not be dismissed except for offences constituting what was charmingly called "moral turpitude" in the case of a lecturer, "gross moral turpitude" in the case of a senior lecturer and "persistent gross moral turpitude" in the case of a professor, normally jokingly interpreted as having sex with a student in the former case or with the Vice-Chancellor's wife in the other two cases.

There is no doubt that such freedom led to enormous advances in many fields of human endeavour, in particular by allowing some of the most brilliant minds time to think and to solve problems. One recent example that comes to mind is Andrew Wiles' solution to Fermat's Last Theorem, achieved after more

than twenty years of effort, much of it spent working in isolation in his attic study. No doubt this freedom has also been abused at times and we all know a few individuals who have done little or no research since they landed a permanent post. It is also difficult to argue that it is possible to allow the same freedom to all 100,000 or so full-time academic staff now employed in UK universities. Thus over the last twenty years increasing constraints have been imposed on academic staff, including, for many, the requirement to attract income to support their research. Some of those who have failed, either individually or, more commonly as a member of an unsuccessful department, have lost their jobs. In parallel, methods to measure research quality have been introduced, as will be discussed in a later section.

RESEARCH FUNDING

Research funding for UK universities is provided in two roughly equal streams: "direct funding" to researchers on the basis of a proposal to carry out a specific project and "indirect funding" to a department from HEFCE on the basis of the quality of its research (the latter in essence a research funding base). This is known as the "dual-support system" and has been in operation for many years. Various bodies fund research proposals, including industry, medical and other charities, and the seven research councils. The last of these fund much of the UK's blue skies research and, as well as the five councils that cover science, medicine and technology, there is an Economics and Social Research Council, and an Arts and Humanities Research Council. The funding they distribute is provided by the government.

For twenty or more years during the 1980s and 1990s university funding was squeezed relentlessly. Student numbers increased but the money available per student was reduced so that student-staff ratios worsened considerably, and indirect funding for research decreased. Direct income for research projects was inadequate and covered little more than the cost of some equipment and the salaries of research assistants. Much research only continued because buildings went unrepaired and staff worked many more hours than was reasonable. The situation was unsustainable. Again credit has to be given to the Labour

government for recognising that there was a problem and in 1999 it commissioned a major report by independent consultants that came to the conclusion that an additional £9 billion was needed to address the problem, most of it in science and technology.

Given the size of this sum of money the scientific community was amazed when the government accepted the report, at least in principle, even though it did not promise the whole £9 billion. However in return it demanded that universities should audit how they spend their money and in particular how much academic time is spend on teaching and how much on research. In successive two-year periods from 2002 an additional £600, £1,000 and £1,550 millions have been provided to universities, mainly for equipment for research in science and technology.

To satisfy the requirement that universities should understand their costs better, we now have to calculate the "full economic cost" of any research project. This includes research assistants' salaries, equipment and an element of central administrative costs, as before, but now in addition the academic's salary for the fraction of time spent on the project and a *pro rata* contribution to the cost of buildings and grounds. From September 2005 all proposals to research councils have been made under this methodology and significant additional government funding has been provided to the research councils to cover the costs. Although only 80% of the full economic costs are covered at present, a typical research grant is expected to be about 40% larger than under the previous mechanism. The government has stated that it is an aspiration to provide 100% of the full economic cost by about 2012.

The purpose of the new methodology is to enable universities to become "sustainable", where a sustainable activity is defined by HEFCE to mean that *an institution needs to do the activity today in a way which will not threaten its ability to do it in future.*

I believe that this statement is a giant step forward for the way in which much university research is funded, although there is an obvious threat to research that does not succeed in attracting external funding. Much may depend on whether the indirect funding element continues through the dual support principle. It will be a while before the full implications of this major change in funding policy are clear.

Teaching is not yet included in the full economic costing regime but it almost certainly will be within a year or so.

THE RESEARCH ASSESSMENT EXERCISE

The UK was at the forefront of the movement to assess quality of research in universities; the primary instrument is the "Research Assessment Exercise" (RAE). It began in 1986 and was initially carried out at three-year intervals. Over the years it has become more complicated, costly and time consuming, and the intervals have increased so that the sixth one, in 2008, will be seven years after the last. The output of the RAE is an assessment of the research quality of each "unit of assessment" (which roughly map to departments) as determined by a peer review panel.

In the first five RAEs the outcome for each department was a grade from 0 to 5. Early on those with the poorest quality research no longer made a submission and the number of departments obtaining 0, 1 and 2 dropped. In 1996 grade 3 was split into 3a and 3b and the category 5* introduced. In 2001 55% obtained a 5 or 5*. Indirect research funding depends strongly on the grade achieved and there has been a consequent concentration of research funding in fewer departments; for example, since the 2001 exercise just four institutions³ obtain almost 30% of the indirect research funding. In contrast, departments assessed at grade 4 now receive little funding, yet this was defined in 2001 as *quality that equates to attainable levels of national excellence in virtually all of the research activity submitted and showing some evidence of international excellence.* As a result many departments have closed; for example the number of physics departments in the UK has reduced from 75 in 1996 to around fifty in 2005.

Universities have changed significantly as a result of the RAEs over the last twenty years. After the 2001 RAE many of the new universities realized that they were unlikely ever to obtain much research funding and appear to have given up on this ambition. Many of the old universities, already strong in research, decided that the ever increasing concentration of research funding meant that they had to try even harder. They have been removing "less active" researchers by a

³ Oxford, Cambridge, Imperial College London and University College London.

variety of methods, including the closure of “underperforming departments”. Dismissal of individual staff, unheard of twenty years ago, is now common, as are early retirement schemes. In their place universities recruit “star performers”, either individuals or research teams. Salaries of such people have greatly increased in this transfer market and are now commonly £100,000 pa or more, unheard of a few years ago in the UK.

In the 2008 RAE every academic will be invited to submit up to four papers written in the last seven years for assessment. Using this information, plus other “performance indicators” such as research income, number of PhD students etc., the panel will then decide what percentage of the work of the department falls into each of the following categories and these percentages will be published.

Four star Quality that is world-leading in terms of originality, significance and rigour.

Three star Quality that is internationally excellent in terms of originality, significance and rigour but which nonetheless falls short of the highest standards of excellence.

Two star Quality that is recognised internationally in terms of originality, significance and rigour.

One star Quality that is recognised nationally in terms of originality, significance and rigour.

Unclassified Quality that falls below the standard of nationally recognised work. Or work which does not meet the published definition of research for the purposes of this assessment.

Note that the 2001 grade 4 definition, near the top of the scale, is very similar to the one star definition, near the bottom of the 2008 scale.

There is an expectation that the outcome from this RAE will be used to increase further the concentration of research funding, in line with the government’s objective that a small number of institutions should be able to compete in research at world level. Laudable as this objective may be, many high quality institutions fear that they may have to pay a high price if this aim is to be achieved. One pointer that fuels this fear is that there will be no statement on how funding will be allocated according to the results until after they are known.

It is widely believed that 2008 will be the last time the RAE will take place, at least in its current, very complicated and expensive, form. Its outcome could establish a priority

order for research funding that remains in place for many years.

FUNDING FOR TEACHING

Until 1998 the government provided essentially all funding for undergraduate teaching, e.g. for England through HEFCE. The nominal amount given annually for each student depends on the subject studied, for example, for medicine it is currently £14,500, for a laboratory-based course such as physics it is £6,100, while for a classroom-based course such as English it is £3,600. In practice the mechanism is rather more complicated than a simple allocation and in addition universities are strictly required to keep within $\pm 5\%$ of approved student numbers. Increased funding is normally only available as a result of bids for “additional student numbers” in subjects deemed a priority by HEFCE.

In 1998 student fees were introduced at £1,000 pa, payable by all students directly to their university. Since then the fee has increased by £25 each year, roughly in line with inflation. Some or all of this fee is paid as a grant to students from poor families.

The 1999 consultants’ report on university funding showed that teaching still remained underfunded and was unsustainable. After a wide national debate, unique for a university-related issue, in 2004 the government introduced a bill in Parliament that would allow universities to charge an annual fee of up to £3,000 from 2006. This legislation was passed by just three votes, the closest the Blair government had come to defeat on any issue at the time. One of the intentions was that different universities would charge different amounts, thereby creating a market. In practice all but two or three have decided to charge the full amount. A significant fraction of the fee income has to be used to provide scholarships for poorer students and universities have independently set up systems for this, although comparing them is more difficult than comparing mobile phone charges. Government ministers also indicated that they expected about one third of the increased income to be used to increase academic salaries although it has yet to be seen if this will happen. Some universities feel that the £3,000 limit is too low but such was the passion of the debate and the opposition to the bill by many of its own MPs that the government was forced to concede that it would not increase before 2009. Some

of the universities that would wish to charge more have recently indicated that they will reduce their undergraduate student numbers and increase masters student numbers, for whom fees are not controlled.

Fees represent a very big change in the way education is funded. From 2006 the cost of being a student, including living costs, will increase significantly to about £8,000 pa. In partial mitigation students will be able to borrow around £4,000 of this as a "student loan" from the government at a low interest rate, to be paid back over many years through the tax system after starting work. The rest will have to be borrowed on the open market or be lent or provided by parents. A typical student on a three-year course is likely to end up with a debt of about £25,000. For students on a longer course, e.g. a five-year medical degree, it will be much higher. Will students still think that a university degree is value for money and will they be able to afford it? The current evidence is that it will dissuade some students from going to university: applications for entry in October 2006 are about 5% lower than in previous years.

The above arrangements apply to England and Northern Ireland. The Scottish Parliament and the Welsh Assembly rejected this approach and instead will provide additional funding for universities. In 2000 Scotland replaced the original £1,000 fee with a graduate endowment tax of £2,000 payable when a student begins employment.

EU students at a UK university pay the same fees as students resident in that country, e.g. they do not have to pay a fee at a Scottish university. The exception is a student from England going to a Scottish or Welsh university, who has to pay the English fee.

In all four countries non-EU students (so-called "overseas students") have had to pay fees for many years, typically £10,000 pa for a science subject and £20,000 pa for medicine, significantly more than the grant plus fee income for an EU student. They provide 8% of UK university income and for most universities they represent the only aspect of teaching that is in financial surplus. Much effort has been expended to increase their number. However the expansion slowed considerably and unexpectedly in 2005 and many a Vice-chancellor is having budget difficulties as a result.

TEACHING ASSESSMENT

No doubt encouraged by the perceived success of the RAE, the next major assessment exercise imposed on universities was a measure of their teaching quality, which began around 1990. It is currently led by a body called the Quality Assessment Agency (QAA).

The early QAA assessments required enormous effort and over a six year period all departments in all UK universities had a week-long visit from a team of six assessors. I was head of a physics department at the time and we spent six months before the visit preparing documents about our teaching that were eventually a metre high. During the visit we spent many hours being questioned by the team, who also observed lectures, seminars, laboratory sessions and tutorials. They interviewed groups of students, ex-students and employers of ex-students. They visited the library, the computer centre and even talked with the chaplain. On the final day we were gathered together in a group and told the result: we had been awarded a score of 23 out of 24. We were delighted! However in the coming weeks we learned about other physics departments in the UK; essentially all had scored in the range 22 – 24. In essence the QAA had found it impossible to differentiate significantly teaching quality in physics departments, a result eventually repeated for almost all university teaching.

There can be little doubt that teaching changed during this period. Whether or not it was the result of all the attention is unclear. PowerPoint presentations are now the norm and students are often handed extended notes. Is it better, though? Probably yes, but there is a strong perception that we "spoon-feed" our students much more than in the past. One major change in most universities has been the introduction of an extended training programme for all new academic staff, even though many regard it as a serious distraction from research. Completion of this training makes them eligible to join a new professional body – the Higher Education Academy.

More recently the approach to teaching quality has changed and the emphasis is on checking that each university has systems in place to assure this for themselves. No longer are visits made to departments. Instead we have to publicize many details of our teaching, including syllabuses, teaching and

assessments methods, a summary of our students' performance and reports of our external examiners. The amount that each university spends on library books, computers etc., each year is publicly available. Moreover since 2005 there is an annual "student satisfaction survey" in which all students in the UK answer the same twenty-one questions about their course and how satisfied they are with staff, classrooms, library facilities etc. The results are publicly available for every department in every UK university.

The UK has one of the lowest university "drop-out rates" in the world: about 85% of our students successfully complete their degree course. Drop-out rates are, of course, measured and published for each institution.

LEAGUE TABLES

What is incontrovertible is that the UK now has a university system that has many measures associated with each institution. There are research and teaching quality measures, student satisfaction surveys, expenditure on each student, staff-student ratios, research income per member of staff; the list is almost endless. Thus various bodies, in particular the national newspapers, try to make sense of all these data by producing a single measure for each university and hence "league tables" are very fashionable.

Each producer of league tables has a different view of why universities exist and therefore they all put different weights on the various measures and get different results. Thus by being selective almost anyone can prove the excellence of their own institution. This point was nicely exemplified recently by Eric Thomas, the Vice-Chancellor of Bristol University, who mischievously declared himself delighted that Bristol was one of 58 universities in the UK top ten. I am equally delighted to say that Royal Holloway is also in the top ten. In practice I believe that league tables have rather little effect on the perceived prestige of each university, either in the UK or abroad.

FUTURE DEVELOPMENTS

By now the reader will be aware that there have been many changes in the UK university system in recent years and that more are in hand. In teaching, what was

undoubtedly an elitist system educating just a few percent of young people has now become a mass business. In research there has been concentration of funding and significant effort has been put into transferring research output to business and industry for exploitation. There has been much pain during the transformation and it is not yet complete.

We have mostly hung on to the UK ideal of small-group teaching, at least for part of our teaching, and we believe that this has enabled the very low drop-out rate to continue. However this has been at the cost of introducing high student fees. It has yet to be seen what the effect of these fees is on the participation rate; it will probably be small but noticeable.

The government continues to look for efficiencies and constantly encourages "new approaches" to teaching, most of which are for the current UK three-year undergraduate degree to be shortened, for example, by teaching forty weeks a year for two years. It is likely that a few universities with low research activity will try this for some subjects in the near future to see how much student interest there is.

This is somewhat contrary to the Bologna process which aims for convergence of university teaching across Europe. However in parallel there is some recognition that education and training of the brightest students takes longer than the traditional three years. In several science subjects, including mathematics and physics, a four-year undergraduate course is now regarded as the normal entry to a PhD, and funding for PhDs in physics has recently been extended from three to 3.5 years.

I believe that a fundamental error in approach was made around fifteen years ago when the last major expansion of the universities took place. It is simply not possible for all universities in the UK to have similar missions, and the pain that resulted from attempts to follow this route for nearly ten years is not at all surprising. Thankfully over the last few years it has been recognised that diversity of mission is essential and a simultaneous increase in funding has allowed universities to address this positively rather than fight each other for resources. More recently it has become plausible that sustainability of activity can be achieved within the next five or so years. It is possibly the most positive step that has been taken for many years.

ACKNOWLEDGEMENTS

I am extremely grateful to my colleague Dr Antonella De Santo for comments on a first draft of this article, in particular for

pointing me towards those issues likely to be of most interest to an Italian audience. Frances Green provided very useful comments related to schools.

MICHAEL GREEN

Professor of Particle Physics at Royal Holloway, University of London. During his career he has worked extensively at CERN, from 1985 to 2000 as a member of the ALEPH collaboration. From 2000 to 2005 he was Dean of Science at Royal Holloway.

Contacts

*Royal Holloway University of London, Department of Physics, Egham, Surrey, TW20 0EX, UK
Tel. 01784 443454 Email: m.green@rhul.ac.uk*