The future of higher education in England: Call for evidence

A response from the Society of Biology to the Institute for Public Policy Research

28th September 2012

The Society of Biology is a single unified voice for Biology: advising Government and influencing policy; advancing education and professional development; supporting our members, and engaging and encouraging public interest in the life sciences. The Society represents a diverse membership of over 80,000 - including practising scientists, students and interested non-professionals - as individuals, or through the learned societies and other organisations listed below.

Response

The Society of Biology has recently responded to a number of consultations and enquiries into several of the Higher Education (HE) topics covered by this call for evidence. Here, we present extracts from some of our recent submissions in response to your enquiry as well as providing some specific comments on the questions you pose.

To what extent should the overall structure of higher education be determined by market forces and to what extent should government play a strategic role? Is the introduction of greater market forces good for the HE sector?

In a recent response to the Higher Education Funding Council for England (HEFCE) on teaching funding[1], the Society of Biology responded:

> With the more market based approach to university finance, students are likely to become increasingly demanding in return for the investment they make in their education. Among other things, their interest in employability will grow. Students will be faced with choosing the courses that provide them with the best employability at graduation, and this is enhanced by better provision and delivery of high cost practical skills that employers, particularly those employing bioscience students, require.
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> The overall impact of the student number controls and funding arrangements will lead some [Higher Education Institutions] HEIs to restrict the range of bioscience courses available due to student fees and the HEFCE teaching funding grant not fully reflecting the additional costs of teaching practical subjects such as the biosciences. The probable consequences of this underfunding of science courses is that it is very likely that HEIs may decide that science programmes are unaffordable under the new funding regime and will reduce their teaching of science subjects, eliminating many of their science programmes or redesigning them to remove some of the practical content. This will reduce diversity and choice in the sector and limit the opportunities available to students to study the sciences. This will lead to a much steeper differentiation between courses that provide high quality research-led teaching environments and those that do not. Strenuous effort must be made to maintain integration of research led teaching into the teaching agenda, and ensuring that degrees in [Science, Technology, Engineering and Maths] STEM subjects are not lost.

We highlight that the increased tuition fees should not be allowed to become a barrier for access to higher education, or damage the functioning of universities as centres for both academic and teaching excellence which are open to people of all social backgrounds.

[1] http://www.societyofbiology.org/policy/consultations/view/72

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Should all our universities aim to replicate the classic research university model or should there be a clearer division of labour between institutions focusing on research and institutions focusing on teaching and scholarship? Should we have incentives in place that encourage more emphasis on teaching quality?

In responses to the House of Lords Science and Technology Select Committee enquiry into the Higher Education in STEM subjects[2], and to the Department of Business Innovation and Skills regarding the Higher Education White Paper[3], the Society of Biology responded:

> Research informed teaching is crucial in order to produce STEM graduates with the high level skills required for employment in STEM careers. This teaching should include appreciation and delivery of the component skills of research, as well as exposure to an active research environment in order to embed knowledge, understanding and skills.
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> In science subjects, one cannot divorce teaching from research. There is an intricate relationship between the two, in terms of space and facilities, financial sustainability, student contact with researchers, academic staff time and workload, and the supply chain of new researchers. Access to research facilities in undergraduate science programmes is needed even in teaching intensive departments.
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> The current focus of the Research Excellence Framework (REF) does not incentivise or recognise teaching or research laboratory-based project supervision, which will lead to the emergence of further divisions between academics who focus on research and those with teaching responsibility. Whilst academics perceive that the only way to promotion is via grants and papers, the perception of the importance of teaching will decrease and its priority will be devalued. This loss of collegiality erodes the student experience at the higher end and weakens skills delivery and added value. It is important that undergraduates are taught by research active scientists who have experience of the latest techniques. We encourage measures to highlight the importance of teaching at HE, such as such as HE teaching awards, Continued Professional Development focusing on teaching in Higher Education, and clear routes to promotion which recognise the importance of teaching as well as research. The Society of Biology[4] and several of our Member Organisations offer such schemes.

What role should higher education play in providing skills for the job market?

In a response to the House of Lords Science and Technology Select Committee enquiry into the Higher Education in STEM subjects[5], the Society of Biology responded:

> A recent report from the Science Council[6] highlighted the importance of scientific training to the workforce. Trained scientists are of enormous value to the population in a range of research and non-research careers, and many employers welcome applicants with a scientific background to non-research based roles due to their analytical skills.
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> Approximately 10% of UK degrees awarded every year are classed as biological sciences[7] (although the definition of the biological sciences used for these statistics is very broad). A greater issue for the biosciences is the numbers of graduates with the desired skills for employment. Increasingly both employers, and HEIs searching for PhD students, tend to recruit candidates with research experience gained through an MSc/MRes or MSci/MBiol (rather than BSc) to ensure they have more of the desired skills and 43% of all employers report a problem recruiting staff with the right STEM skills[8]. There is a significant mismatch between employer

[2] http://www.societyofbiology.org/policy/consultations/view/58
[3] http://www.societyofbiology.org/policy/consultations/view/52
[4] http://www.societyofbiology.org/education/hei/competition
[5] http://www.societyofbiology.org/policy/consultations/view/58
[6] The current and future UK science workforce, Science Council (2011) http://www.sciencecouncil.org/sites/default/files/UK_Science_Workforce_FinalReport_TBR_2011.pdf
[7] HESA data, (2008/09) http://www.hesa.ac.uk/
[8] Building for Growth, CBI/EDI (2011) http://www.cbi.org.uk/media/1051530/cbi__edi_education___skills_survey_2011.pdf

expectations and HE output - employers complain that there are not enough graduates with the right skills while students are unable to find jobs in the sector.

Reports on STEM graduates in general[9], and also specifically on bioscience graduates[10,11] highlight that graduates are lacking both generic transferable skills and research skills and experience. These reports show that employers are most concerned about bioscience graduates lacking basic mathematical and statistical capability, ability to apply scientific and mathematical knowledge, and practical and analytical skills. Specific scientific skills change relatively rapidly as technology advances and techniques are adapted to different purposes (and are frequently automated), so to properly prepare a workforce in training it is important to teach basic skills, critical thinking, experimental approaches and ethics, as well as imparting fundamental knowledge.

There is a danger that these numerical skills are downgraded in bioscience courses and particularly in student assessment. Quantitative skills training is something that biological sciences students may individually seek to avoid in many cases, having chosen biology on the mistaken grounds that it is not a quantitative science. Universities may seek to avoid teaching essential but unpopular skills in the face of activities such as the National Student Survey.

However, we do note that not all graduates want or need advanced research skills, as they may not want to become researchers in the future. The STEM graduate career pipeline is not simply a route to an academic research position, and as such, graduates need to gain a range of transferable skills during their course in order to equip them for a range of potential roles. We stress the need for relevant careers advice for students, graduates and postgraduates, that remains current with the rapidly changing employment market, and that is accessible to as many people as possible. There is no dearth of advice available but not everyone who needs it will come looking for it and will think critically about its reliability and relevance to them. Also many students consider careers advice to be irrelevant when they are still unsure about careers and so do not engage with careers advice early enough.

The development of our Degree Accreditation Programme[12] features industry and academia working together to recognise academic excellence in the biosciences, highlighting degrees which educate the research and development leaders and innovators of the future. When fully rolled-out across all the biosciences, accreditation will recognise outstanding biosciences courses across the UK that focus not only on core knowledge but also on experimental and analytical skills. It is our hope that Degree Accreditation will provide employers with assurance over the levels of laboratory and fieldwork experience provided by a degree, and the coverage of key areas of expertise required for further employment in specialist scientific careers. Accreditation will also make it easier for students to choose degrees which will equip them for future scientific careers.

Is there a cultural gap between HEIs and industry? How can we encourage universities to be more entrepreneurial? What institutional and policy reforms would facilitate better university–industry collaboration?

In a response to the House of Lords Science and Technology Select Committee enquiry into the Higher Education in STEM subjects[13], the Society of Biology responded:

> We broadly support the aim set out in the Government's Higher Education White Paper, Students at the Heart of the System,[14] earlier this year to encourage interaction between universities and businesses, and welcome

[9] Building for Growth, CBI/EDI (2011) http://www.cbi.org.uk/media/1051530/cbi__edi_education___skills_survey_2011.pdf
[10] Skills needs for biomedical research, ABPI (2008) http://www.abpi.org.uk/our-work/library/industry/Pages/skills-biomedical-research.aspx
[11] Report of Industry Survey on Accreditation of UK Bioscience Degrees, Society of Biology (2011) http://www.societyofbiology.org/documents/view/832
[12] http://www.societyofbiology.org/education/hei/accreditation
[13] http://www.societyofbiology.org/policy/consultations/view/58

the Wilson Review of Business-University Collaboration. On issues such as widening participation and promotion of STEM as a subject of choice, where industry and HEIs are each working independently, joint programmes may be both more effective and more economic.

The CBI/EDI education and skills survey[15] identified that 52% of employers expect difficulty recruiting STEM staff in the next three years. In order to ensure that sufficient numbers of graduates with the appropriate levels of skills are generated, employers need to play a key role in promoting study of STEM subjects and careers at all levels.

Incentives for STEM students could include industry training funds and bursaries for undergraduate students; offers to contribute towards paying off student loans on employment; and sponsoring research council PhD CASE studentships; as well as academic prizes for younger students to help promote the study of STEM subjects to students at a younger age, and inspire them towards a future in STEM. Increasing the number of student placements offered – which can range from four weeks to a year - and work experience or shadowing opportunities offered by companies would help to make STEM graduates more likely to pursue careers in this area. Integration of these opportunities into degree programmes would highlight the potential vocational nature of STEM subject degrees, and provide crucial training opportunities for the skills employers require.

With the changing landscape of the pharmaceutical industry, HEIs are finding it more difficult to develop links with such organisations, and it is harder to monitor many relationships with smaller organisations than it was to foster links with a small number of large organisations. Umbrella organisations such as the Association of the British Pharmaceutical Industry and the Bioindustry Association have a key role to play in facilitating discussions and particularly the Society of Biology in our unique position to act as one voice for the biosciences.

We here add that with more visible university-industry research collaborations and career permeability being encouraged by senior scientists acting as 'role models', the next generation of scientists will come to expect this level of engagement between industry, reducing the need for specific interventions in the future.

In a recent response to the Higher Education Commission on postgraduate education[16], the Society of Biology responded:

> Employers should play a key role in promoting the study of STEM subjects and careers at all levels through training funds, bursaries, academic prizes and CASE studentships (*Collaborative Awards in Science and Engineering*, which allow students to receive research training in collaboration with an industrial partner). There should be an increase in the number of student placements offered – and integration of these opportunities into degree programmes – highlighting the potential vocational nature of STEM subject degrees.
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> The availability of these courses encourages students to develop new skills outside of their day-to-day research activities. These could be tailored towards external employment if the training were designed by industry and business to their standards, providing a standardised quality. With 'employability' an increasingly important factor in students' decisions, such verification would presumably be attractive from their perspective too. Gaining skills, whether through this type of scheme or otherwise, should be recognised and rewarded.
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> The Higher Education White Paper also suggests that institutions offering taught and research courses to postgraduates should be aware of trends in the biotechnology and pharmaceutical industries, to meet emerging capability gaps and to equip students to enter the workplace. Closer university-industry collaboration would be helpful to meet this requirement, as this responsibility depends on both sides.
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> Clear and concise career information should be provided to postgraduates (online or within their parent institution) that clearly sets out relevant opportunities. Even more helpful would be regular careers workshops

[14] Department for Business, Innovation and Skills Higher Education White Paper: Students at the heart of the system 2011 http://discuss.bis.gov.uk/hereform/white-paper/
[15] Building for Growth, CBI/EDI (2011) http://www.cbi.org.uk/media/1051530/cbi__edi_education___skills_survey_2011.pdf
[16] http://www.societyofbiology.org/policy/consultations/view/69

> allowing direct interaction with people who occupy positions outside academia. Knowledge Transfer Partnerships should be encouraged, as they not only involve postgraduates directly with research and development in industry but also forge important and potentially long-lasting links between academic and industry professionals. Networking opportunities are also vital for this, such as conferences and workshops involving academia and industry, providing important forums in which links can be made.

Government schemes could support HEI-industry interaction including secondments and joint appointments and we would like to highlight the "Lecturers into Industry" initiative funded by the Department for Employment and Learning (DEL) in Northern Ireland, where lecturers in further and higher education can take a short sabbatical to work in the industrial sector to update their industrial experience.

Are we content to see the current concentration of research funding continue? Do we need greater regional balance in the distribution of research funding?

In responses to the House of Lords Science and Technology Select Committee enquiry into the Higher Education in STEM subjects[17] and to HEFCE on teaching funding[18], the Society of Biology responded:

> As research resources are increasingly focused into narrower 'islands of excellence', even in research active institutions the proportion of well-funded researchers falls. In these cases strenuous effort must be made to maintain integration of these staff into the teaching agenda, and ensuring that degrees in STEM subjects are not lost. The concentration of research into a few elite institutions will lead to geographical limitations on studying STEM which would certainly have widening participation implications, particularly if it occurs in areas of low university density. These changes will limit the choices available to students who for financial or cultural reasons or because of family responsibilities are constrained to live at home which will impact severely and negatively on equality and diversity.

If investment in world-class research and teaching is to keep pace with the best in the world in an age of austerity, how can we pay for it? What should be the balance of private and public funding? Should we retain the principle of selectivity in distributing research funding?

Science contributes enormously to our economic and social prosperity, and the life sciences are a particularly successful story across the United Kingdom. The outputs from higher education, both new knowledge and highly skilled people, are essential for a successful UK economy. It is vital to increase and exploit our knowledge and skills in areas of national strength, and to enable this we need to ensure that HEIs are not discouraged from offering high quality provision in bioscience courses by the high costs[19] of offering practical subjects such as this.

Quality-driven funding is essential but a fine balance is needed when funding research based on excellence. Some level of funding concentration is needed in order to reach a critical mass in particular research areas, but the system must be responsive to new and emerging groups and not disadvantage small pockets of excellence in particular research fields, which should be supported and nurtured.

We caution against over concentration of research and research funding in the 'golden triangle' of the South East, but note that there is a wide geographical spread across the country of excellence in the biosciences.

In a recent response to the Science and Technology Select Committee inquiry on the commercialisation of research[20], the Society of Biology responded:

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[17] http://www.societyofbiology.org/policy/consultations/view/58
[18] http://www.societyofbiology.org/policy/consultations/view/72
[19] http://www.hefce.ac.uk/pubs/year/2012/201204/
[20] http://www.societyofbiology.org/policy/consultations/view/70

The UK is a world-leading research nation with tremendous potential for science-led innovation and growth. Our leadership position may be threatened by the expanding number of researchers globally and by our relatively declining rate of national investment in research. Translational research in the life sciences offers great opportunity for growth but capitalising on this is typically a long-term and complex process for which funding is difficult to secure. Government should incentivize and support investment in early stage development research.

The growth strategy rightly identifies that infrastructure investments needed for the future do not align with amounts available from traditional sources of finances; however the Government needs to set out measures to address these challenges and how this will work with current funding streams to produce economic gain. With the Science budget effectively cut by 15%, there is a need for smart investment by government to match that of our competitors and to encourage private investors to choose UK research and development. We need to make the most of UK's potential for growth not only in the biomedical sector, but also the high tech and agri-sectors that are not addressed in the Strategy for UK Life Sciences.

This response contains specific evidence and case studies of private funding or biosciences research, and the impacts of this funding.

What contribution should higher education make to improving social mobility and building a more socially just nation? What are the barriers to higher education for students from non-traditional backgrounds? Which parts of the higher and further education sectors are likely to make the biggest contribution to promoting social mobility? Does improving participation require a further expansion of student numbers and, if so, how should this be paid for?

It is accepted that lowering the barriers to HE for students from a lower socioeconomic background will bring significant benefits to society and the wider economy.

The Society of Biology has previously expressed concern that several of the original proposals in the Higher Education White Paper could initiate an unwelcome approach to higher education provision by incentivising the development of a low-cost element to the sector, with prioritisation of recruitment of high-performing students to non-science subjects and negative effects on widening participation[21,22,23]. We had concerns that several proposals around student number controls in particular would discourage widening participation in the sciences and were pleased when these were addressed by HEFCE in 2012[24].

The recent abolition of initiatives such as Aimhigher and the Education Maintenance Allowance (EMA) means that the cost of widening participation activities falls to HE institutions themselves, paid from their own student tuition fee income. This may put additional financial pressure on some HEIs, and we suggest that policy-makers monitor any change in the profile of students entering HE as a result. Public sector funding may be needed to address this, and the value of this investment in HEIs that effectively widen participation and bring more diverse students into HE should not be underestimated.

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[21] Society of Biology response to HEFCE consultation on teaching funding and student number controls http://www.societyofbiology.org/policy/consultations/view/54

[22] A joint response from the Society of Biology, Institute of Physics and Royal Society of Chemistry to the consultation on the HE White Paper http://www.societyofbiology.org/policy/consultations/view/52

[23] HEFCE consultation on teaching funding and student number controls 2011/20 http://www.hefce.ac.uk/pubs/year/2011/201120/

[24] http://www.hefce.ac.uk/pubs/year/2012/201204/

We gratefully acknowledge all who have contributed to the previous responses cited in this document, and specific comments on this response from The Physiological Society; the Biochemical Society; and the Heads of University Centres of Biomedical Science (HUCBMS).

The Society of Biology is pleased for this response to be publically available. For any queries, please contact Society of Biology, Charles Darwin House,12 Roger Street, London, WC1N 2JU. Email: education@societyofbiology.org

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