

University of Southampton - Submission to House of Lords Inquiry – Higher education in STEM subjects

1. The University of Southampton welcomes the opportunity to comment on the issue of STEM subjects, particularly in the light of the changes to Higher Education policy currently being implemented. The Committee has a vast agenda as a starting point and we recommend that it focus on a small number of issues where it can have a significant formative impact on government policy. In particular we would urge the Committee to focus on the match between the supply of graduates and postgraduates in STEM subjects to the likely future demand for STEM graduates based on the government's vision of the development of UK economy.
2. In this submission we highlight four issues that affect the supply of STEM graduates, and on which recommendations made by the Committee could have a positive effect.
 - Identifying ways that Government could direct the remaining HEFCE Teaching Funding and other discretionary funding to support the future development of STEM subject teaching in Universities
 - Incentivising employers to engage in education and offering employment experience
 - Fixing the visa system to retain international talent that is educated in UK universities
 - Identifying mechanisms to promote widening participation and increase diversity

Identifying ways that Government could direct the remaining HEFCE Teaching Funding and other discretionary funding to support the future development of STEM subject teaching in universities

3. The mainstay of the supply of STEM graduates to UK industry comes from UK/EU students studying STEM subjects in UK universities. It is therefore crucially important that the changes proposed by the Government in the Higher Education White Paper do not adversely affect the supply of STEM graduates to the UK economy. We are concerned that current proposals may have this effect. Given the high cost of investment in infrastructure, it is highly unlikely that new higher education providers (as envisioned in the Higher Education White Paper) will teach STEM subjects – they are much more likely to focus on less expensive to teach classroom-based subjects. We are also concerned that a failure to protect incentives for existing universities may also force them to rationalise STEM subject provision.
4. The Government has recognised the importance of STEM subjects by removing most of them from the core and margin student number controls proposed in the HE White Paper for 2012-13. This is welcomed as a short-term measure, though it is not clear why some STEM subjects, such as biological sciences, are not part of the list of Strategically Important and Vulnerable Subjects (SIVS) which are removed from the core and margin student number controls. A long-term and sustainable approach to STEM funding needs to be identified.
5. In relation to funding, HEFCE have made it clear that no additional teaching funding resource is available. We are concerned that this will lead to a real terms reduction in funding per student, reducing the incentives for universities to maintain STEM subject provision, and leading over time to a reduction in the volume and range of STEM provision.

6. We recommend that the Committee investigate how the Government will maintain the funding to meet the higher costs for STEM subjects in real terms, and not reduce funding if STEM student numbers increase.
7. As a part of this examination of a long-term and sustainable approach to STEM funding we recommend that the Committee also examine ways in which residual HEFCE discretionary funding could be applied to support the teaching of STEM subjects in universities. For example, the Indicative Allocations of Teaching Capital Investment Fund 2 for 2012/13 future teaching capital funding from 2012/13 and beyond could be applied to support STEM subjects only.
8. Similarly, widening participation (WP) funding support could be weighted to favour recruitment initiatives in STEM and the support costs for WP students in STEM activities.
9. Finally, we believe there to be an anomaly in STEM classification in the context of a knowledge economy increasingly shaped by the World Wide Web. In many Universities, Computing Science is very close in cost and academic content to STEM subjects. We recommend that an assessment is made of Computer Science provision at different Universities and using rigorous measures, in recognition that some Computer Science provision should be rebanded as Band B and treated consistently with STEM subjects. Such an approach has been used in the past by HEFCE in determining funding rates for Media Studies.

Incentivising employers and universities to work together on curriculum issues, and to identify employment experience for STEM graduates

10. The supply of STEM graduates is not just a question of overall numbers, but also a question of quality and “employment readiness”. To ensure that STEM graduates have the skills needed by industry, employers and universities need to work together. Whilst there are many good examples of this, there remain some barriers to closer co-operation..
11. On the development of curriculum for STEM subjects, universities need to be encouraged to work with industry partners, so that the skills industry needs and the ways of delivering them are clearly identified and brought into courses. One barrier to this which the Committee could look into is the role of Academies and Learned Societies, and in particular their accreditation of university courses. Universities want to respond to business needs, but they also want their courses to be accredited by the appropriate academy or learned society. The requirements which these bodies set can be very prescriptive and slow to change, and it becomes difficult to introduce new elements to courses as demanded by business without dropping some elements which the Academies insist are retained. The Committee could usefully explore this issue, and the role that business could play in influencing academies and learned societies about the content of university courses, and the process and “value add” of accreditation. We would encourage where possible a rationalisation of accreditation strongly shaped by various industrial sectors.
12. Several employers of STEM graduates provide opportunities for STEM students or recent graduates to work in STEM-related work environments. This can be highly relevant and beneficial work experience for the student, and a significant factor to bring them into STEM-related employment. It is also beneficial for the employer to identify new talent. The Committee could examine the issue of scaling-up employment opportunities in the context

of the responsibilities placed upon the Local Enterprise Partnerships established by Government and the work of the Wilson Review. Is there more the Government can do to make it easier for companies and universities to set up paid placements for students?

Fixing the visa system to retain international talent that is educated in UK universities

13. The supply of STEM graduates comes not just from the UK and EU countries. UK universities are educating students from all over the world in STEM subjects. To develop and maintain strong STEM-related industries we need to ensure that the best talent from across the world is available to UK and UK-based global companies. Some of those people will come after graduation overseas, but a key supply route is from students who have been educated in UK universities. The visa system we have in place now allows some of the most talented people in the world to develop their skills here, and just when they could be of most benefit to our economy, we send them home. This is particularly true in some STEM subjects.
14. Almost half of post graduate researchers in Engineering in UK universities, for example, come from outside the EU, and the abolition of the post study work provision means that from April, they will have to return to their home countries unless they already have a position lined up paying over £20k per year.
15. The UK visa system is in sharp contrast to our competitors, who are working hard to attract and then retain top talent. Over time, we will lose not only the opportunity to employ them, but they won't come here to study either – and the market for international students is in itself worth billions to the UK economy.
16. The Committee could look at the visa system. Should different rules apply to STEM subjects (or Strategically Important and Vulnerable Subjects, SIVS, which includes most STEM subjects)? What changes are needed to ensure we balance the need to control migration whilst building a strong economy based on a highly-skilled workforce?
17. This is not just a concern for those who are currently studying in the UK, but also for potential applicants who may view the UK as a less welcoming environment for post study employment and look to other countries for their doctoral studies

Identifying mechanisms to promote widening participation and increase diversity in STEM subjects

18. University participation from students from poorer backgrounds has increased significantly in the last 15 years. However, whilst the number of entrants from that group into non-STEM subjects has risen significantly, the number entering STEM subjects has fallen.
19. However, it is not a uniform picture, and there have been some successes. Some STEM subjects (particularly medicine and biosciences) have seen a huge rise in female students over the past generation.
20. There is a danger in the major reforms in Higher Education which the Government has proposed that research-intensive universities are discouraged from widening participation, as often the best students from poorer backgrounds will not have AAB grades at A-Level, due not to ability but to more limited opportunities at home and school. The decision taken by the Government and HEFCE to exempt Strategically Important and Vulnerable Subjects, (which includes most STEM subjects) from student number controls is therefore extremely

positive, although whether such students are put off university altogether from higher fee levels is still to be seen. Universities must also clarify their expectations of A level subjects studied appropriate for different degree courses.

21. The Committee could look at the issues surrounding widening participation and increasing diversity in STEM subjects. We have recommended above that HEFCE and BIS consider weighting widening participation funds towards STEM recruitment activities and to enable appropriate support for STEM students from non-traditional students when they enter Universities.
22. We hope that these observations constitute a positive contribution to the work of the Select Committee, and would be delighted to contribute further if this would be helpful.