A collection of recent policy reports.

Compiled by Dr Jenny Koenig, June 2012.

ABPI, Association of the British Pharmaceutical Industry, Skills needs for biomedical research: creating the pools of talent to win the innovation race, (2008) Available at < http://www.abpi.org.uk/our-work/library/industry/Pages/skills-biomedical-research.aspx> [Accessed 25 June 2012]

In terms of core skills - general capabilities that cut across all scientific disciplines - members were concerned about: basic mathematical capability, practical skills, ability to apply scientific and mathematical knowledge. In terms of core disciplines it is quite clear that the UK has a substantive skills deficit in biomedical sciences, many of which are at the heart of translational medicine or are key to the commercialisation of research, namely: clinical pharmacology / experimental medicine; drug metabolism and ADME; pharmacokinetics, pharmacodynamics and modelling; in vivo sciences and supporting animal technologies; chemical and process engineering; statistics and computational chemistry.

ACME, Mathematical Needs: Mathematics in the workplace and in Higher Education, (2011). [pdf] ISBN No: 978-0-85403-895-4 Available at <http://www.acme-uk.org/media/7624/acme_theme_a_final%20%282%29.pdf> [Accessed 29 May 2012]

In this report, mathematical needs are described from the perspective of higher education and employers. The overwhelming message, from virtually all respondents, is that we need more young people to know more mathematics and to be confident in using it. ... The quantitative demands of almost all university courses are increasing. ... In the workforce there is a steady shift away from manual and low-skill jobs towards those requiring higher levels of management expertise and problem-solving skills, many of which are mathematical in nature.

ACME, Mathematical Needs: The mathematical needs of learners, (2011). [pdf] Available at <http://www.acme-uk.org/media/7627/acme_theme_b_final.pdf> [Accessed 29 May 2012]

This report takes the 'bottom-up' approach and aims to identify what learners need in order to be successful and proficient in mathematics, to learn mathematics well, and to engage in mathematics lessons, and draws important conclusions and recommendations for a national policy.

Koenig, JA. A survey of the mathematics landscape within bioscience undergraduate and postgraduate UK higher education (2011). [pdf] Published by the UK Centre for Bioscience, HEA. Available from

<http://www.bioscience.heacademy.ac.uk/ftp/reports/biomaths_landscape.pdf> [Accessed 25 June 2012]

Students enter bioscience undergraduate degrees with a very wide variety of mathematics1 qualifications from A at A2 Maths to less than C at GCSE. This wide variation causes difficulty in designing appropriate courses. ... Most of the maths taught within bioscience undergraduate degrees is equivalent to the content of GCSE and AS level maths. ... Whilst the mathematical concepts are similar the key difference is that at university level the maths is taught within a biological context. ... Students' attitudes and expectations are major limitations. ... A lack of mathematics content in A level Biology means that students do not expect to encounter maths at undergraduate level. ... A minority of undergraduate degree courses provide options for bioscientists to extend their mathematical knowledge beyond the equivalent of AS level maths.

Nuffield Foundation: Is the UK an outlier? An international comparison of upper secondary mathematics education (2010) Jeremy Hodgen and David Pepper, King's College London; Linda Sturman and Graham Ruddock, National Foundation for Educational Research [pdf] Available at <http://www.nuffieldfoundation.org/sites/default/files/files/Is%20the%20UK%20an%20Outlier_Nuffield%20Foundation_v_FINAL.pdf> [Accessed 25 June 2012]

In a survey of 24 countries, England, Wales and Northern Ireland had the lowest levels of participation in upper secondary mathematics. They were the only countries in which fewer than 20% of upper secondary students study maths. In the majority of countries surveyed (18 out of 24), at least 50% of upper secondary students study maths.

Porkess, R. The Future of Statistics in Our Schools and Colleges (2012). Published by the Royal Statistical Society and the Actuarial Profession. Available at <http://www.rss.org.uk/uploadedfiles/userfiles/files/The%20Future%20of%20Statistics%20in%20our%20Schools%20and%20Colleges.pdf> [Accessed 25 June 2012].

The increasing importance of statistics to our national life should be recognised in our evolving education system. ... Under present conditions, statistics is best placed in the mathematics curriculum. ... The curriculum should be designed so that,wherever possible, students have met statistical techniques in mathematics before they need to use them in other subjects. ... The first statistics course in AS and A level Mathematics, usually called Statistics 1, should contain hypothesis testing to support students using it in other subjects. ... The statistics content within mathematics, up to GCSE, should include some topics that are either not currently covered or are only treated lightly. ... The prospect of new courses for mathematics and statistics post-16 is to be welcomed...

Royal Society, Preparing for the transfer from school and college science and mathematics education to UK STEM higher education (2011). [pdf] Available from <http://royalsociety.org/uploadedFiles/Royal_Society_Content/education/policy/state-of-nation/2011_02_15-SR4-Fullreport.pdf> [Accessed 25 June 2012]

In 2009 39% of students in England who took A level Biology also took A level Maths (the equivalent figure in Scotland is 66%). In 2009 59% of students who took A level Chemistry also took A level Maths (in Scotland the equivalent figure is 89%). In both cases these numbers increased over the period 2005 - 2009.

SCORE, Mathematics within A level Science 2010 Examinations (2012) **[pdf]** Available at <http://www.score-education.org/media/10036/full%20maths.pdf >[Accessed 25 June 2012).

A large number of the mathematical requirements listed in the 2010 biology, chemistry and physics AS and A2 specifications were assessed in a limited way or not at all within the examination papers. The examination questions that did require mathematics were felt to be of insufficient difficulty; too many involved only single step questions, require only simple recall, and were set only in familiar contexts. There were many mathematical requirements identified in biology, chemistry and physics A-levels that go beyond the current GCSE mathematics.

Vorderman, C., Budd, C., Dunne, R., Hart, M., Porkess,R. A world-class mathematics education for all our young people (2011). [pdf] Available from <http://www.conservatives.com/News/News_stories/2011/08/~/media/Files/Downloadable%20Files/Vorderman%20maths%20report.ashx> [Accessed 25 June 2012]

... We are in no doubt that since the introduction of the GCSE, grade inflation has taken place. However, this is not the fault of the students nor the teachers and schools, and the annual media assault on each new cohort, who are merely having to follow a system which is given to them by law, is not helping. The blame must be recognised to lie squarely with the regulatory system. By age 16, there is a 10-year learning gap in mathematics between the highest and lowest achieving students. It is simply not possible for this hugely disparate group of students to be tested using one qualification. The present system for GCSE Mathematics, including the tiering arrangements for Foundation and Higher, is not fit for purpose...

We are advising a radical change in mathematics education from the age of 14 to 18 with two critical recommendations. The first involves fundamental changes to GCSE. The second is that there should be some form of compulsory mathematics education for all students to the age of 18.

International aspects

Committee on Undergraduate Biology Education to Prepare Research Scientists for the 21st Century, National Research Council. BIO2010: Transforming Undergraduate Education for Future Research Biologists (2003). [pdf] Available at: <http://www.nap.edu/openbook.php?record_id=10497&page=1>. [Accessed 29 May 2012]

Description: This report from the US National Academies of Science discusses incorporating more math, physics, chemistry, engineering and computer science into classes and laboratory work and emphasizing independent research will help undergraduate education reflect real-world science. Schools, professional societies and funding agencies should develop new teaching materials and facilitate faculty collaboration.

Institute for Innovation in Science & Mathematics Education, 2012. Forum on Preparedness for First Year Mathematics. University of Sydney, Australia, 15 Feb 2012 [pdf] Available at <http://sydney.edu.au/iisme/downloads/IISME_15Feb_%20booklet.pdf> [accessed 29 May 2012].

Issues and strategies for dealing with diverse cohorts. A review of experiences in a wide range of Australian Universities.