

Response to Education Committee inquiry on purpose and quality of education in England

Summary

1. Education gives young people the opportunity to live a rewarding life, equipping them to be active participants in society.
2. There is currently a shortage of STEM skilled school-leavers and graduates, holding back potential growth in the economy and a wide appreciation of science.
3. Improved science and mathematics education has an important role to play in fulfilling both the intellectual needs of individuals and the economic needs of the nation.
4. A broad and balanced baccalaureate style curriculum to 18 will best equip young people with the range of skills they will need.
5. Professional, well-supported, motivated and trusted teachers are needed to inspire young people to participate in STEM subjects.

Full Response

6. The Royal Society welcomes the inquiry from the education select committee exploring the purpose and quality of education in England. Consensus on the aims of our education system will help provide the stability needed to support excellent teaching and enable innovation. A clear vision will support coherent policy development and implementation.
7. It is the Society's view that education should provide young people with knowledge and understanding of how the world works and opportunities to live rewarding and worthwhile lives. In science and mathematics, there is a strong alignment between the intellectual and cultural needs of the individual and the economic needs of the nation.
8. The primary and secondary school phases are crucial periods in young people's development, associated with changes in ways of thinking and how they deal with abstract concepts. The science and mathematics education they receive at these stages will impact on how they perceive the world for the rest of their lives.
9. Whether they are destined to become professional scientists or scientifically-literate citizens, education in science and mathematics should develop the natural intellectual curiosity and creativity of young people.
10. Science and mathematics education should also aim to enable people to be astute citizens, able to make informed judgements about contemporary scientific issues or decisions, for instance on medical treatments, based on an informed understanding of risks and ethics.
11. As well as offering an insight into the wonders of nature, a high standard of education in these subjects should also seek to maximise young people's chances of success, both professionally and personally, in an increasingly competitive society.

12. It is important to open children's minds to what the world offers and fire their imagination, including encouraging them to develop positive attitudes toward science, which are important to encourage them to consider a STEM-related career.¹ Creative and experimental approaches will be particularly important for keeping students interested and engaged in science, and for equipping them well for the future, whether or not they pursue a career in science.
13. There are currently shortages of graduates and school leavers with skills in some areas of STEM. The CBI/Pearson 2015 education and skills survey found that over half of businesses (55%) believe there will need to be more STEM skilled people to fill their high-skilled jobs.² Engineering UK have forecasted there will be 257,000 new engineering vacancies that will need to be filled by 2022 in order to meet the demands of employers.³ Raising levels of post-16 participation in science and mathematics will be necessary to ensure there are sufficient numbers of STEM graduates and other skilled technical professionals to meet employers' needs.
14. The low number of students studying subjects such as physics and engineering is a particular challenge. In these subjects there needs to be a greater focus on balancing gender participation, with girls only accounting for 21% of physics, 39% of mathematics and 29% of further mathematics A-level entries.⁴ This is a huge waste of talent and reduces the career paths open to many women. Addressing these imbalances would present a significant opportunity for the economy, with Engineering UK finding that equalising labour force participation between men and women could increase the UK's GDP per capita growth by 0.5% per year.⁵
15. In 2014 the Royal Society published our report '[Vision for science and mathematics education](#)', which establishes aspirations for the development of 5-18 education over the course of the next twenty years.
16. The Royal Society supports the growing consensus among both employers and educators that to meet the aims we outline above, the current curriculum should evolve into baccalaureate style frameworks akin to those found in many education systems around the world.⁶ Any baccalaureate framework should be broad and balanced, with subjects in the arts, humanities and social sciences alongside inspiring STEM curricula, and encompass vocational learning.
17. A career in science isn't for everyone, but all young people will benefit from learning science and mathematics in some form until they leave school. There should be a focus on developing skills in undertaking experimental work and problem-solving.
18. Achieving the aims for the education system will not be possible without professional, well-supported, motivated and trusted teachers. In the Wellcome Trust monitor survey, six in ten young people stated that it was having a good science teacher that inspired them to study

¹ King's College London 2013 ASPIRES. *Young people's science and career aspirations, age 10–14*. London: KCL.

² CBI/Pearson 2015, [Inspiring Growth, CBI/Pearson Education and skills survey 2015](#). London: Pearson

³ Engineering UK 2015 [Engineering UK 2015. The state of Engineering](#). London: Engineering UK

⁴ JCQ data <http://www.jcq.org.uk/examination-results/a-levels>, accessed 12 January 2016

⁵ Engineering UK 2015 [Engineering UK 2015. The state of Engineering](#). London: Engineering UK

⁶ Anderson, R 2014 [Making education work. A report from an independent advisory group chaired by Professor Roy Anderson](#). London: Pearson.

science at university.⁷ Improving teacher wellbeing will help to ensuring skilled teachers are retained, which will contribute to addressing shortages in these subjects.

19. This is an exciting and important time in education as countries world-wide recognise the importance of high-level skills and their impact on economic growth, well-being and prosperity. Our Vision takes the long view but recognises that there is both urgency and great opportunity for Government to act now.

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⁷ Wellcome Trust <http://www.wellcome.ac.uk/News/Media-office/Press-releases/2013/WTP052643.htm>, accessed 19 January 2016