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## **Getting More Science, Technology, Engineering and Maths in our Schools**

Thank you very much for inviting me to join you this evening.

It is a great honour and responsibility to be one of the 2010 intake on MPs; though all of us I am sure would rather we had started our political careers at a time of a more favourable economic and fiscal inheritance.

I am not a member of the government and I do not speak for the government. But as a backbencher my speciality is education, and that is the select committee I sit on.

Since joining that committee I have found it remarkable in conversations with educationalists, unions, academics and others, that almost all the time we talk about British state education with reference only to itself, and without reference to two key external benchmarks.

1. The small external benchmark of how things are done in UK *private* education – the 7% of pupils who go on to get 20, 30, 40% of the most important jobs
2. The massive external benchmark of how things are done in the entire rest of the world

### **International Challenge**

It is one of the most refreshing aspects of the new government that on any area all ministerial analyses begin with the question: how do the *best* education systems in the world do this?

This is essential because of the changing and rapidly expanding open market we as a nation are competing in.

It is right to have a targeted approach-a strategy for Great Britain plc. Our record on picking winners is not unblemished, but we do need a strategy. We will never again make T-shirts

cheaper than China, but there are sectors in which we can excel. The trick is to find sectors in which there is the coincidence of a high-value, attractive growth market and something that Britain is especially well-placed to take advantage of, such as advanced manufacturing, pharmaceuticals, the creative industries, financial services, higher education and tourism.

These industries require not only basic skills development but a raising of the expected level of skill and a celebration of excellence – yes if you like, an elitism. Levelling opportunities is vital – and the gap today is huge – but it is not enough. The average standard must rise too.

Among other things, this requires, in my view, a much better marrying up between employers, Higher Education institutions and learned societies; and what happens in our schools and what young people are tested on. And this need for marrying up continues into the tertiary level, so we excel at exploiting discoveries as well as making them.

### **Issues & Positives re STEM Subjects**

The STEM subjects – science, technology, engineering and maths – are at the centre of a number of the challenges we face.

- In the last 10 years we have gone from 4th to 16th place in science, from 8th to 28th in maths in international rankings.
- The number of science and engineering degrees awarded in China more than trebled between 1998 and 2006. By comparison, we in the west (UK, US, EU) stagnated.
- At postgraduate level, Asia now awards 1 in 4 of all engineering phds - almost as many as the EU and the USA combined.

There is also some good news.

- Uptake of science, technology, engineering and mathematics subjects at GCSE and A level has been rising steadily according to BIS.
- At undergraduate degree level, in 2009/10 the number of UK-domiciled STEM entrants was up by 5% compared to 2008/09.
- In 2009/10 UK domiciled STEM PhD entrants were up 9% compared to 2008/09.

## **Government action**

What else can the government do? What should it do? I would like to hear from you on that. But in the meantime let me outline some of the things it is doing to support and improve performance in these crucial areas.

The government supports a number of programmes, such as STEMNET's STEM Ambassadors programme with its network of commercial and academic volunteers who raise awareness amongst children of the range of careers that science and technical qualifications offer and provide stimulating scientific activities to increase their interest in STEM subjects.

Others include the Further Maths Support programme, the Stimulating Physics Network and National Science & Engineering Week.

These programmes can be hugely beneficial in stimulating interest in the subjects and careers they can lead to.

Even more important is the underlying subject content, teaching and certification.

## **Review of the National Curriculum**

A review of the National Curriculum was launched in January of this year focusing on international comparisons and competitiveness.

Michael Gove has said that he specifically wants to see STEM play a bigger part in the new curriculum. While saying he does not want to prejudice the outcome of the review he would like to see a reevaluation of how we teach maths and at what age.

Specifically - looking at lessons from East Asia, where there is much greater focus on fundamental number concepts, fractions and the building blocks of algebra in primary school. They have minimum standards that they aim to get practically all children to reach so they have a firm foundation for secondary.

## **Post 16**

We now have the extension of the participation age to 18, and

Gove has also made it clear that he would like to see steps taken to stop students dropping maths at 16, unlike almost all other countries. The 'maths gap' that most pupils now experience after the age of 16 means that even those who did well at GCSE have forgotten much of the maths they learnt by the time they start their degree or a job.

DfE has stated the ambition that within a decade the 'vast majority' of students will continue to study maths up until 18.

### **Science Awards**

Both DfE and BIS have said that they want to encourage student to take the Triple instead of the Double Science award at GCSE. Double science is taught to reasonable strength and depth and the grades across all three subject are averaged into two GCSE. Triple award is taking a separate and in depth GCSE in each subject.

Students who take all three sciences as separate GCSE's are much more likely to take a science at A level.

### **Teacher Supply**

Perhaps most important of all is the supply of good quality teachers.

DfE have allocated £135 million over the spending review period to support sustainable improvement in science and maths education in schools. A major part of this will focus on improving the supply of teachers with specialist subject knowledge in chemistry, physics and maths, through "conversion" courses that enable graduates of related disciplines to acquire the specialist subject knowledge necessary to train and serve as teachers in these subjects.

DfE will offer high-achieving graduates, especially those in shortage subjects like science and maths, financial incentives to train as teachers.

### **Wider Reform Programme**

These reforms in STEM education form part of a hugely ambitious programme led by Michael Gove to both narrow the gap in educational attainment between rich and poor and to raise the average standard so we are better equipped to compete in the changing global market place.

Flagship policies include:

- The £2.5 bn pupil premium, ensuring that extra resources follow pupils from the poorest backgrounds, those with special educational needs, and Services families.
- Academies and Free Schools, devolving power and bringing new freedoms for strong headteachers, and parents.

- New measures on discipline to change the conversation from “I know my rights” to “I know where I stand and I know who’s in charge”
- Restoring credibility to the exam tables, and refocusing on core academic subjects through the English Baccalaureate.

More than anything, the attitude of Michael Gove and his team is, I believe, neatly summed up in the title of the White Paper: “The Importance of Teaching”.

That is why the government is pushing forward new ways to bring more top talent into the profession; and introducing Teaching Schools - modelled on teaching hospitals - to spread outstanding practice across the education system.

It is a bold programme and one I am proud to support.