

Speech

Enterprise and entrepreneurship

From: [Department for Education and Nick Gibb MP](#)
Delivered on: 19 January 2016 (Original script, may differ from delivered version)
Location: Education World Forum, Methodist Central Hall, Westminster, London
First published: 19 January 2016
Part of: [School and college qualifications and curriculum](#)

Schools Minister explains that academic knowledge, and a sensible use of technology, will ensure pupils flourish in the world of work.



Can I start by saying thank you for inviting me to be part of this panel. Since coming to office in 2010, entrepreneurship and enterprise have been cornerstones of this government's long term plan for the economy.

We have saved businesses £10 billion in red tape, and have extended the doubling of small business rate relief until April 2017. Over 34,000 start-up loans worth £187 million have been provided to people starting their own business. Compared with 2010, there are now 900,000 more small businesses, and employment in small businesses has increased by 1.6 million. Today, business in Britain is flourishing and growing.

Such measures have created a fertile garden for new enterprises to grow, but the extent of such growth is ultimately determined by the number of knowledgeable, skilled and ambitious young people leaving our schools. Highly qualified school leavers are an irreplaceable component of a strong economy.

But what actually constitutes being 'highly qualified?' Since 2010, the government has focused on increasing the challenge, and the academic ambition, of our national examinations and qualifications. We have overturned a culture of low expectations that discouraged generations of capable pupils, predominantly from disadvantaged backgrounds, from studying the core academic subjects that would open doors to their future.

It is our belief that all schools should introduce their pupils, up to the age of 16, with an understanding of the world around them. To be given the best chance of success in later life, all pupils should know the rules of mathematics and the natural sciences, great historical events, geographical landmarks, a language other than their own, and enduring works of art and literature. In short, they should be given the gift of knowledge.

Such a message is, perhaps, at odds with the message often delivered at international education forums such as this. There is a common view amongst some educationists that the internet, and the advent of google in particular, makes the teaching of knowledge redundant.

One educationist who is well known on the international stage recently wrote a book promoting 'new pedagogies'. Chief amongst them was 'learning to learn.' He wrote of today's education, 'the goal is not to master content knowledge; it is to master the learning process.'

Indeed, the Director of Education at a leading global think tank wrote in a 2010 report: 'Educational success is no longer about reproducing content knowledge... Education today is much more about ways of thinking which involve creative and critical approaches to problem-solving and decision-making.'

Though such a view may seem forward-thinking and persuasive,

I believe it to be profoundly misguided. Those who are most adept at problem solving and decision making, and most easily master 'the learning process', are those with a well of background knowledge to draw upon.

An educationist who has shaped my thinking on this more than any other is Daniel Willingham, professor of cognitive science at the University of Virginia. With reference to robust scientific evidence, he explains how the 'thinking skills' most prized by schools and employers are dependent upon background knowledge.

In mathematics, pupils can only solve complex problems once they have achieved fluency in the use of algorithms, and memorised their number bonds and multiplication tables. Communication in a foreign language is impossible without having mastered its grammar, and learnt an extensive vocabulary. In studying a historical period, a knowledge of the events is vital before attempting to analyse evidence or explain causes.

One memorable example Daniel Willingham cites is an experiment where good readers with a low knowledge of baseball, and poor readers with a high knowledge of baseball, were both asked to read a text about baseball, and tested for understanding. In this instance, the ability to read was not enough: poor readers with high knowledge performed much better than good readers with low knowledge.

Does this mean that schools should aim to teach all information that pupils are likely to encounter in the working world? No, such an aim is impossible. Schools can equip pupils, however, with a framework of knowledge which enables them to learn more in the future. This framework is what an academic curriculum provides.

It is the consensus of most cognitive psychologists that an individual can only hold 5 to 7 new pieces of information in their working memory at any one time. All other information must reside in long term memory for new knowledge to be understood - or else 'cognitive overload' is experienced. This is why, for

someone with no background knowledge, browsing the internet is such a barren and fruitless means of learning.

Say, for example, a young tech entrepreneur wants to find out about the advantages of cloud computing. The first paragraph on the Wikipedia page suggests that sharing resources achieves 'economies of scale', an unfamiliar term. So the young entrepreneur looks it up, but the definition for 'economies of scale' uses another unfamiliar term: 'variable cost'. The definition of which in turn contains the terms 'fixed' and 'marginal costs', and so on and so forth in an infinite series of google searches which take the young entrepreneur further and further away from the original term 'cloud computing'.

The internet is a wonderful tool for those who already possess considerable knowledge. As a means of initial instruction it is not so useful.

In 2013, we reformed the national curriculum in England to put in much of the subject knowledge that previous governments - under the influence of the 21st century skills movement - had taken out. Our mathematics and science curriculum content was based in part on the curriculums of far eastern education systems such as Shanghai and Singapore, where schools still place great value on the mastery of academic subject knowledge. It is no coincidence, to my mind, that their pupils top international league tables such as PISA and TIMSS.

Of course, many argue that whilst pupils in the Far East do well in tests, their formal style of education limits creativity and independent-mindedness. One look at the skyline of Shanghai, or the commercial district of Singapore, should put such arguments to rest. According to the World Intellectual Property Organisations, China, Japan and Korea provided 3 of the 4 top patent offices for the number of patent applications in 2014. Remarkably, China contributed 89% of the worldwide growth in patents filed in 2014, compared with 2013. So much for a formal, academic education limiting a country's potential to innovate.

And it is this formal, academic education which best equips pupils for work in the modern world. The 2012 PISA survey of financial

literacy in 13 OECD countries contained a very interesting finding. Pupils completed financial literacy tasks, on areas such as variable interest rates and inflation. There was a strong correlation between pupils' performance in numeracy and literacy tests, and pupils' financial literacy. However, there was no clear relationship between states which offer lessons in personal finance, and pupils' financial literacy. For pupils from Shanghai, which topped the financial literacy table by quite some margin, mastering mathematics appeared to be the best means of becoming financially literate.

In opposition to the idea that a formal education is the best means of fostering enterprising and entrepreneurial citizens, the individual cases of well-known school or university drop outs are often cited. 'Bill Gates and Mark Zuckerberg both dropped out of Harvard,' it is claimed. 'Richard Branson never completed school,' they add. Less often is it mentioned that prior to university, each of them received an academic education at an elite private school.

Indeed, 2 Swedish academics recently took on the myth of the untutored business genius in their Centre for Policy Studies paper 'SuperEntrepreneurs ...and how your country can get them'. They analysed the educational background of around 1000 self-made men and women who have earned at least \$1 billion. Only 16% of such 'superentrepreneurs' from the USA lacked a college degree, compared to 54% of salaried workers.

In addition, superentrepreneurs in the USA were 5 times more likely to hold a PhD degree as the general population. One third of American superentrepreneurs have degrees from one of the top 14 American universities, compared to 1% of the general population. The exceptional stories of Bill Gates, Steve Jobs, Richard Branson and the Rausing brothers are well known precisely for that reason: they are exceptions. When it comes to producing a new generation of entrepreneurs, an investment in an academic curriculum will always pay dividends.

This brings me to my second point. Any discussion of enterprise and entrepreneurship must consider the great advances in technology that are transforming the world. Schools must

respond positively to these advances, but they should do so in a thoughtful and judicious fashion.

As part of our national curriculum reforms, our government has introduced a new computing curriculum into schools, which moves away from everyday computer use - ICT, and focuses instead on understanding how computers work. The curriculum has been developed by teachers and sector experts, led by the British Computer Society and the Royal Academy of Engineering, with input from industry leaders like Microsoft, Google and leaders in the computer games industry.

From primary school until the age of 14, pupils will be taught programming languages, computational thinking, and Boolean logic - making this country, I believe, the first in the G20 to teach such a curriculum.

Secondly, instead of proclaiming that educational technology will 'disrupt' traditional schooling, we should focus instead on how technology can supplement what teachers already do well. For example, educational technology has the potential to bring enormous efficiencies to the important but time-consuming process of marking pupils' work.

In this country, the Centre for Evaluation and Monitoring at Durham University and the company GL Assessment offer well-honed computerised assessments. These allow a teacher, with minimal effort in terms of marking, to assess a pupils' understanding with great accuracy, and diagnose areas for further work.

One of the 3 British teachers nominated for the Varkey Foundation's Global Teacher Prize is Colin Hegarty, who left his accountancy job in the city to teach mathematics at a London secondary school. I met him last week, and he demonstrated the website he has been developing, which combines instructional videos in mathematics with sophisticated computerised assessment, based on a bank of 400,000 carefully designed questions. Such programmes have the potential to improve radically the way in which teachers assess the strengths and weaknesses of their pupils.

Similarly, computer apps provide excellent tools for quizzing pupils about key facts and information. As cognitive scientists such as Robert Bjork have demonstrated, frequent quizzing reinforces the place of knowledge in our long-term memory. No longer do pupils revising for examinations have to use flashcards: they can use computer apps such as Quizlet or Memrise on their smartphone instead.

One highly successful UK educational technology export is Show My Homework, a cloud-based homework software, which allows teachers to post homework assignments online so that children (and perhaps more importantly parents!) can check what work they should be doing. It is now used in over 1000 schools, and has 2.5 million users worldwide.

In the cases of computerised assessment, quizzing apps, and useful teacher tools, educational technology is used to supplement what teachers already do. This does not mean, however, that computers can replace the work of teachers. Teaching is an unavoidably human activity. A computer may supplement the work of a teacher, but it will never supplant it.

One well-known educationist shot to fame a few years ago with a popular TED talk, extolling the ability of pupils to learn from the internet independently. He asked in his talk: 'if there's stuff on Google, why would you need to stuff it into your head?', and added 'I decided that groups of children can navigate the internet to achieve educational objectives on their own.'

There is considerable empirical evidence from classroom studies, however, that web-based learning does not improve pupil outcomes. Professor John Hattie from the University of Melbourne published 'Visible Learning' in 2009. This seminal book brings together 800 meta-analyses of academic research in order to judge the impact of 138 different teaching methods and school interventions.

Amongst all 138 interventions, web-based learning was in the bottom quintile of effect sizes, ranking well below Professor Hattie's threshold for an effective intervention. By contrast, teacher-led interventions, such as Mastery Learning or Direct

Instruction scored very highly. Teachers will always remain the pre-eminent means of ensuring that a pupil succeeds: a teacher not only brings knowledge to the classroom: she brings motivation, personality, and ongoing support.

Last year's OECD report into school computer use appeared to confirm that, whilst an extremely important aspect of modern schooling, computers are not the magic bullet of education reform. The 5 countries where pupils spend the least time using the internet in school - Poland, Japan, Hong Kong, Shanghai and South Korea - are all amongst the world's highest achieving jurisdictions.

No education minister should fill schools with the latest technologies and expect that they, on their own, will spark an education revolution. Such practices will not provide a country with a new generation of entrepreneurs. In fact, by allowing educational technology to crowd out the timeless benefits of a knowledge-based curriculum and high-quality teacher instruction, it may well mitigate against such an aim.

The optimal mixture of knowledge, attitudes and character traits which will produce an enterprising and entrepreneurial population will always be a subject of debate. As school ministers, however, we underestimate the importance of knowledge at our peril.

We must draw the entrepreneurs and business leaders of tomorrow from all quarters of society, irrespective of birth or background. And that is why all children should be taught the core academic curriculum which will enable them to carry on learning for the rest of their lives.

Share this page



Facebook



Twitter

Published:

19 January 2016

From:

Department for Education

Nick Gibb MP

Part of:

School and college qualifications and curriculum

[Is there anything wrong with this page?](#)

Services and information

[Benefits](#)

[Births, deaths, marriages and care](#)

[Business and self-employed](#)

[Childcare and parenting](#)

[Citizenship and living in the UK](#)

[Crime, justice and the law](#)

[Disabled people](#)

[Driving and transport](#)

[Education and learning](#)

[Employing people](#)

[Environment and countryside](#)

[Housing and local services](#)

[Money and tax](#)

[Passports, travel and living abroad](#)

[Visas and immigration](#)

[Working, jobs and pensions](#)

Departments and policy

[How government works](#)

[Departments](#)

[Worldwide](#)

[Policies](#)

[Publications](#)

[Announcements](#)

[Help](#) [Cookies](#) [Contact](#) [Terms and conditions](#)

[Rhestr o Wasanaethau Cymraeg](#) Built by the [Government Digital Service](#)

OGL All content is available under the [Open Government Licence v3.0](#), except



where otherwise stated

© Crown copyright