Speech: Nick Gibb: empowering teachers to deliver greater equity

It is an honour to open the International Summit on the Teaching Profession. This conference provides an excellent opportunity for politicians, unions and teacher representatives from the nations of the UK and countries from around the world to discuss how we can further improve education.

Empowering teachers to provide a great education for their pupils is at the heart of what I do as School Standards Minister. Increasingly, we know what can be done to improve educational outcomes for all pupils. Improving outcomes is not simple, but the principle underlying important reforms is: knowledge is power.

Knowledge of evidence about effective teaching practice; knowledge of cognitive science research into memory; and a knowledge-rich curriculum that empowers all teachers to deliver improved educational outcomes for all pupils.

Increasingly, education research is exposing outdated theories that still abound in many circles. In their 2013 paper Urban legends in education, Kirschner and Van Merriënboer expose 3 prevalent education myths linked to the fallacy that pupils should direct their education and not teachers.

These 3 myths conflict with knowledge of cognitive science and best teaching practice. Providing teachers with this myth-busting research improves their knowledge and empowers them to deliver high-quality lessons.

The first myth is that pupils today are 'digital natives' and, consequently, their education should involve immersion in digital technology. However, Kirschner and Van Merriënboer's paper concludes that a pupil's education might suffer if teaching tries to play to the perceived technical aptitude of millennial pupils.

The second myth is that pupils have unique learning styles and that education must be tailored to the learning style of each pupil. In my experience, this is a particularly persistent myth in schools in England.

The Education Endowment Foundation – an independent charity set up by the government in 2011 to find out what works in education – concluded the following about learning styles:

> Studies where teaching activities are targeted towards particular pupils based on an identified learning 'style' have not convincingly shown any major benefit, particularly for low attaining pupils. Impacts recorded are generally low or negative.

Kirschner and Van Merriënboer conclude similarly that:

> Though very appealing, there is no solid evidence that learning styles—as such—actually exist and that there is any benefit to adapting and designing education and instruction to these so-called styles.

In accordance with the EEF, they also remark that teaching to the perceived learning styles of pupils may have a negative effect on the outcomes of pupils.

The third myth is all that one needs to know and learn is that teaching knowledge is redundant because children can now find out whatever they want with the click of a mouse. The corollary of this belief is that teaching should instead focus on generic skills and competencies.

This myth still abounds at international education conferences — as many people here will know. Now that pupils have a seemingly unlimited amount of knowledge stored on their smart phone devices — so goes the argument — all that is required is to ensure pupils learn how to learn.

This myth is intuitively appealing given the technological boom we are living through now, but this argument is not new. In 1914 it was argued that:

> Educated people are not those who know everything, but rather those who know where to find, at a moment's notice, the information they desire.

It was wrong in 1914 and it is wrong now. As [ED Hirsch wrote in 2000](#):

> There is a consensus in cognitive psychology that it takes knowledge to gain knowledge.

Knowledge begets knowledge. It does not suffice to provide pupils with tools to find knowledge. Decades of research tells us that in order to make sense of and retain new information, pupils must have pre-existing knowledge with which to link this new information.

Ensuring teachers have access to high-quality research empowers them to deliver lessons that avoid falling for these alluring, but fallacious myths, improving educational outcomes for all pupils.

Many of the myths that pervade education use the context of the 21st century as justification. Teachers are told that this new millennium requires an education that gives pupils freedom to problem solve, so that they develop the skills they need to be successful in modern economies.

Teachers, it is argued, should step back and facilitate problem-solving activities and allow pupils to hone their critical thinking. But the evidence against this position is now overwhelming, and we must ensure that teachers

are exposed to this evidence.

For example, [research conducted in Holland](#) by Kroesbergen, Van Luit and Maas compared outcomes for low-achieving pupils split into 2 groups. One received teacher-led instruction, the other was taught using a child-centred method. The experiment considered the automaticity of pupils and their ability to problem solve. Pupils provided with explicit teacher instruction significantly outperformed their peers in that experiment.

And similar results have been replicated the world over. Klahr and Nigam from the University of Pittsburgh, [investigating the relative effects of direct instruction and discovery learning](#) found:

> Not only that many more children learned from direct instruction than from discovery learning, but also that when asked to make broader, richer scientific judgments, the many children who learned about experimental design from direct instruction performed as well as those few children who discovered the method on their own. These results challenge predictions derived from the presumed superiority of discovery approaches in teaching young children basic procedures for early scientific investigations.

And the [2015 PISA results](#) – which examine the ability of pupils to solve scientific problems – also support this finding. In all but 3 countries, pupils reporting higher levels of teacher-directed instruction achieved significantly better results. In the majority of countries, pupils reporting higher levels of enquiry-based instruction achieved significantly worse results.

The research is clear on this point: it is not by allowing pupils to behave like scientists in lessons that they are best prepared to become the scientists of the future. It is by being taught scientific knowledge that pupils are best prepared to become the scientists of the future. Standing on the shoulders of giants first requires you to climb up to their shoulders.

Providing teachers with access to this pedagogical research is critical to improving outcomes. Not only does the research increasingly show what works best, we are beginning to understand why this works best. And this understanding is critical to improving not just outcomes, but equity too.

Thanks to our greater understanding of cognitive science, we know that people have very limited working memories, allowing them to hold 3 to 7 pieces of information at a time. However, our long-term memory is limitless – for all practical purposes. Hence if teachers want pupils to be able to solve problems or think critically about a topic, it is important that pupils already have domain-specific knowledge about this topic stored in their long-term memory.

[Sweller's seminal work on cognitive load](#) demonstrated the importance of domain-specific knowledge for pupils to successfully solve problems. This area of research supports the view that designing a knowledge-rich curriculum

that ensures pupils are taught a broad range of knowledge, best prepares pupils to solve problems by applying their knowledge.

[Bruner and Ross's earlier work on problem solving](#) had already demonstrated the importance of guiding pupils away from mistakes when helping young children to solve problems – hence reducing the cognitive complexity of solving a novel problem. Amongst the other important features of instructing children to solve a problem, Bruner and Ross also highlighted the importance of highlighting critical features of a problem and modelling solutions to a task – both key features of high-quality teaching.

And the knowledge underpinning teacher-led instruction has now been disseminated into general [principles of instruction](#) that teachers can easily refer to when designing lessons.

Knowledge is power for teachers. But it is also power for pupils.

Ensuring all pupils have access to the knowledge they need is a question of improving educational outcomes and equity. In England, the government has placed an emphasis on ensuring all pupils are taught a knowledge-rich curriculum.

The Sutton Trust – a respected charity that champions social mobility – [has recently produced evidence](#)that in England high-ability disadvantaged pupils are less likely than their more advantaged peers to attend a school that teaches a stretching academic curriculum. Equally, the Sutton Trust has produced [evidence suggesting that schools pursuing a curriculum](#) that prioritises an academic core of subjects is beneficial for pupils – particularly those from disadvantaged backgrounds.

[Blanden and Macmillan](#) – examining inequality and social mobility – suggested that focusing on standards alone was not enough to encourage social mobility. Instead, focus should also be given to spreading access to the most high-value qualifications.

In England, the government has incentivised secondary schools to teach pupils English, maths, at least 2 sciences, either history or geography and a foreign language, so that more pupils – irrespective of background – take these high-value qualifications at age 16. Not only do these qualifications provide pupils with a broad academic education, but they also facilitate access to the best universities in the country.

In order to improve standards and improve equity, it is imperative that all pupils – irrespective of background – are taught a broad knowledge-rich, academic and high-status curriculum covering the core academic subjects mentioned above alongside a rich arts education that gives pupils a deeper appreciation of their culture.

Knowledge is power. We must empower teachers to pursue well-evidenced teaching methods. We need to ensure teachers have up-to-date knowledge of cognitive science and the implications for what and how to teach. And we need to design knowledge-rich curricula so that pupils are given the greatest

opportunity for success.

Thank you.

[News story: Clinical decision support in emergency care: apply for funding](#)

Organisations can apply for a share of £55,000 to develop data analytics projects that help improve patient care in emergency departments.

Up to £55,000 is available to develop innovative data analytics projects that will enable clinicians to make informed, safe and timely decisions.

Improved provision of critical data should enable early decision-making on treatment and disposition. It should enhance patient flow, satisfaction and outcomes. This competition will support this effort.

The clinical focus of this competition is the management of chronic obstructive pulmonary disease (COPD) for patients in emergency care departments.

Using data to support decision-making

The competition is looking for proposals that:

- support evidence-based clinical decision-making and care for patients with COPD
- use available data to predict length of stay
- use available data to predict mortality

It has 2 phases. Up to £10,000 is available for phase 1 and up to £45,000 for phase 2.

- phase 1: technical feasibility. Projects should last up to 12 weeks and range in size up to a total cost of £2,000
- phase 2: development, evaluation and testing. Projects should last up to 9 months and range in size up to a total cost of £15,000

Competition information

- this competition opens on Monday 10 April 2017
- there will be a briefing event for applicants on Monday 8 May 2017
- you must register before midday on Wednesday 31 May 2017
- you must apply before midday on Wednesday 7 June 2017

This is a [Small Business Research Initiative](#) (SBRI) competition. [NHS Scotland](#) and the [Scottish Government](#) are providing the funding.

[Press release: Making sense of big data to improve the nation's defence, security and prosperity](#)

The Defence Science and Technology Laboratory (Dstl) has today announced the launch of the Data Science Challenge. The challenge is designed to bring the brightest minds in data science together to solve real-world problems. The first challenges – detecting and classifying vehicles from aerial imagery and the classification of documents by themes– are now open to entrants, with each challenge boasting a total prize fund of £40,000.

The Data Science Challenge is part of a wider programme set out in the Defence Innovation Initiative that aims to build an open innovation 'ecosystem', harnessing the talents of individuals, academia and industry to develop new approaches to complex problems. The Data Science Challenge is piloting new ways of working including the use of crowdsourcing to engage the data science community to develop cutting edge solutions to Defence and Security problems.

The Data Science Challenge includes two distinct problems that will test the participants' ability to mine large unstructured datasets to extract useful information:

- Safe passage: detecting and classifying vehicles in aerial imagery

Being able to automatically detect and categorise vehicles in aerial imagery will dramatically improve how quickly we can assess and identify them. This challenge asks participants to detect and classify vehicles such as buses, cars and motorbikes, from a set of aerial images.

- Growing instability: classifying crisis reports

Analysing data in documents such as media reports can provide a better understanding of a potential crisis situation, growing instability in a particular region or specific theme such as terrorism. Using news material, this challenge asks participants to predict topic tags for classifying unseen reports so that they can be used to improve awareness and understanding.

Minister for Defence Procurement Harriett Baldwin MP said:

> Our Innovation Initiative is about harnessing diverse and talented

individuals from business, academia, and beyond to keep the UK ahead of our adversaries.

In this latest challenge, supported by our £800 million Innovation Fund, we are calling on experts to develop the latest technology to crunch big data and identify the solutions that will keep us safe.

James Srinivasan, a Principal Data Scientist at Dstl added:

Around the world, governments are using the power of data to meet many of the huge challenges that they are facing. By analysing complex, evolving information, data science can provide invaluable insight that informs how we can best respond to event.

There is real talent out there and we want to encourage the curious to experiment and learn. We are determined to push the boundaries of what can be done, and to keep striving to always be better. This is why we are launching the Data Science Challenge today.

We are keen to encourage all data scientists, not just those in the defence and security sectors, who want to rise to the challenges that we have thrown-down today, to get involved.

The Data Science Challenge is sponsored by Dstl, the Government Office for Science, Secret Intelligence Service and MI5.

Participants can register from today at www.datasciencechallenge.org and have between 3 April and 11.59pm on 17 May 2017 to develop and submit their solutions. Winners from each of the challenges will be announced at the end of May 2017.

The top three entrants will receive cash prizes. The first prize is £20,000, the second placed entrant will receive £12,000 whilst the third will get £8,000.

News story: Royal Fleet Auxiliary's new tanker arrives in UK for customisation work sustaining 300 jobs

The 39,000-tonne tanker, which can carry up to 19,000 cubic metres of fuel and 1,300 cubic metres of fresh water, will join the Royal Fleet Auxiliary, a civilian-manned fleet which provides support for warships, helping the Royal Navy to maintain its operations 24/7, 365 days a year, around the world.

Tidespring is the first of a fleet of four Tide Class tankers which will all be taken through customisation in Falmouth. She will now undergo an intense programme of work at the A&P shipyard, and is expected to enter service before the end of the year. The new Tide Class tankers will provide key support to the Queen Elizabeth Class carriers when they come into service, alongside the wider fleet.

The arrival is a significant milestone in the 'Year of the Navy' which will also see the debut in Portsmouth of the first of the Queen Elizabeth-Class aircraft carriers, the start of construction for the fleet of new Type 26 Frigates and the opening of the first permanent Royal Navy base east of Suez in more than half a century.

The first of the newest support ships for the Royal Navy, RFA Tidespring.

Minister for Defence Procurement Harriett Baldwin said:

> RFA Tidespring's UK arrival is a key milestone in 2017, the Year of the Royal Navy, which will also see the MOD develop world-class ships and submarines in support of Britain's role as a leading naval power.
>
> Backed by a rising Defence budget, the delivery of the Tide Class tankers is a crucial element of the Government's £178 billion plan to ensure our armed forces have the equipment they need.

The customisation work is helping to support around 300 jobs at A&P Falmouth. The UK work content in the wider Tide Class programme is worth around £150 million, sustaining further jobs at 27 UK-based companies. The project is being delivered well within budget by the MOD.

Systems to be installed in Falmouth include the communications equipment, self-defence weapons and armour needed to allow the ship to operate in the most challenging environments.

RFA Tidespring. Crown Copyright.

Vice Admiral Simon Lister, who led procurement of the Tide Class at Defence Equipment and Support, said:

> RFA Tidespring will be a familiar and reassuring presence for Royal Navy ships as they undertake missions in defence of the UK's interest.
>
> The continued successful delivery of the Tide Class programme, meeting all requirements and under budget stands as a testament to the excellent working relationships which DE&S has built with suppliers in the UK and around the world.

The Tide Class has a flight deck able to accommodate the large Chinook helicopter and offer significant improvements over previous RFA tankers such as double hulls and greater environmental protection measures.

[News story: Freight train derailment, East Somerset Junction](#)

At around 17:50 hrs on Monday 20 March, six loaded wagons of an eastbound freight train became derailed as the train passed over East Somerset Junction, between Castle Cary and Frome, while travelling at about 20 mph (32 km/h). The train, the 17:05 hrs service from Merehead to Acton yard, was joining the up Westbury line from the Merehead single branch line.

There were no injuries. The accident resulted in substantial damage to the railway infrastructure; around 100 metres of track including two sets of switches and crossings were destroyed. Train services between London Paddington and the West Country were diverted via Swindon while the wagons were recovered and track repairs took place over the following four days.

The freight train consisted of a class 59 diesel-electric locomotive hauling 38 loaded wagons of types JNA, JHA, HOA and IIA. It was carrying stone from the Merehead quarries for use in the construction industry. The wagons that derailed were the 24th to 29th from the front of the train. The train split between the 21st and 22nd wagons when the derailment occurred, and the train was stopped by the automatic application of the brakes.

The leading wagon which derailed was of the HOA type. The derailment occurred close to where a set of trailing points had been removed and replaced by plain line in 2012.

Our investigation will identify the sequence of events that led to the accident, and how the wagons derailed. It will also include consideration of:

- the condition of the track, its geometry and how it was maintained
- how the wagons were loaded
- the condition of the wagons
- any relevant underlying management factors

Our investigation is independent of any investigation by the railway industry, the British Transport Police or by the industry's regulator, the [Office of Rail and Road](#).

We will publish our findings, including any recommendations to improve safety, at the conclusion of our investigation. This report will be available on our website.

You can [subscribe](#) to automated emails notifying you when we publish our reports.