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2019/20

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MIKE SHARPLES

on teaching in a digital age

HOW TO

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Welcome...

...to this edition of *Technology & Innovation* magazine; your regular update on the latest developments in edtech, keeping the emphasis very firmly on how it can be used to enhance teaching and learning, and to support – but never supplant – the brilliant work that teachers do, in and out of the classroom, every day.

There's no denying that technology is as inextricably linked to the world of education these days as it is to pretty much every other aspect of our lives. And of course, there is much to celebrate about this: from automated sign-in systems to AI-driven assessment, not to mention assistive software that ensures that no student is left behind and apps that make communicating with parents and carers a doddle, the market is filled with brilliant, tech-enabled options for helping to improve both safeguarding and outcomes for young people, whilst reducing the workload of those in charge of actually delivering their education.

However, in these days of ever-tighter budgets and an increasingly demanding curriculum, it's crucial that edtech doesn't become a distraction. Impact is everything – and if a fancy piece of hardware or smart software solution is time-consuming to implement, difficult to use or not proven to make a real difference, then clearly, no school should be wasting energy or money on it, regardless of how impressive the salesperson is able to make it sound.

That's why within these pages, as always, we've pulled together sound advice, fresh inspiration and as much evidence-based information as possible from industry experts, consultants, and above all, practising teachers. We're not interested in fads or gimmicks, just what works – because we know that's what you want, too.

Perhaps you'd like to find out about challenges and competitions that invite young people to tackle real-world problems; if so, then turn to pages 32-33, or 78-79. Or maybe SEND is your top concern, in which case you'll find plenty to consider on pages 54-55 and 64-65. Gordon Cairns' experience of using selfies to raise aspiration amongst his pupils (p.30) is a fascinating read – and our special 25-page focus on STEAM is packed with passionate and practical pieces promoting the importance of these subjects and suggesting ways to raise their profile in schools.

Whatever your specialism, experience, or level of techie expertise, we hope you find plenty to interest you here – and if there's anything you feel we've missed out, and should be covering in future publications, please do get in touch and let us know about it!

Best wishes

Helen Mulley, editor
helen.mulley@theteachco.com

ON BOARD THIS ISSUE

Mike Sharples is Emeritus Professor of Educational Technology at The Open University, and the author of *Practical Pedagogy: 40 new ways to teach and learn* (Routledge).

Maddy Kavanagh is programme manager for Longitude Explorer at Nesta Challenges, as well as on the Inventor Prize.

Andy Mitchell is an independent educational consultant and until recently, was Deputy Chief Executive of The Design and Technology Association.

Denise Inwood is a former senior school leader and managing director of BlueSky Education.

Terry Freedman is an ed tech consultant and freelance writer. He publishes the ICT & Education website at www.ictineducation.org.

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2019/2020 EDITION

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Published by:
Maze Media (2000) Ltd,
25 Phoenix Court, Hawkins Rd,
Colchester, Essex, CO2 8JY.
Tel: 01206 505900

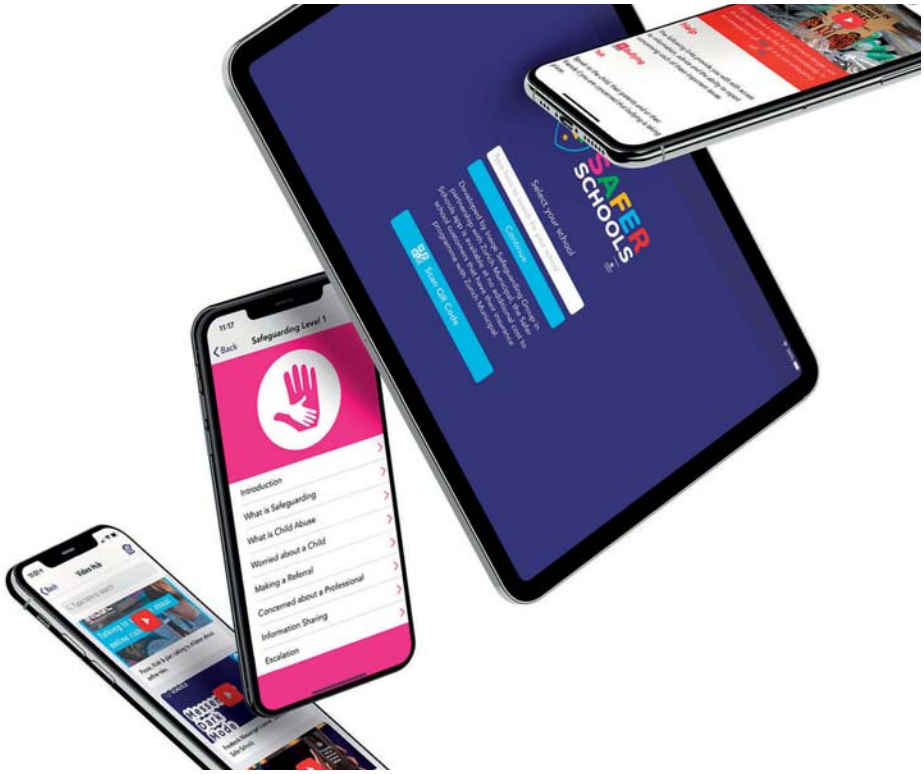
Q&A

“Help young people deal with online dangers”

Jim Gamble QPM discusses the value the Safer Schools App can bring to the school community

30 SECOND BRIEFING

The app helps school communities protect themselves in the digital world through contemporary safeguarding information. Delivered in partnership with Zurich Municipal, it gets people the right information when and wherever they need it.



T&I How did the Safer Schools partnership originate?

JG As the current CEO of the Ineqe Safeguarding Group and the former and founding head of CEOP, I recognised the opportunities and the real challenges schools face in our digital world. This has driven me to work hard to develop the Safer Schools Partnership with Zurich Municipal. We work directly with frontline safeguarding professionals in schools to engage parents and children, when it matters most.

Why do we need to educate ourselves about online risks?

The distinction between children’s lives online and offline has become increasingly vague. The news regularly features stories about young people being groomed or bullied, often with an online dimension. Only by understanding the threats and risks of technology, alongside the context of a child’s life, can we credibly and adequately respond to the safeguarding needs of the children and young people in our care.

Why should schools be excited by this product?

With the potential to place specialist information in the pockets of entire school communities, this is the most exciting safeguarding children initiative I’ve ever been involved with. If you’re one of the 13,500+ schools insured directly or indirectly by Zurich Municipal, the App is yours – for free*. You’re invited to engage in a worthy partnership with some of the leading safeguarding professionals in the field.

How do you keep the content relevant?

The Ineqe Safeguarding Group has experienced teams monitoring specialist safeguarding news in real time. They also analyse emerging themes from Serious Case and Local Practice Reviews. All of the Safer Schools material is subject to a robust quality assurance process, overseen and informed by Ineqe’s in-house Counsel (the former Head of Legal at CEOP) and an editorial panel comprising Local Authority and school safeguarding professionals.

ABOUT JIM:
INEQE CEO, CEOP founder and chair of multiple safeguarding boards.

SAFER SCHOOLS
oursaferschools.co.uk
saferschools@ineqe.com

What are your plans for the future?

The powerful potential the App has to revolutionise safeguarding practices in school communities grows by the day. By listening to user feedback, we continue to build our technical capabilities and the diversity of our content. With a lot to offer it really is a step change, and we hope you’ll support us in securing a safer future for all our children by joining Safer Schools.

What’s the difference?

+ A bespoke safeguarding App with content tailored to each demographic within your school community
+ Addresses issues on safeguarding in the context of social media, imagery, bullying, sexting and gaming
+ Features also include CPD accredited training, digital footprint surveys, push notifications and AI prompts

*Safer Schools App is available for free to school and LEA customers that have their insurance programme with Zurich Municipal.

FREE!

SAFER SCHOOLS

Are you a Safer School?

Safer Schools is a partnership between **Zurich Municipal** and **Ineqe Safeguarding Group Ltd**.

Safer Schools helps entire school communities to better protect themselves in the digital world, through delivering contemporary and relevant safeguarding information to teachers, pupils, parents and carers.

Find out if you are a **Safer School** today!

Find us at **oursaferschools.co.uk**
Call us on **028 9600 5777**
Email us **saferschools@ineqe.com**
Scan the **QR Code**

**The Safer Schools App is available for free to school and LEA customers that have their insurance programme with Zurich Municipal*

WHY I LOVE...

Carole Mjadzelics, Deputy DSL, Castle Hills Primary School, explains how the Safer Schools App empowers her school community

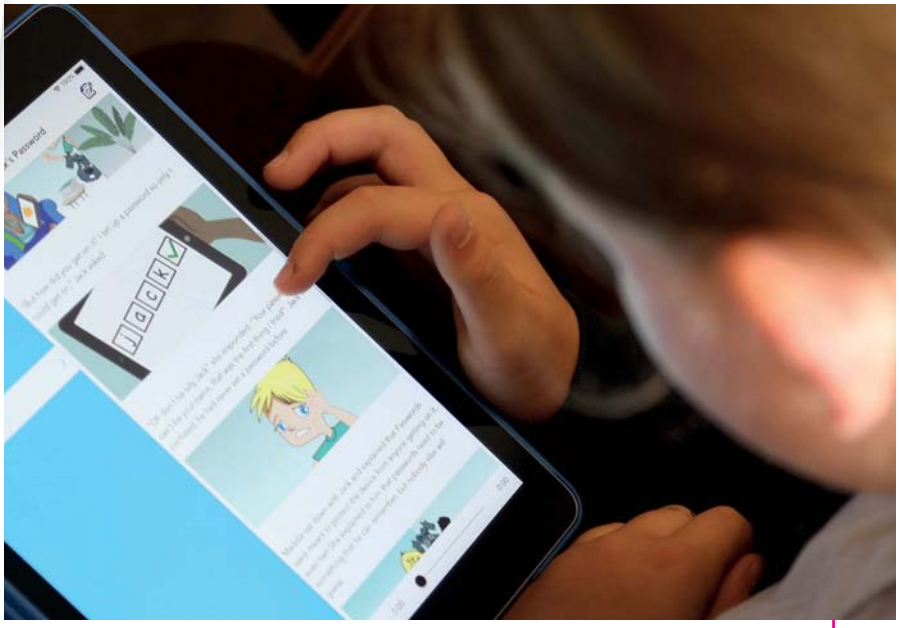
ABOUT ME:

NAME:
Carole Mjadzelics

JOB ROLE:
Deputy DSL

SCHOOL:
Castle Hills Primary School

FAVOURITE FEATURE:
The 'Digital Footprint' Survey feature allows us to be intelligence led and tailor our lessons to meet the needs of our pupils.



TALKING ABOUT: USING THE SAFER SCHOOLS APP

Safeguarding doesn't end when a pupil leaves the classroom

Whether offline or online, safeguarding is one of the most complex challenges teachers face. A colleague of mine recommended the Safer Schools App and how it brings the combined expertise of many safeguarding professionals together to provide advice, warnings and alerts. I got in touch with the team – they were so helpful! I completed a short form and 48 hours later, my school had access to this excellent free resource.

It helps us move beyond compliance

Before, we would have presentations and only 12 parents would turn up. Within three days of notifying our community of the Safer Schools App, there was an influx of downloads. The phones went crazy! Parents have been very enthusiastic about completing the quizzes. Our staff have completed Safeguarding Level 1 training within the App and over 75% of our pupils use it. This App has empowered our school community better than anything else we have tried before.

It's at hand every day – with updates when you need to know something

It's excellent that the App is contextualised and provides information tailored to the individual user. It's a powerful tool for staff, parents and pupils to develop their knowledge. I carry the App around to ensure that if there's an alert I can keep everyone updated. It's very reassuring to know that the expert team behind the App have their fingers on the pulse.

SAFER SCHOOLS

Contact:
Find out if you are a Safer School today! Simply visit **oursaferschools.co.uk**, call **028 9600 5777**, email **saferschools @ineqe.com**

Customised to be our very own

One of the things I really like about the App is that it's bespoke to my school – with the incorporation of our logo. Our school calendar, newsfeed and policies are all integrated within the App, which is really handy for staff and parents. Also, the ability to send out push notifications without holding personal data means it's a fantastic platform to communicate with school groups whilst being GDPR compliant.

The best things in life really are free*

At first, I simply thought "this is too good to be true, how can so much be offered and our school pays nothing?" But I was delighted to be reassured that the school receives free access as part of our insurance package with Zurich Municipal. In a time when budgets are cut to the bone, it's amazing to find a company that is prepared to invest in supporting and educating children, providing this service to customers at no cost.

Safer Schools App is available for free to school and LEA customers that have their insurance programme with Zurich Municipal.

WILL IT WORK FOR YOU?

+ Getting set up is simple and the App is really easily customised for your school.

+ Cutting edge tech – GDPR compliant, with instant accessibility via QR codes.

+ Information, advice and CPD accredited courses assessed by subject experts.

+ Continuously evolving new features and content based on school feedback.

Power UP!

Mike Sharples shares six ways to teach better in a digital world

It's an exciting time for technology in education. Global technology companies such as Google, Amazon and Microsoft are promoting adaptive teaching systems to give each student a personal tutor that responds to their personal needs and ability. Machine learning systems can analyse data from online learning platforms to predict a child's future performance. Virtual reality offers alternative worlds of historical re-enactment and scientific wonder. Even drones have been recruited to the teaching of geography.

But technology alone won't solve the deep problems of education. The reason is simple. What thrives in the lab rarely survives in the jungle of a school classroom or university lecture hall. Adaptive learning systems may work for a week or so, but students soon get bored with mechanised tutors and teachers struggle to cope with pupils progressing at different paces. Predicting future performance through machine learning is fine, but how do you use the results? What do you tell a young person who is predicted to fail the next exam? Virtual reality is a cool device for an inspiring lesson, but how does a school cope with a cupboard full of VR headsets, all needing to be untangled and charged ready for use? And how do you manage a class of students stumbling around with their heads in boxes, or waiting in line for their turn to view ancient Rome?

After 40 years of technologies for learning – educational television, language labs, classroom response systems, programmable robots – the only specifically educational technology that is widespread in schools is the interactive whiteboard (IWB). And at least one review of evidence has found that whilst some teachers are using them in imaginative ways, overall there is "no significant or measurable impact on achievement" from having IWBs in schools.

> ***"Thoughtful conversations are to be had around whether university is the best route"***

It's not what you use, it's how you use it. We need to focus on how teachers use technology, not just the technology itself. The key to this is pedagogy, the theory and practice of teaching, learning and assessment. A teacher with effective pedagogy can make a success from even the most mundane technology, or no technology at all. In my book *Practical Pedagogy: 40 New Ways to Teach and Learn* I discuss 40 innovative pedagogies. Here are six examples, based on the themes of the book: personalisation, connectivity, reflection, extension, embodiment and scale.

1 Spaced learning

Neuroscience is uncovering how people produce long term memories. This has led to the method of spaced learning whereby first, a teacher gives information for 20 minutes; then, students take a ten-minute break for physical activity such as aerobics or origami; third, students are asked to recall key information for 20 minutes followed by another ten-minute break; and fourth, students apply their new knowledge for a final 20 minutes. A study of spaced learning shows a significant increase in learning compared to a typical lesson. The method has been tested successfully in schools, but a larger-scale trial is needed to show whether it can be deeply implemented into practice.

2 Learning from gaming

The new approach of 'intrinsic integration' links the motivation of games with specific learning activities and outcomes, so the play is both engaging and educationally effective. Game designers can manipulate elements of challenge, personal control, fantasy, and curiosity that match the pedagogy. This creates a productive cycle of engagement and reflection. Providing shared goals and actions in games also help learners work together to solve problems and create self-organising communities.

3 Explore first

Explore first gives students complex problems to explore before they receive direct teaching. The aim is for young people, working together, to use their existing knowledge to consider possible solutions, then evaluate and explain

the best answer. By struggling and sometimes failing to find a solution, learners gain a deeper understanding of the structure of the problem and its elements. After this process, their teacher explains the essential concepts and methods of the solution, helping students to firm up their knowledge by comparing good and bad answers. The pedagogy requires children to embrace challenge and uncertainty. They may feel less confident at first, but this experience can help them become more creative and resilient.

4 Learning through wonder

An encounter with a wondrous event or object – a plasma globe, a gyroscope, an ostrich feather – creates an experience that provokes curiosity. A pedagogy of wonder is similar to guided discovery learning, where a teacher helps students solve a problem or understand a principle through hands-on exploration. But it differs in how the quest begins: by showing an object or event that sparks curiosity; presenting the familiar in a new way; setting up a puzzle; or conjuring with science and nature. Teachers can include wonder in learning activities through magic shows, object lessons, nature tables, cabinets of curiosities, and outdoor quests, as well as through literature that evokes 'a sense of wonder'.

5 Design thinking

Design thinking is about solving problems using the methods and thinking processes of designers. These include creative processes such as experimenting, creating and prototyping models, soliciting feedback, and redesigning. Design thinking places students in contexts that make them think like designers, creating innovative solutions that address people's needs. Learners need to solve technical problems but they also have to understand how users will feel when employing the solutions. Design thinking is a social as well as a mental process. It requires thinking and working across different perspectives and often involves conflict and negotiation. For example, young people designing an educational computer game need to think from the perspective of a good teacher as well as from the perspective of a game player. As a pedagogy, design thinking may involve civic literacy, cultural awareness, critical and creative thinking, and technical skills. When implementing this approach in the classroom, the teacher and students need to take risks and try new methods.

6 Open pedagogy

Open textbooks are published without copyright restrictions. Open pedagogy involves students, with teachers, revising and remixing material from open textbooks and other sources, such as videos and pictures, that are free of copyright. The aim is for young people to learn by recreating teaching resources in ways that make the editorial processes and creative products visible to themselves and others. Their products are continually adapting to events in the world and to new knowledge. The results can be imaginative and provocative, such as adding contemporary dialogue to an out-of-copyright movie. By recruiting their students to the open education resources movement, teachers take a stance on the value of open access to education resources.

ABOUT THE AUTHOR
Mike Sharples is Emeritus Professor of Educational Technology at The Open University, and the author of *Practical Pedagogy: 40 new ways to teach and learn* (Routledge).

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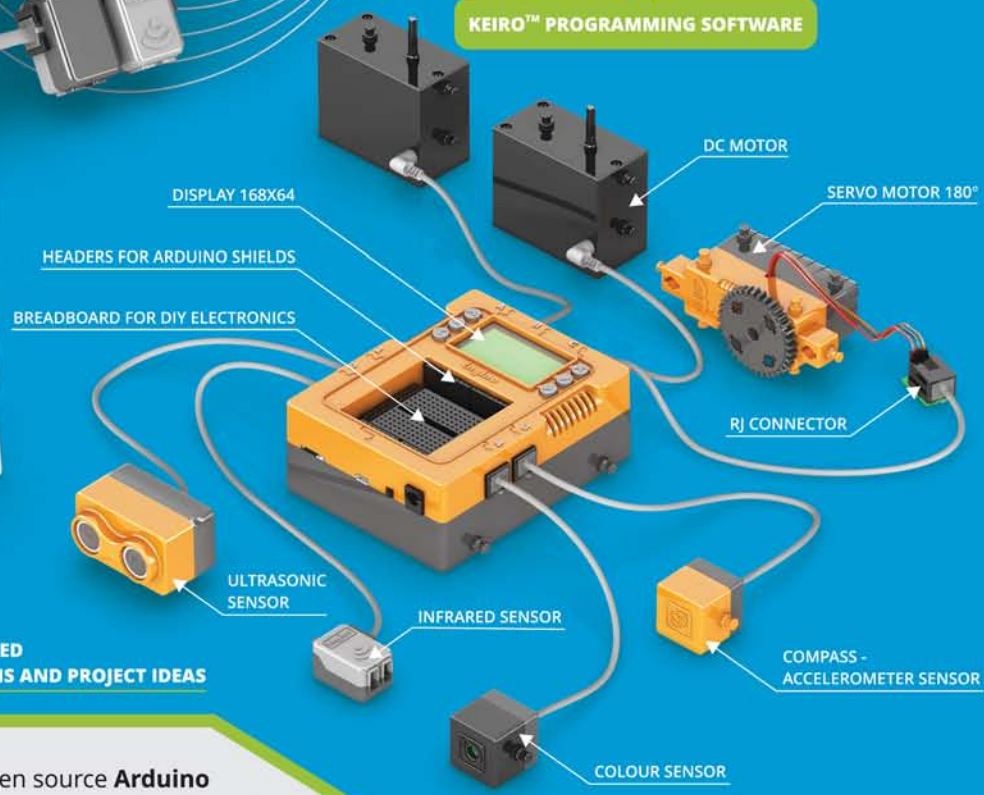

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4 REASONS TO TRY... Code-IT in Python

Why the new digital product from Hodder Education is the must-have resource every computer science classroom needs

1 IT WILL SAVE YOU TIME

Consisting of 17 standalone modules, Code-IT in Python provides a structured learning journey through programming concepts, required at GCSE. Using the responsive environment, students must test their own code in order to solve coding challenges – all of which are auto-marked, detect plagiarism and provide teachers with progress reports.

2 IT WILL FILL THE CODING SKILLS GAPS

Students can start their journey by using a block-based language and then transition into the text-based Python language with ease; exemplar lines of code, in block- and text-based are provided to aid development. Within each module, teachers will also find cheat sheets, lessons ideas and presentations to reinforce students' learning.

3 IT'S NOT YOUR AVERAGE CODING PRODUCT

Code-IT in Python is the only platform that combines an online, responsive coding environment with sound learning material focused on GCSE content. It will provide your students with a wide range of programming skills, equipping them with the necessary tools to complete any programming project effectively and efficiently.

4 YOU CAN ACCESS A FREE, 30-DAY TRIAL

You can access the Data and Containers module today on a free, 30-day trial so you can explore the platform. Visit the website to watch walk-through guides and explore the modules available – modules cost £30 each for a year subscription plus save up to 20% by bundling them up.

HODDER EDUCATION LEARN MORE

Contact:
hoddereducation.co.uk/code-it
computing@hoddereducation.co.uk
01235 827720

At a glance

+ A coding environment which provides a structured learning journey through programming concepts, required at GCSE.

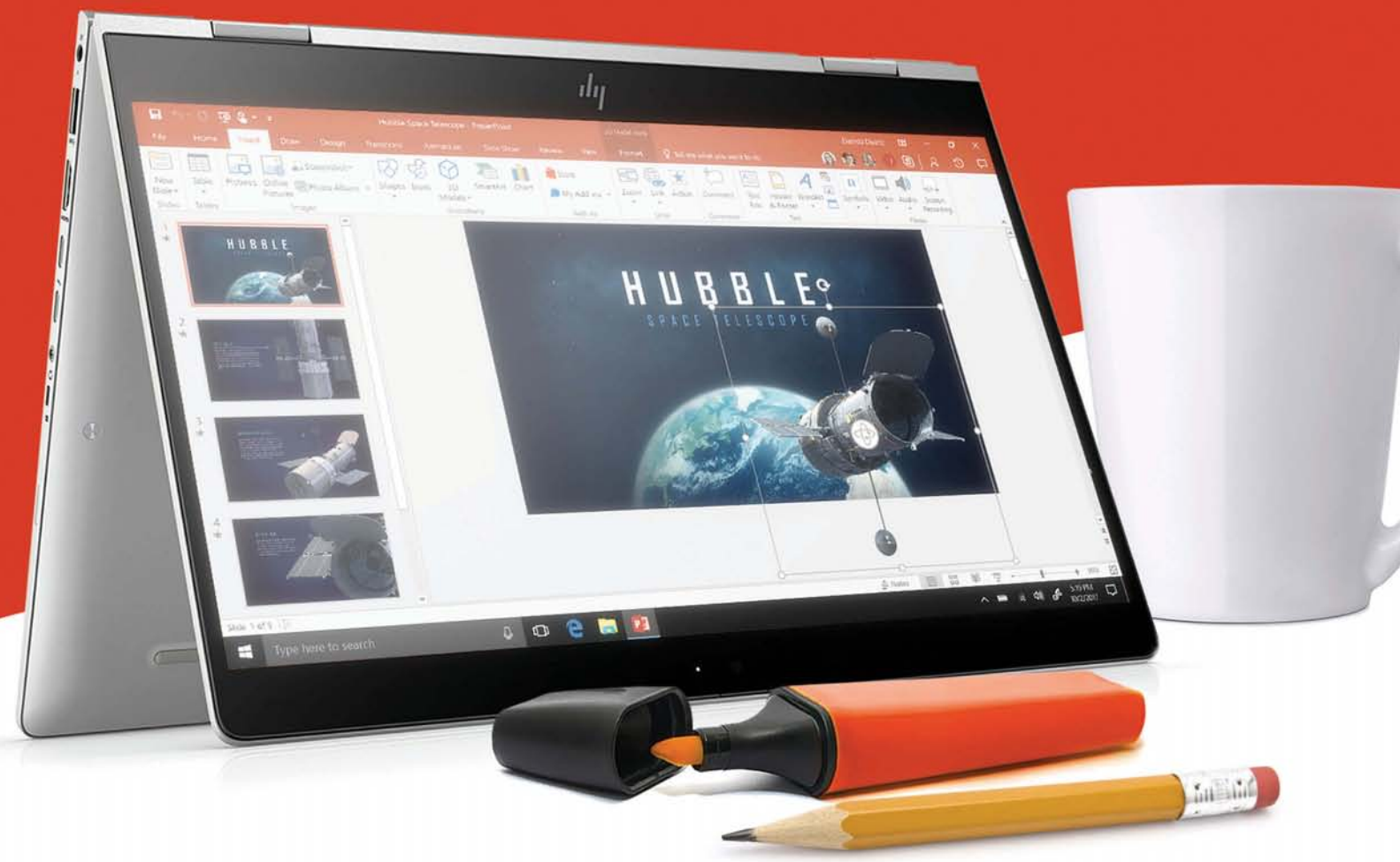
+ Auto-marked coding challenges that require students to write and test code, with immediate feedback provided.

+ Progress reports on students' activity, cheat sheets, lesson ideas and presentations to help reinforce learning.

Microsoft

BACK TO SCHOOL

ALL YOUR FAVOURITE APPS IN ONE PACKAGE



Office Home & Student 2019

available at ebuyer.com

NEED TO KNOW - Q&A

"The biggest benefit is more time than ever"

Stuart Bell explains how teachers can use Microsoft software to engage pupils and encourage creativity

30 SECOND BRIEFING

Ebuyer is a Microsoft Certified Silver Partner and a complete solution service provider. Ebuyer can advise, supply, integrate and manage bespoke solutions for your school. The specialised buying and solutions teams ensure the most competitive prices and results.

T&I Why are teachers using Microsoft software?
SB Many schools run on software such as Microsoft Office 365 as this is something which can be used by teachers, staff and students across the board. It gives you the benefits of all of your favourite apps like Word, PowerPoint and Excel but it also offers so much more! You can reap the full benefits of Microsoft Teams and Minecraft for Education. Technology in the classroom provides interesting and challenging lessons but also eases workload by tracking and analysing students' progress. As a bonus, all students in M365 licensed schools receive student use benefits of Microsoft Office."

Any particular app you'd recommend to teachers?
The big three apps - Word, Excel and PowerPoint - have so many features to help teachers. For example, there's a wonderful feature in PowerPoint which uses artificial intelligence. Microsoft Translate allows students to convert speech to text while translating the words into any language. This is a really useful tool to help pupils for whom English is a second language or students who learn more slowly.

Any app you'd recommend for all student age groups?
Students of all ages enjoy creating presentations and there's a brilliant new feature in PowerPoint called Morph. It creates the appearance of movement when transitioning between slides and allows students to add animation with just a few clicks. It's very easy for any student to use and allows them to express their creativity and imagination with just a few clicks.

Can software help improve basic reading and writing skills?
All the apps in Microsoft Office Home and Student 2019 include tools and features to encourage and help reading and writing skills. Converting text to speech helps students with their reading and comprehension of words. And as mentioned earlier, the translation tools are helpful for students struggling with English and really boost their confidence in the classroom.

ABOUT STUART:
Stuart Bell is a software specialist at Ebuyer.com.

ebuyer.com

Contact:
To discover more on how your school can benefit from Microsoft software visit Ebuyer.com and search 'office' or contact Stuart Bell on 01430 433671 | solutions@ebuyer.com

What's the biggest benefit for teachers in using Microsoft software?
Time. It's something all teachers need more of and using Microsoft software gives you more time than ever before. You can create assignments, generate lesson plans and track homework so much more efficiently. And the ability to comment on assignments in real time means lugging home a big stack of books to mark has definitely been consigned to the past.

What's the difference?

+ One time purchase with no ongoing subscription costs – software can be used on one device.
+ Includes classic versions of all your favourite apps including Word, Excel and PowerPoint.
+ Includes 60 days support from Microsoft at no additional cost.

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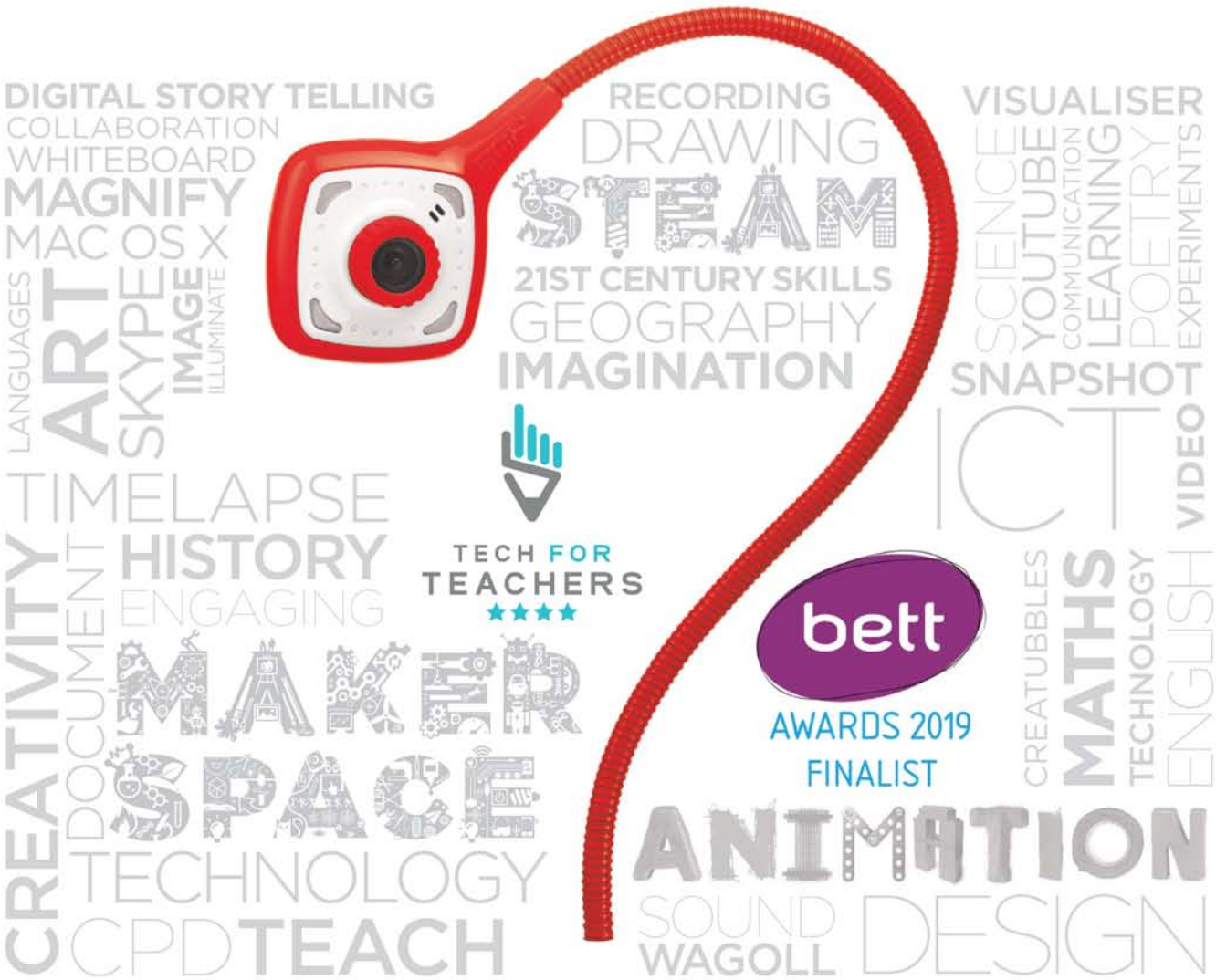

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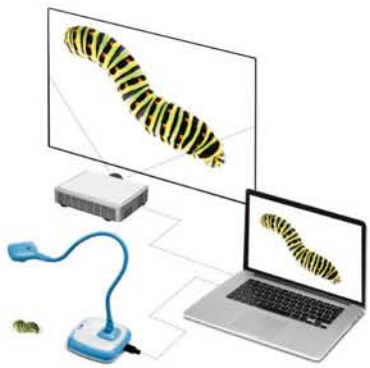

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CELEBRATING STEAM

Bringing science, technology, engineering, maths – and the arts – to life

STUDENT VOICE: Binah Phillips, Y10

"Some teachers are discovering new ways to engage the generation of students who spend so much time online. Teachers have adjusted their lesson planning and found ways to keep us interested. What I have found successful is mostly linked to independent learning. I've used Art2day, an account the school pays for, to search for artists by key words and themes. In drama we use the AQA website to look at grade boundaries so we know what they want us to write about when writing up our coursework. When it comes to revising in lessons, my experience is that teachers are finding more engaging ways to keep students energy levels up and to keep us motivated. Quizlet Live and Kahoot harness the kids' competitiveness and interest in online games and help us learn dates in history or key vocab in French.

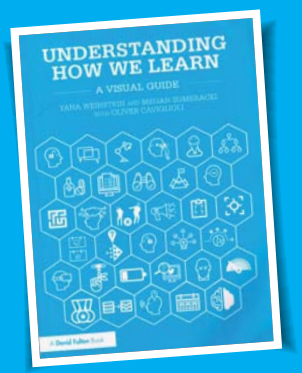
Less effective is the overuse of Powerpoint – in some cases the themes and formatting never change, which although potentially convenient for teachers, often ends up just boring the students with long winded explanations. Software that allows teachers to take control of our screens and focus on the work of one student, or teachers projecting photographs of tests onto the screen to point out mistakes, generally causes more embarrassment than productivity.

In an ideal world I would like to have more opportunity to work independently on computers. If this happens often depends on whether a specific teacher has booked a computer room. For me, I am most productive when I have the opportunity to research areas that interest me and write things up on my own."

26%

of girls say they are considering a career in STEM – compared to 43% of boys.

Source: The Institution of Engineering and Technology



RECOMMENDED READING

Understanding how we learn: a visual guide (Yana Weinstein/Megan Sumeracki with Oliver Caviglioli, Routledge, £19.99)

Students seem to believe that if they spend hours poring over a topic, that will somehow pummel their brain into retaining it all. Sadly for them, much of the time spent in that way is likely to be wasted. Enter psychological research to shed light on what would work. A number of areas are covered here including, crucially, strategies for effective learning. And not just for students: there are pages of tips for teachers and parents too. Other topics include information about how memory works, and how to plan your studying. Also, in tune with the current zeitgeist, several myths are busted along the way. The many illustrations provide an easy way into the subject matter. With end-of-chapter summaries, the book helps the reader to get the gist of a topic very quickly, and the copious references provide plenty of further reading. All this, and readable too!

Reviewed by Terry Freedman

An essential SUBJECT

Every young person deserves a fantastic computing experience at school, says **Peter Marshman** – and here's how to make it happen...

We are all aware of the need for young people to develop the skills and knowledge required to ensure they are equipped to succeed in the workplace. Computational thinking is becoming increasingly vital, with job roles emerging - such asBig Data Analysts, Cloud Computing Specialists and Autonomous Vehicle Designers to name a few; as well as those of tomorrow, perhaps Climate Change Scientists, Memory Surgeons or even Commercial Space Pilots. That's why computing is such an essential subject in schools, a subject for all and one which develops students' logical mind-sets through concepts such as pattern recognition, abstraction, algorithmic thinking and decomposition. These valuable building blocks enable pupils not only to be excellent problem solvers and programmers but also to make use of these cross-curricular skills to support all their other subjects, whether that be helping them construct English statements, abstract and analyse data for geography or even develop effective algorithms in dance.

Offering a fantastic computing experience for students requires a multi-faceted approach. Here are my top tips for schools to achieve this:

VALUE THE SUBJECT

Computing is often described as a 'hard' subject.

"I have not seen a group of subject professionals as willing to share resources and ideas that is as strong as the computing community..."

It *can* be hard to study for students, but only if they have limited exposure to it in comparison to that of other subjects in school. As a minimum, students should receive one lesson per week of computing at KS3. It's essential that, should they desire, all students have the opportunity to opt for KS4 and KS5 computing or computer science courses. It is this journey of skills gathering that provides them with confidence in their own ability and to be able to apply the concepts of computational thinking successfully. I also believe it is essential that students who do not opt for a computing qualification at KS4 or KS5 should continue to develop their digital skills – since there will be few jobs for which students will not require some previous experience of computing.

HIGHLIGHT CREATIVITY

Computing is a hugely creative subject. Just considering coding, all students are likely to develop different artefacts, none of which will be the same. They can use code artistically, for example by creating Islamic artwork using algorithms and geometric shapes, or by developing intelligent chatbots which might help give medical advice, customer service or even provide company to lonely humans. Students can learn through physical computing using hardware such as Raspberry Pis or BBC Micro:bits to create solutions to help solve environmental concerns. Computing is also a hugely collaborative subject; students can code in a real-time platform to help each other develop efficient processes and debug each other's code, which could also be achieved through paired

programming approaches.

FOCUS ON CPD

With the computing landscape changing constantly, it is essential for teachers to be provided with time to undertake professional development to improve their pedagogy for teaching computing and to realise their teaching potential. In my opinion, I have not seen a group of subject professionals in both education and industry as willing to share resources and ideas that is as strong as the computing community. Schools should make the most of their local Computing at School Master Teachers and Community Leaders who provide support for new teachers or those who may not have computing as a specialism. They should also offer their teachers the opportunity to develop their teaching pedagogy and subject knowledge through CPD, making the most of government-funded programmes, like the National Centre for Computing Education.

ENRICH AND ENGAGE

With so many opportunities for students to visit leading digital organisations such as Google, Microsoft and Cisco, young people have the chance to contextualise the work they do in the classroom and change their perceptions of the wide range of roles available in the digital marketplace. Alternatively, students can visit local hospitals to see robotic surgery in action or visit a local science research centre to see how computing engineers are able to program a Mars Rover to find signs of life. They can express themselves and design or develop systems to make lives better, for example by entering the TeenTech Awards, developing AI solution for the IBM Change the World challenge, taking part in the Cyber Discovery challenges or entering the First Lego League to design and code autonomous robots. With the breadth of computing so wide, these experiences can spark innovation and provide extended projects for students to express themselves and further develop their computational skills as they do so.

ENCOURAGE COLLABORATION

I believe that computing is a highly collaborative subject. It is important for schools to provide learning spaces which support this form of working. Computing is no longer conducive to rows of PCs where students work individually, instead they are now encouraged to form small groups to problem solve in teams and also to ensure that classrooms promote learning away from a digital device. 'Unplugged' learning is a great way for students to build foundational knowledge and build mental models and notional machines giving them confidence, independence and tenacity when facing new challenges.

SUPPORT NETWORK

The National Centre for Computing Education (NCCE) is funded by the Department for Education and marks a significant investment in improving the provision of computing education in England.

Run by a consortium made up of STEM Learning, the Raspberry Pi Foundation and BCS, The Chartered Institute for IT, its vision is to achieve a world-leading computing education for every child in England.

The NCCE provides high-quality support for the teaching of computing in schools and colleges, from Key Stage 1 through to A level. Its extensive range of training, resources and support caters for all levels of subject knowledge and experience.

To find out more about what's on offer visit teachcomputing.org

ADDRESS THE GENDER GAP

I believe there is a myth that engaging girls in computing is difficult. Far from it, but it does require long term planning and investment in enrichment as well as young ambassadors within a school. Girls build self-efficacy in computing through accessing contextual learning, looking at how computing can change the world and making people's lives better. They may need role models – young ambassadors such as older students in the school, or for learning to be embedded at an early age, with opportunities to visit organisations where they can hear from young professionals and help dispel some of the misconceptions about what a career in the digital industries might look like.

SELL STEM

It is said that more than 60% of jobs in the STEM industry require computing skills and knowledge. Computing should not be seen as a silo subject but one which provides thematic learning experiences across other departments within the school where the curricular can be mapped and enriched. By providing a fantastic computing education within your school, students will build skills to help them succeed in other STEM subjects.

REACH OUT

I believe it is crucial that schools are aware of the need to support the transition into KS3 computing by collaborating with primary schools. Approaches for this could include highlighting schemes to support teachers such as Barefoot Computing, as well as those which support the pupils themselves, such as the Digital Schoolhouse scheme.

ABOUT THE AUTHOR
Peter Marshman is Head of Computer Science and ICT at Leighton Park School in Berkshire. He is a Computer Science Champion for the National Centre for Computing Education and a Computing at School (CAS) Community Outreach Manager (prior to this he was a CAS Master Teacher).

REASONS TO TRY...

4 The Big Bang

Discover a wide-ranging programme that aims to inspire and inform young people about opportunities in STEM careers

1 ENGINEERING, SCIENCE... AND FUN!

There are thousands of exciting job opportunities for engineers and scientists, and equipping young people with skills in STEM subects is key to their future employability. The Big Bang is a wide-ranging programme, exploring the exciting opportunities out there and the routes into these rewarding careers

2 THE BIG BANG UK YOUNG SCIENTISTS AND ENGINEERS FAIR...

is the largest celebration of STEM for young people in the UK, with an award-winning combination of exciting theatre shows, hands-on activities, interactive workshops and careers information from STEM professionals.

Next year's Fair will be held at the NEC Birmingham, **11-14 March 2020** (www.thebigbangfair.co.uk). The Big Bang Fair hosts the finals of **The Big Bang UK Young Scientists & Engineers Competition**.

3 THE BIG BANG COMPETITION...

looks for the very best projects from every area of STEM. Finalists compete for exciting prizes, including the coveted titles of GSK UK Young Engineer and GSK UK Young Scientist of the Year. 11-18 year olds in full-time education or training can apply online or through a regional heat at a **Big Bang Near Me Fair** (www.thebigbangfair.co.uk/competition).

4 BIG BANG NEAR ME FAIRS...

are free regional events that take place across the UK. These Fairs help 11-18 year olds from all backgrounds to discover close to home the exciting and rewarding careers that their STEM subjects can lead to . You can also bring the Big Bang to your school through Big Bang @ School (www thebigbangfair.co.uk/nearme).

The Big Bang

Further information:
For news and updates about the Big Bang, please sign up to the monthly newsletter: www.thebigbangfair .co.uk/newsletter

At a glance

+ The Big Bang Fair 2019 welcomed over 80,000 people, including more than 62,000 young people

+ 200 projects attended the UK finals of The Big Bang Competition, showcasing their projects at The Big Bang Fair 2019

+ Next year's Big Bang Fair will be held at The NEC in Birmingham, 11-14 March 2020

Teach computer science with confidence

National Centre for Computing Education

Are you currently teaching or planning to teach GCSE computer science?

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This professional development programme from the National Centre for Computing Education will boost your confidence across the curriculum, and help you identify the areas of subject knowledge where you may need support.

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Smarter protection

Choosing the proper tablet security solution for your school and students doesn't have to be difficult

When Apple released its first iPad it opened a world of possibilities for educators. Unfortunately, it also opened a world of painful and expensive device damage. Once technology reached the hands of eager and energetic students, it quickly became apparent that the power of these new tablet devices needed to be protected from the rigors of the classroom and beyond.

Not long after, tablet cases began emerging in the market, providing varying benefits and solutions to tech-enabled schools. Suddenly educators were faced with a new challenge, one which persists to the present day: which case to invest in?

Contact:
Adam Gould
0044 7967 733263
adam@stmbrands.com.au

HOW TO CHOOSE WISELY

When considering a tablet case history has taught a number of salient (not to mention valuable) lessons on how to choose the best option for your school. First and foremost, the case must truly be protective. Though many appear to be and claim to be, there are relatively few case options that continue to live up to expectations, while others come up short. To avoid both costly repairs and the immeasurable cost of student downtime, it's vital to invest in a case that delivers reliably rugged protection. In contrast to expectation, reliance merely on the most heavily marketed brands may not always provide the best solution. Though budget is always a consideration, avoiding a shortsighted price-based evaluation up front can actually prove more affordable than facing the unexpected costs of damage incurred with cheaper, less protective cases.

Beyond protection it's critical to also consider additional functionality and usability. Does the case allow the tablet to be used in different formats, including typing and viewing? Does the case allow quick visual identification of device tagging? Does the case help save battery life and improve the ease of student use? Are the ports easy to access? Can it securely store the optional Pencil or Crayon? Is the screen protected during transit but easily accessible when in use? Is the case slim enough to optimize charging, storage, and transport? These all become relevant points when considering deployment of devices.

THE SMARTER OPTION

One of the best-performing cases that emerged early on and quickly moved to the top of its class (and has since continued to improve) is the Dux case from STM Goods (Smarter Than Most). Millions of iPads across the globe have been deployed safely in the reliably protective and functional wrap of Dux. As a local administrator attested recently, "To date there have been no breakages of iPad devices since installing STM Dux cases, and due to the high protection factor and ease of use, there has been zero downtime since implementation." - Nick Hutchings, Head Teacher, Hamilton Primary

MORE THAN YOU'D EXPECT

Providing administrators and students a unique and unparalleled combination of Mil-Spec-exceeding ruggedness, versatile typing and reading configurations, clear back panel for device ID tagging, and a full screen cover (among others) the precocious Dux case provides everything a student and school system need to get the maximum benefit from their device-supported programs. Working with educators, STM continues to innovate its Dux case (and other products) as technology changes. Dux (pronounced "ducks" and Australian slang for the smartest student in class), continues to live up to its name bringing both versatility and protection to modern classrooms. STM has also created Dux solutions for Microsoft Surface, Chromebook and laptops. The latest innovation from STM, the Dux Smart Keyboard, brings the same rugged protection and innovation plus natural and intuitive typing with a lightning connected keyboard integrated case.

STM continues to drive forward working with educators to help ensure a smarter future in education. Dux cases and other STM education products are available at stmgoods.com/education-corporate or through Exertis Unlimited.

The solutions ARE OUT THERE

According to STEM industry, school leavers lack workplace skills, says **David Lakin** – so what can be done to improve things?

Job candidates who have academic knowledge, but lack workplace skills are a problem. This is the claim made by 73% of UK engineering and technology employers surveyed by the Institution of Engineering and Technology (the IET) earlier this year.

Over the coming months, students will be starting to make decisions about their post-16 education, choosing their A-levels or opting for vocational routes such as apprenticeships and the new T-levels. But the question remains, is the UK curriculum really giving students enough support to move into exciting and rewarding STEM careers?

Start early

On the one hand, more students are choosing to continue with their education in the sciences and maths after GCSE – the gateway subjects to STEM careers such as engineering. This year's A-level results came with the news that the number of students taking STEM subjects at A-level has increased by 26% since 2010. More girls are opting for science subjects – biology, chemistry and physics combined – and maths remains the most popular subject at A-level.

But education alone is not enough to prepare students for STEM careers. It is crucial that young people are supported in their studies, and without the right balance of education, work experience and careers guidance, they might not be aware of the exciting range of engineering roles available to them, which in turn could be compounding the industry's skills problem.

> ***"Teachers can give students the skills and insight they need for their future careers, providing they have the right teaching support and resources..."***

It's never too early to start developing the next generation of homegrown engineering and technology talent that have the right practical skills for careers in modern engineering, and we believe that a combination of education and work experience will help achieve this.

Available routes

As well as practical workplace skills – such as commercial awareness, teamwork and problem-solving – students need an understanding of the career options available to them and the routes they can take to get there.

IET research* has found that from an early age, young people have misconceptions of engineering and technology roles, which means they could too easily dismiss them. Perceptions have improved in recent times, with young people and their parents less likely to describe engineering jobs as "messy and dirty" and more likely to describe them as "modern, professional and interesting". But there are still barriers stopping students from making informed choices about their careers. According to the same research, more than one in five parents say that if their child came to them asking for advice on engineering and technology careers, they wouldn't know enough to help.

It's clear that the problem of getting students workplace-ready isn't just something that needs to be solved by educators. It's a responsibility for parents, who can influence their children's future career choices, and for industry, which needs to provide sufficient training for new recruits. Government and policy makers also have a responsibility, given that the decisions they make will shape our future workforces.

Although improvements require effort from all parties, change can start in the classroom. Teachers can give students the skills and insight they need for their future careers, providing they have the right teaching support and resources.

Workplace ready

Students often get their first taste of the workplace (and the skills required) on their work experience placements in Years 10 or 11. Developing workplace skills, however, shouldn't stop there. Teachers can bring real life scenarios and case studies to lessons using free teaching resources, such as those provided by IET Education (theiet.org/education).

Another option is to get students involved in engineering and technology challenges, either during the school day or as part of an after-school club. Examples include the *FIRST*® LEGO® League programme, where young people work in teams to design, build and program an autonomous LEGO® robot, all the while developing valuable skills for their future careers.

Understanding the options

Lessons which incorporate case studies and challenges may provide students with some inspiration for their future careers, but they also need dedicated careers guidance.

One way to get students thinking about and talking through their options is a session with a careers

advisor. But without the input of professionals who have everyday experience of working in STEM, careers advice can be broad, without enough detail or anecdotes to excite students.

An alternative is using careers resources created by professionals from the STEM industry, like those provided by the IET. Or even better – inviting STEM Ambassadors into the classroom to speak about their careers and support activities. Either way these volunteers can share their personal experiences in the STEM industry and discuss the routes they took to get there. Another option is to connect with an IET Schools Liaison Officer, whose role involves signposting and supporting STEM activities – from careers talks, to after school clubs and science fairs.

Out and about

Of course, nothing beats getting out of the classroom and showing students what the world of work really looks like. If teachers get the time, it's worth looking out for open days and local company initiatives, which allow students behind the scenes of STEM workplaces.

Every year, the IET runs an Engineering Open House Day, where organisations ranging from the BBC to Amazon open their doors to young people and families, allowing them to discover how creative, exciting and rewarding a career in engineering can be.

With plenty of opportunities to encourage students into STEM careers, and students increasingly showing enthusiasm for STEM subjects beyond GCSEs, it just takes teachers and schools to connect the two!

For resources to get your students workplace-ready, visit theiet.org/education

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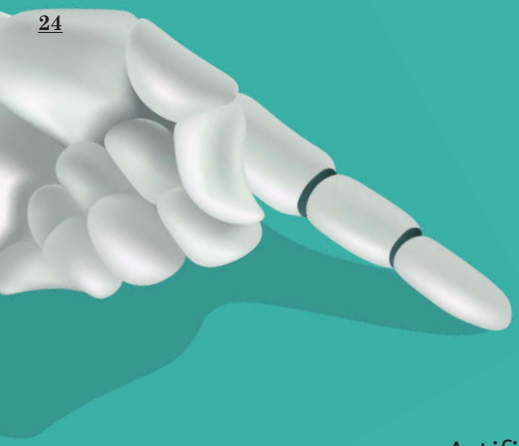
*www.engineer-a-better-world.org



Bring on the ROBOTS!

Artificial intelligence in the classroom can help young people build the skills they will need to shape their world, says **Joslyn Adcock**

The words 'artificial intelligence' (AI) and 'machine learning' (ML) are often associated with images of robots taking over the world. While this might sound like something out of a sci-fi film, it's also slowly becoming a reality. AI and ML are ingrained in our lives and play a powerful role in shaping the future of our world. Therefore, it's important that we make sure students understand the potential of this technology, and the impact it will have on their learning and careers in the years to come.

The first thing to note is that AI and ML aren't the same thing. While ML is a programmable process which allows a computer to learn a skill, AI goes beyond this by allowing a computer to 'think' for itself without being programmed.

Siri and Alexa are obvious examples, but other common uses of AI that you might not be aware of include smartphone photo editing software (whereby your phone automatically selects settings to enhance images), personalised recommendations on platforms like Netflix or Spotify (based on your previous activity), chatbots and algorithms on websites (which track your spending and suggest purchases). It's even used in home appliances (recognising your voice and cleaning habits and providing personalised suggestions and solutions for your family).

Practical application

The potential AI provides is huge, and within the education sector it is already included in the delivery of lessons, including personalised learning, and automatic grading and assessment - all with the intention of reducing workloads and driving efficiencies.

Moreover, with researchers believing that human-level AI could arrive by 2040, it's important that we also teach students about AI in the classroom. It's more than likely they'll be working in a world full of AI technology, so we need to equip them with the skills to not only understand how it works, but how it can be used to positively impact society and provide solutions for the challenges we currently face.

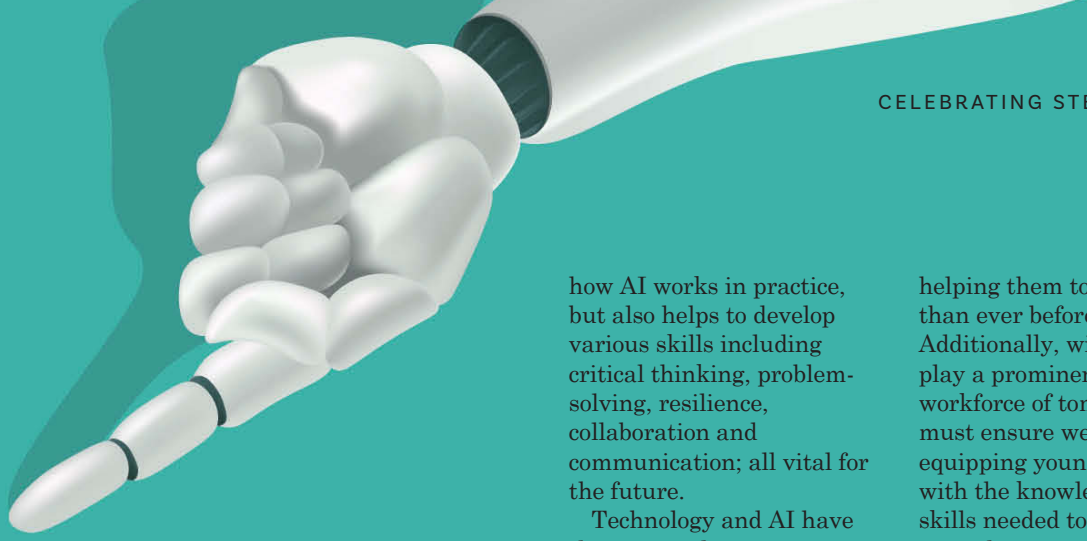
> ***"Showing students how it works across different sectors will help pupils understand the relevance of AI in any scenario"***

Now, AI and ML may not fall within the curriculum at the moment, and teachers might find it a difficult subject to teach – whether that's due to a lack of resources or skills – however, the value it brings to students' knowledge truly makes it a worthwhile investment. It incorporates broader computational thinking skills and the opportunity to take coding a step further. Integrating coding hardware and AI/ML technology provides the opportunity for students to develop deeper skills and awareness of its application in a real-world context, through a range of practical applications which they can then take with them into the world of work.

Given the breadth of the subject, teachers need a simple and practical way of bringing concepts to life in order to teach about AI and ML effectively. This is particularly relevant for STEAM lessons, helping students familiarise themselves with examples of how this technology might work in practice. Robotics and practical applications are a good way of achieving this. After all, robots are intriguing to children and using them to explore and demonstrate behaviours and ideas will help students understand how AI works in an accessible, creative and fun way.

A real challenge

Connecting AI lessons to real examples - such as exploring how scientists are using it to tackle climate change - will also help engage students and increase willingness to learn. Showing students how it works across different sectors will help pupils understand the relevance of AI in any scenario; this is particularly important for those students who may



struggle to engage with STEAM subjects and understand its purpose for what they want to do in the future.

For example, today, there are many navigation systems used in cars. Some of these systems are now taking on the drivers' responsibility of driving passengers to their destinations. To explore the concept of a driverless car, why not task students to design an autonomous vehicle that follows user-defined driving commands?

Set out your start and end positions. Before students figure out the best route between points A and B, they must learn the related context and how their autonomous cars can execute a series of movements based on user input.

To get them started, group students into pairs and set up an active brainstorming process to consider the following questions:

- What are autonomous cars and how do they work?
- Where do autonomous cars get their directions?
- What movements does the car need to perform in order to move through a series of city streets on a north, south, east, west grid?

Once they've had a chance to discuss the questions, get them to write down the solutions they will use for their prototype and ask them to explain how they will evaluate their ideas throughout the project. That way, when they are reviewing and revising their prototype, they will have specific information they can use to evaluate their solution and decide whether it was effective.

Hands-on learning

The next step is to build the vehicle using a robotics kit – the prototype can also incorporate other materials if students want to get creative; this is particularly effective when bringing in the arts and creativity into coding lessons. Students will then need to program the robot to move according to a recorded set of instructions given to it. Set up certain parameters for the robot to follow, for example, pressing the 'up' button will move the robot forward 30cm.

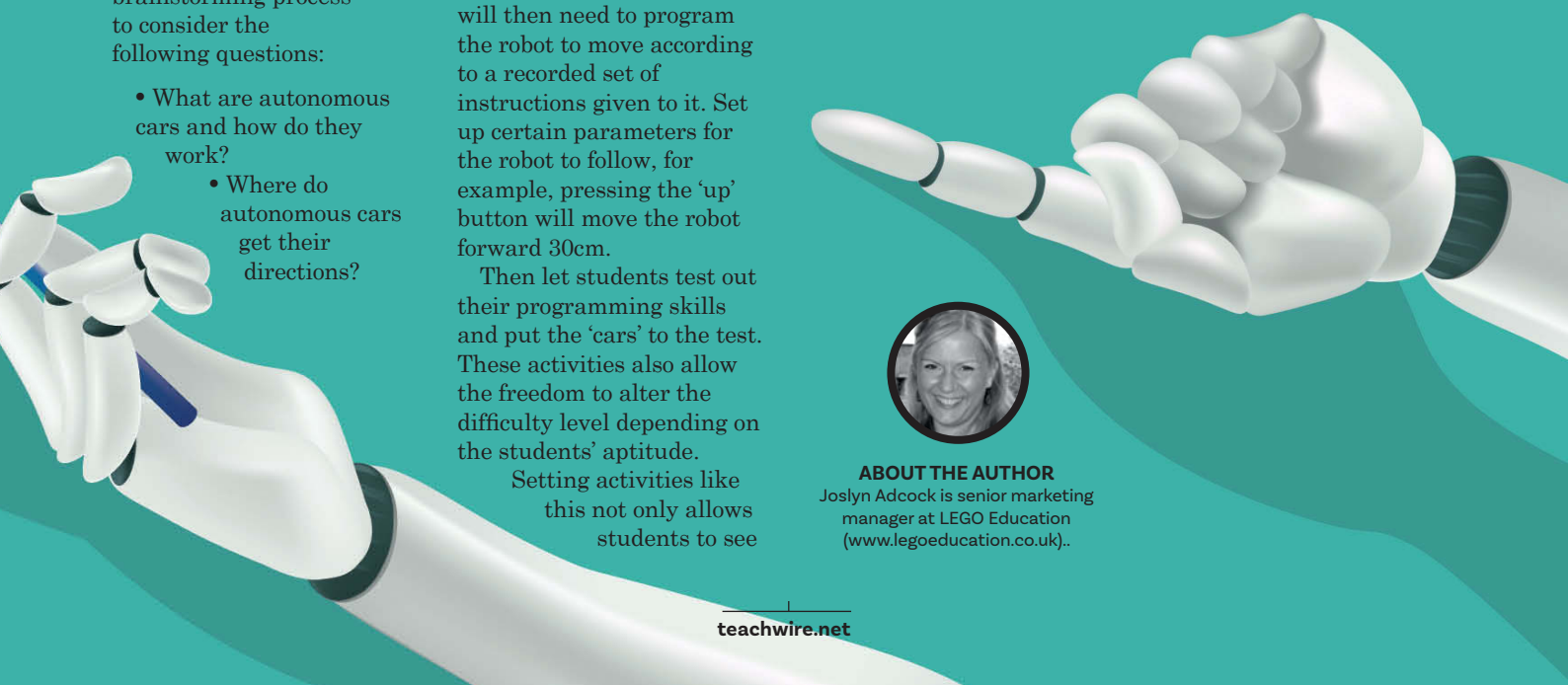
Then let students test out their programming skills and put the 'cars' to the test. These activities also allow the freedom to alter the difficulty level depending on the students' aptitude.

Setting activities like this not only allows students to see how AI works in practice, but also helps to develop various skills including critical thinking, problem-solving, resilience, collaboration and communication; all vital for the future.

Technology and AI have the potential to empower both teachers and students, helping them to do more than ever before. Additionally, with AI set to play a prominent role in the workforce of tomorrow, we must ensure we are equipping young people with the knowledge and skills needed to help them not only survive, but thrive, both now, and in the future.

5 POSITIVE IMPACTS OF AI ON EDUCATION

- **SHAPING PERSONALISED LEARNING** AI helps provide greater levels of individualised learning by understanding a student's current level and giving suggestions to improve outcomes.
- **AUTOMATING GRADING AND ASSESSMENT** With workloads being a huge issue in education, AI can be used to automatically mark and assess homework, including written and oral assessments by learning about previous examples of strong and weak papers rated by humans.
- **ENHANCING THE EXPERIENCE FOR SEN STUDENTS** AI has the potential to provide enhanced ways of learning for students with SEN including text to speech conversion, automated captioning of videos, voice commands, and eye control for keyboarding.
- **OFFERING INTELLIGENT TUTORING** AI can offer virtual assistance to students. AI's 'brain' never switches off meaning that students can study outside of the classroom and seek extra support without having to rely on the availability of their teacher 24/7.
- **INCREASING FAMILIARITY WITH TECH** Technology is everywhere and it's essential for children to learn about as early as possible. Demonstrating the potential and real-world context of AI will no doubt encourage more children to engage in lessons and consider careers within STEAM.



ABOUT THE AUTHOR
Joslyn Adcock is senior marketing manager at LEGO Education (www.legoeducation.co.uk)..

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We provide the tools and resources that bring learning alive and inspire the next generation to engineer a better world.

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Explore our engineering competitions for schools including the world-renowned *FIRST*® LEGO® League competition.

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THE WOW FACTOR

Discover how the IET can help inspire students about STEM

The IET is dedicated to addressing the education and skills gap in STEM (science, technology, engineering and maths) professions, particularly engineering. Through the IET Education programme, the institution provides teaching resources and competition days for schools, designed to introduce young people to engineering and fuel their enthusiasm for STEM subjects. The IET provides the tools and resources that bring learning alive and inspire the next generation to engineer a better world.

IET The Institution of Engineering and Technology

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TEACHING RESOURCES

The IET aims to make lessons even more interesting by showing that learning has real-life applications. Its teaching resources and classroom activities feature innovative examples of engineering and technology from around the world. Designed for students aged 11-19 years and available free of charge, they include lesson plans, handouts and film clips.

STEM POSTERS

The IET offers a range of free classroom posters to download or order. This pack includes reference posters on electricity and electronics; topical posters with examples of some of the most innovative engineering around today; and case study posters to highlight the real-life applications of these areas.

FARADAY CHALLENGE DAYS

The annual IET Faraday Challenge is an engineering-based competition for schools. Six teams of six students, aged 12-13 years, compete against one another to see who can design, create and promote the best solution to a given challenge. All challenges are genuine, real-life engineering problems.

CAREERS INFORMATION

The IET works with several organisations under the Tomorrow's Engineers brand to produce a range of engineering careers information for 11-19 year olds, their teachers and parents. These include a map illustrating various academic and vocational routes to engineering careers. Maps are available in formats for each UK nation.

"We need to widen the talent pool"

It's a rewarding, exciting career option, says **Neha Okhandiar** – so why aren't more young people choosing to pursue engineering?

How can young people future-proof their career? What advice do teachers, careers advisors and parents/carers need to share with pupils now? And what decisions do students need to make in order to keep their options open? One area that is under-represented and is ripe for a satisfying career is engineering.

Technology has a massive impact on everyone's lives. From how we work and travel, to the way we engage with friends and family, technology is constantly changing. Engineers are central to creating incredible devices and software that make the impossible possible. From cybersecurity to AI and robotics to 3D printing, engineering offers a wealth of hugely exciting career opportunities.

Engineers are integral to the success of major infrastructure projects and are at the heart of developments in nanomedicine; they make cars safer, roads smarter and broadband faster. It's engineers that develop sustainable solutions for our future food, water and energy needs, that work on artificial intelligence and that protect individuals and organisations from cyber-attacks. It's engineers whose ideas and innovations will shape our future world, making a real difference to how we live our lives.

But what do engineers *do*?

Equality, diversity, inclusion

Engineers design the systems, equipment and components that make air travel and space exploration possible. They develop the hardware and software in our homes, devices and wearable tech. They come up with innovations that improve health and healthcare. They are key in disaster recovery, flood prevention and building safety. They are cleaning up oceans, advancing recycling and reducing the carbon footprint in everyday life. They help amateur and professional sportspeople perform better and even keep animals safe and healthy.

Over a quarter of UK enterprises are involved in engineering, employing more than five and a half million people. Demand for engineering skills is high and will continue to rise in the future – EngineeringUK estimates the UK will need around 203,000 roles requiring engineering skills to be filled annually through to 2024.

There's a critical shortfall in the young people on pathways to fill future jobs that won't be resolved simply by encouraging more people to study science, technology, engineering and maths (STEM). EngineeringUK is committed to Equality, Diversity and Inclusion and the need to increase the diversity as well as the number of young people choosing academic and vocational pathways into engineering.

Women are underrepresented in engineering, making up only 12% of the workforce, and at A level only 29% of girls take STEM subjects. Black, Asian and minority ethnic people (BAME) are also underrepresented in the engineering sector.

There's a compelling business case for the sector to harness and widen the talent pool. This goes beyond securing the numbers of engineers we need – workforce diversity improves innovation, creativity, productivity, resilience and market insight, and should also enable more to benefit from engineering and technology products and services.

Come to the fair!

But what can schools and educators do to break down the barriers for getting more girls and people from BAME backgrounds staying on STEM education pathways? Working in collaboration with charities like us or developing partnerships with local businesses are just a couple of solutions.

Educators can set up or support a STEM or code club in their local schools in partnership with engineering firms and invite diverse speakers or outreach coordinators to deliver activities that excite the next generation of engineers.

Even better, EngineeringUK would encourage schools to consider giving young people the chance to meet industry professionals and

really get hands-on with engineering by visiting or hosting their own Big Bang Fair. Research shows that interactions with real-life engineers help young people to discover how fulfilling, diverse and exciting careers in modern engineering can be. Literally thousands of these encounters occur each year at The Big Bang UK Young Scientists & Engineers Fair (thebigbangfair.co.uk) held over four days at the NEC in Birmingham with 80,000 young people, teachers and parents attending. Visitors to The Big Bang Fair (11-14 March 2020) will get to see amazing new technologies in action; from piloting a drone and building a model jet engine to creating a 3D selfie and seeing inside your own eye.

Giving students opportunities to engage with real-life engineers and scientists is central to all EngineeringUK careers activity and helps support schools to meet some of the key Gatsby benchmarks for good careers guidance.

Challenge and success

Other great ways to develop students' coding and technological skills (as well as interpersonal skills such as teamwork and communication) is to take part in Tomorrow's Engineers EEP Robotics Challenge (engineeringuk.com/our-programmes/robotics-challenge) and Energy Quest (engineeringuk.com/our-programmes/energy-quest). The Robotics Challenge gets students aged 11-14 working together in teams to solve real-world engineering, technology and computing challenges. Facilitated by their teachers who can use the opportunity to grow their technical expertise, students learn how to design, build and control robots to complete a series of challenges and develop and present short research projects into a contemporary engineering problem.

The Tomorrow's Engineers Energy Quest is also a curriculum-linked, year-round, established programme for schools that helps improve the perception of engineering among both girls and boys. The free programme encourages young people to find out all about sustainable energy and learn about associated engineering careers.

We're keen to support and work with teachers, schools and careers advisors and have a wealth of resources that can inspire tomorrow's generation of engineers and help careers advisors or STEM professionals and ambassadors plan effective engineering outreach activity. Good examples of this are This is Engineering videos (thisisengineering.org.uk) and Tomorrow's Engineers careers resources (tomorrowsengineers.org.uk) which can be used as icebreakers or starter questions, and showcase inspiring real-life engineers.

We also have helpful resources for employers who should be looking to attract a more diverse cohort include Engineering work experience, an employer's guide (bit.ly/tsengineering), created by Tomorrow's Engineers, Royal Academy of Engineering and industry employers. It might be useful for schools to be aware when they are coordinating work experience with employers.

Collaborative working between educators, policymakers, industry and charities is crucial to success if we are to inspire tomorrow's engineers.

ENGINEERS IN ACTION

Case study 1: Philex

Philex designs environment-friendly electronics that collect ambient energy such as solar energy, vibration kinetics, heat, or magnetics in the air. This is then used in next-generation ubiquitous applications such as wearable activity trackers, portable devices and ambient intelligence devices.

"Every time when I have an interesting idea, I spend the majority of my time proving, and seeing and evaluating its impact. Maths, physics and science are very important to what I do; they are like coding tools for coders, cars for drivers, or medical instruments for doctors."

Case study 2: Mairead

The microchips inside our mobile phones and MP3 players are getting smaller and more capable of doing increasingly amazing things all the time. But, we're not robots made up of circuits so we need a way of converting digital signals – the way your MP3s are stored – into sounds that we can hear.

This is one of the projects that Mairead works on as a Design Engineer at Dialog Semi-conductor.

"I like it when we get a chip back and the designs I've been working on perform correctly. The time-frame from designing to manufacturing and testing a product can often be several months and it's a nice relief to find out that your work is a success."

Read more case studies and download free careers resources at www.tomorrowsengineers.org.uk

ABOUT THE AUTHOR
Neha Okhandiar is media manager at EngineeringUK

Faces of the FUTURE

Today's teens love photo filters, says **Gordon Cairns** – so why not turn their enthusiasm for an altered selfie into a learning opportunity?

Face-altering photo filters that radically alter your appearance might easily be dismissed as the latest hilarious viral craze, likely to be as dead as Grumpy Cat by 2020. However one such program could help address the paradox at the heart of education: how do we inspire our pupils to improve their future prospects when the only tools we have are offers of short-term rewards?

While Snapchat's Gender Swap filter has equally amused and horrified millions of users across the world since its launch by showing them how they might look as the opposite sex, apps which artificially age a face can actually change how the viewer perceives their future, causing them to make better decisions accordingly.

Looking ahead

So far, researchers have applied the technology to adults who were asked about their saving plans for retirement and then confronted with their own face converted by wrinkles, bags under their eyes and saggy jowls to connect them with the person they will become. The respondents were more likely to put extra money towards their retirement after they had seen the result of the face-aging app. Logically, this could also have an application for the young, given that the decisions they take today in the classroom will have a far greater influence on their future than how much money to put away for a pension.

And research conducted by educational psychologists has found a positive correlation between future thinking and future success. Dr Michael McKay from the University of Liverpool has collated compelling data that suggests thinking more clearly about what happens after school may help improve young people's educational prospects. It's not just in the long term that future thinking can have a positive impact, either. A large scale study conducted by researchers from the University of St. Andrews, involving almost 2000 S4 Scottish school students, found that those who thought about going to university were more likely to make healthy eating and exercise choices and less likely to smoke, drink alcohol or take drugs. It is clear that being able to positively influence the future thinking of teenagers can bring benefits.

A different person

But as anyone has tried to motivate pupils by focusing on their post-school life knows, it is not as simple as that. For many young people, the distant rewards of an interesting job, expensive car or glamorous lifestyle are just too far off to positively impact their behaviour today, so we resort to praise and short-term goals to motivate. The problem is, as psychologists have recently discovered, we see our future self as a different person. In an experiment conducted by Emily Pronin from Princeton University, participants were asked how large a glass of a disgusting cocktail they wanted to drink. Unsurprisingly they chose the smallest amount and were quite happy to choose a larger amount for other people. But when the scientists asked how much they might drink in a fortnight's time, they decided to give their future selves the same amount as strangers. Brain imaging supports the conclusion that, for many people, when we think about ourselves in the future, we react as if thinking about another person. We actually need to see a version of our future selves to empathise with ourselves.

Conveniently, modern technology has made it possible to apply the positive benefits of this research through a device most students carry around in their pockets - mobile phones. Through the creation of apps which prematurely age your face, technology exists to bring an image of this 'other' you to life.

And in a very unscientific manner, I have been trying out this technology with various classes over the last couple of years, using the Agingbooth app (others are, naturally, available).

An encouraging start

I've found that most students are adept at the relatively straightforward technical application of the app; with just a bit of manipulation the head fits in the frame on the phone or tablet screen. And ten years ahead seems to be a good time to stop the time machine; at the point when the educational decisions taken at school will be bearing fruit in the post-university or college phase. However I initially made the mistake of thinking that asking image-obsessed adolescents to be photographed would be equally trouble-free. In truth, of course, many snaps will be discarded before the teens

are happy with their picture and then a generous amount of time must be put aside for the 'Oh My God' moments for each pupil as they come face-to-face with their future selves. Any conversations about future aspirations will be further delayed as the young people inevitably act on the uncontrollable urge to show their images to everyone else in the room.

Nonetheless, my purely anecdotal experience of trying out an aging app to positively influence the current behaviour of pupils has been encouraging. They have generally taken on board the ideas and have modified their behaviour, whether it being working harder towards their exams or cutting out some classroom silliness. Of course research into how this technology might be used most effectively to positively alter students behaviour would be the ideal next step.

My own action plan is far more personal, but no less important. The next time I am contemplating finishing off the rest of that chocolate chip cookie dough ice-cream, I need to look at my disapproving face from the future, modify my behaviour, and put the remains of the tub back in the freezer...

HOW TO PUT YOUR STUDENTS IN THE PICTURE

- Depending on your school's mobile phone policy, ask your class to either download AgingBooth or one of the other free apps available onto phones, or use a class set of iPads.
- The pupils take a head and shoulders portrait with the device on selfie mode, then apply the aging app onto their own image to see how they might look in their future.
- This is followed up with a discussion about what job they might have, where they could be studying or what their accommodation might be like at that future stage of their life.
- We return to the idea of future selves when the class is to undertake an important piece of work or need motivation to finish a task. Ideally, the images should be accessed quickly to reinforce the idea they are working towards their future.
- Similarly, if someone is losing focus and is looking for a way to cause a disruption in the classroom, ask them to get their phone out and look at their aged picture and imagine how their adult self would want them to behave.

ABOUT THE AUTHOR
Gordon Cairns is an English and forest school teacher, who works in a unit for secondary pupils on the Autism Spectrum Disorder

In search of the LOST EINSTEINS

Challenge prizes can help inspire the next generation of inventors, says **Maddy Kavanagh** – but what about those young people who never take part?

Across the UK, schemes that focus on providing young people with the opportunity to participate in innovation and invention are currently only reaching 1.5 percent of the total pupil population. In an innovation landscape that already struggles with diversity and representation, this increases the risk of missing out on vital progress and positive societal change. If some groups of young people can't gain access to the fields of STEM, entrepreneurship and innovation, we could be stopping an infinite number of brilliant ideas from becoming reality. But what can we do to solve the issue of these 'Lost Einsteins'?

Finding the gaps

The term Lost Einsteins (bit.ly/2JsvpsX) was coined by US researchers J Van Reenen et al., and refers to the women, minorities and individuals from low income families who are sorely underrepresented among inventors. Within these groups, there are likely to be people who would have created high-impact inventions, had they had the opportunity to become inventors. The research also highlights another important factor: that exposure to innovation in childhood is also a driver for the gaps in innovation.

Nesta's recent Opportunity Lost (bit.ly/2Y00YSW) report set out stark realities for the field of innovation. The data shows us that among the founders of innovation startups, women are outnumbered by men by 4:1 and that over the last 15 years, only 7% of UK patent applications were made by women. This is a problem not only because a narrow subset of the population are generating ideas which will become products for the wider population, but in that it also suggests we're missing out on the talent of people who are currently underrepresented in the field.

Schemes like Nesta Challenges' Longitude Explorer Prize, which is returning in September 2019 with the support of the Department of Business Energy and Industrial Strategy, aim to bridge the gap between young people and innovation. Longitude Explorer challenges young people to develop innovative, practical solutions to society's biggest issues using tech and AI. The prize offers positive intervention, enabling students to discover innovation and entrepreneurship early on, while also learning the foundations of establishing a marketable product from business mentors.

Incredible ideas

We've seen some truly incredible ideas develop through previous iterations of the Prize. The winners of 2015, an all-girl team from Gloucestershire, developed an app which helps charities coordinate the logistics of supporting vulnerable people across the world. A runner-up team created a data collection and navigation tool for ambulances, which allows crews to check live data about nearby hospitals, such as available beds. The 2017 winners created a wearable device for people on the autistic spectrum, which changes colour based on sensory information to reflect the emotions of its wearer, allowing teachers to be alerted to the anxiety levels of their students without verbal communication.

But how could programmes like Longitude Explorer help tackle the diversity gap in innovation? Our research shows that the way these schemes are delivered is vital. We know that for young people from under-represented groups to feel like they can engage in innovation, they need role models they can relate to, as this gives young people the confidence boost needed to believe that they also have the potential to succeed. Van Reenen's research shows that growing up around female

GET INVOLVED!

Longitude Explorer Prize will open for entries at the end of September 2019 and will run throughout the academic year. Nesta is calling for schools and other learning groups to support 11-16 year olds to enter ideas in teams of 2-5 for how AI can make the world a better place. Up to 30 teams will gain access to expert mentors and a toolkit to turn their ideas into reality, and the winning team will win a cash prize for their school and individual prizes for students. To keep up to date, register on the website: **nesta.org.uk/project/longitude-prize**

inventors directly affects the likelihood of girls becoming inventors, while growing up around male inventors has no impact. This year, we'll be using role models in a more prominent position, sharing their stories of success and their learnings from when things have gone wrong. Working with mentors will also give young people the opportunity to build a strong network with respected figures in innovation and gain practical opportunities to see how their own skills can create technologies for social good.

We also aim to remove the barriers that young people face to accessing opportunities. The current spread of opportunities available across the UK is massively uneven, with pupils in the South of England up to twice as likely to take part in schemes as those in the Midlands and North, with even fewer opportunities in Northern Ireland and Wales. In addition to geographical disparity, Nesta's research found that schools with the most deprived students are considerably less likely to take part in invention schemes, and are six times less likely to reach the finals of innovation competitions than those with the least deprived students. By linking the programme to the work teachers are already doing, and supporting schools with the practical resources needed to take part, we aim to create a level playing field for all teams to be able to enter the prize, and even win the whole competition.

"Schools with the most deprived students are much less likely to take part in invention schemes..."

The female touch

Given what we already know about the imbalance of opportunities available to young people to learn about innovation, and the gender gap that already exists in STEM subjects, it's particularly pertinent that the theme of this years Longitude Explorer Prize is Artificial Intelligence. Whilst women represent 47% of the UK workforce, they only represent 17% of the tech sector, with new Nesta research (bit.ly/2xK1aXE) suggesting that female representation is lowest within AI compared to other STEM fields, at 13%. Although gender inequality elsewhere in STEM is starting to show improvements, it appears that AI is stagnating.

The absence of women in AI means young women are missing out on some of the most groundbreaking and exciting careers, but also the sector itself misses out on the positive impacts of a diverse workforce. A more diverse workforce would result in a wider set of ideas and inputs when building these new technologies, going some way to mitigating the risk of bias. Nesta's research also shows women are more likely to consider societal, ethical and political matters, which will, in turn, result in more considered, potentially less biased production of new technologies and innovations.

By basing Longitude Explorer around the social benefit uses of AI, we want young people, and particularly girls, to realise not only the potential that AI has to influence wider society for the better, but how they can be the driving force in this change.

ABOUT THE AUTHOR
Maddy Kavanagh is programme manager for Longitude Explorer at Nesta Challenges, as well as on the Inventor Prize.

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WHY I LOVE...

Adrian Brandwood discusses how CREATE Education helped his school introduce 3D printing into the curriculum

ABOUT ME:

NAME:
Adrian Brandwood

JOB ROLE:
SLE Head of Design Technology

SCHOOL:
Broughton High School

FAVOURITE FEATURE:
The confidence in design thinking skills and 3D modelling, CAD and CAM skills that the use of 3D printing brings to our pupils.

TALKING ABOUT:
3D PRINTING AND STEAM LEARNING IN SCHOOL

Our vision three years ago was to offer 3D design and manufacture to all our pupils.

We needed dependable, quality equipment that would allow a reliable experience. This is where our relationship with The CREATE Education Project was developed. We wished to source a supplier of equipment that was not only interested in providing the kit but also shared our vision to develop all pupils' experiences of 3D printing and its potential in the future - to allow for incremental skills to be developed year on year, from Year 7 onwards.

There are many aspects of teaching and learning in Design Technology that link pupils' experiences to the world of work.

However, nothing has had the impact that 3D printing has had on our curriculum, transcending all disciplines of Design Technology in a creative, inspiring and challenging way. CREATE Education has supported both pupils and teaching staff to bring to life new opportunities in 3D printing. Over 12 months, using seven 3D printers of different sizes to cater for our curriculum demands, CREATE's passion for all aspects of 3D printing has provided the unique opportunity we desired, with all pupils in a class having access to the equipment, alongside tailored resources for delivery to enable the pupils to use the software and produce 3D prints and high quality models that were fit for purpose, with confidence.

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The impact on teaching and learning has been significant

All pupils have a growing confidence with 3D modelling, in turn developing excellent CAD and CAM skills and producing high quality prototype models. The use of 3D printing has contributed to all pupils' GCSE outcomes in manufacturing in a variety of subjects including engineering, textiles and design technology. Our after school engineering club is now even more popular as its primary focus is on building even greater skills in design thinking and manufacturing using our Ultimaker 3D printers. Pupils in all years regularly attend and have the freedom to innovate and be as creative as possible.

The experience has opened the pupils' eyes to new roles and career pathways

Technologies such as 3D printing allow students to design and create in real time and develop needed skills for the future. By taking theoretical science and maths principles and applying them along with design thinking, creativity and problem solving to solve real world scenarios, engineering skills are developed. Most importantly, access to and experience of the new technologies through companies such as CREATE Education provide students with the opportunity to get ahead, and prepares them to take advantage of the jobs and careers available to them, be that by further education or apprenticeships.

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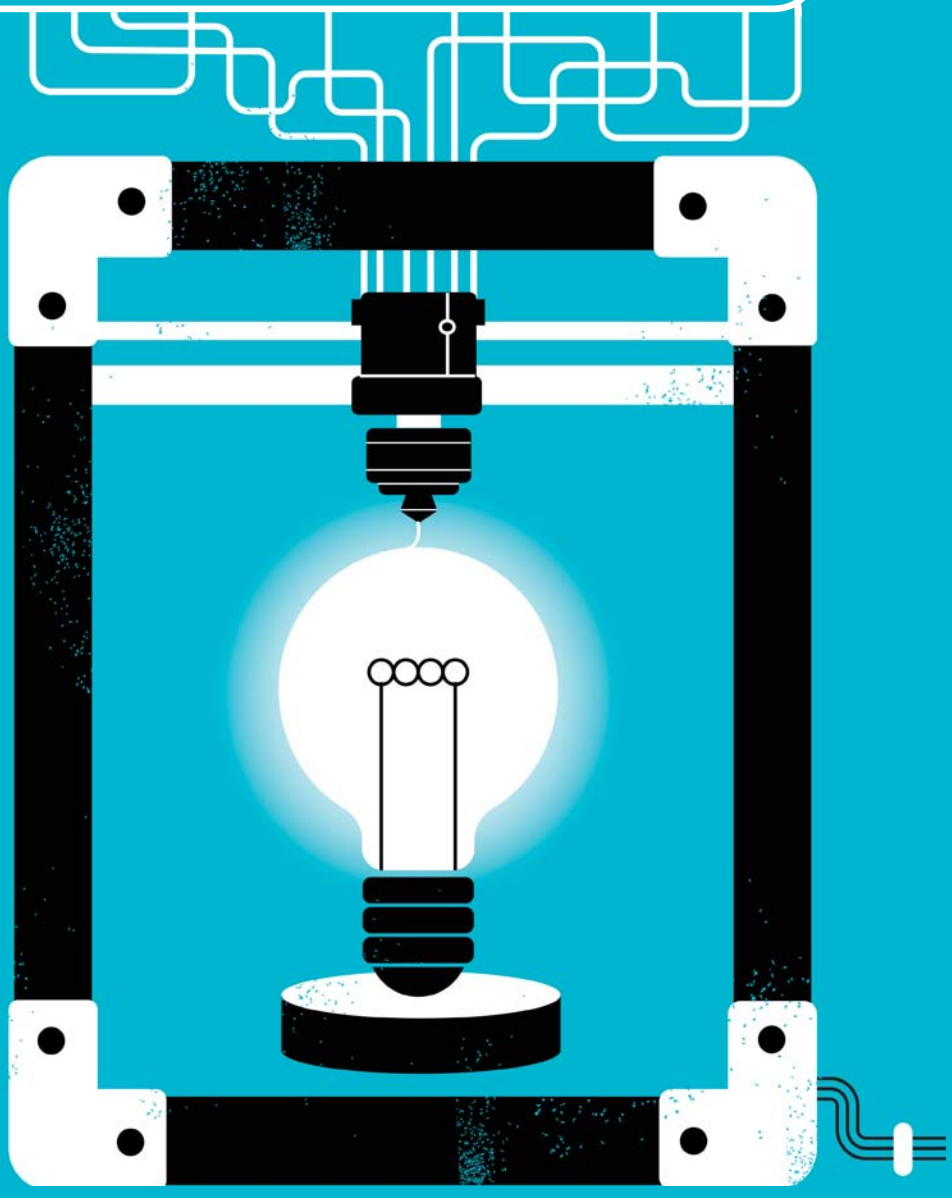
+ Meets new DfE statutory guidance linking careers guidance to Gatsby benchmarks.

A new generation of CREATIVITY

Technology is changing the way we work, as well as the way we learn – and schools and industry need to be a part of it, says **Nicola Shaw**...



"The future of work will be a race between education and technology"

Mauricio Macri – President of Argentina – host of G20, 2018

The advent of Industry 4.0 has highlighted that as disruptive innovation and new technologies create different ways of thinking and working, there is a need to address the impact and indeed, potential opportunities, for workforces of the future.

As manufacturers across the globe move toward new business models with data, cyber systems, cloud computing and technologies such as 3D printing at their foundations, it has been identified that employers are facing a global skills crisis due to the rapid development of digital innovations and the current lack of skills needed to adapt to these technologies.

Moving forwards, industry will need to find employees who can apply the principles of the technological revolution by being adaptive, agile and responsive, whilst having the ability to solve complex problems with both critical thinking and creativity.

The good news is that research suggests employment levels could thrive as employees work in conjunction with new technologies via integrated thinking or 'systems thinking' instead of the perceived threat of the workforce being replaced by Industry 4.0 technologies such as Artificial Intelligence (AI), machine learning and robotics.

The engineering gap

There is no doubt that one of the new emerging technologies of Industry 4.0 – additive manufacturing, more commonly known as 3D printing – is becoming more mainstream, with the technology permeating into a wide spectrum of industries including engineering, manufacturing, medicine, architecture, product design and even the food industry.

New job types are being created all the time as 3D printing develops and combines with other Industry 4.0 technologies.

Unfortunately, however, there is no current requirement directly documented in the curriculum for schools to develop the knowledge and skills required by industry

to prepare them for future careers in this area.

In schools, the STEM focus in the classroom tends to be toward maths and science – with the increasingly notable absence of Design and Technology (D&T) within the curriculum. Indeed, in an analysis by the Press Association, entries for GCSE design and technology in England fell by 32% between 2012 and 2017.

This is impacting directly on the 'E' in STEM, with many of the key skills gaps being noted within the engineering sectors.

Engineering is about problem-solving using imagination, creativity, scientific knowledge and technical skills to produce solutions to real life problems, with engineers desperately needed to help tackle some of the world's biggest challenges.

The use of 3D printing within the classroom is the perfect vehicle for developing the use and application of knowledge in a hands on, fun and practical way and developing the top work skills as identified by the World Economic Forum (see panel, top right).

If you can imagine it, it can become a possibility through the development of new technologies – this is engineering!

Design process

Many schools are actively adopting 3D printing technology; 3D printing provides design technology and art departments with a number of benefits including the use of technology as a rapid prototyping tool, allowing students to quickly produce multiple iterations of a product or part.

Students use creativity and design thinking skills to design a 2D model or sculpture and then take the learning into design software before realising their design in a 3D finished product. With art being increasingly recognised as being a valuable addition to the traditional STEM subjects, often referred to as STEAM, creativity and artistic flair are valuable skills in their own right. New technologies are all about user interaction and aesthetics. Innovations such as 3D printing allow students to design and create in real time.

> *"New job types are being created all the time..."*

By taking theoretical science and maths principles and applying them – along with design thinking, creativity and problem solving – to real world scenarios, not only are engineering skills developed but, importantly, students are engaged in the process – which in turn could lead to a desire to pursue careers in engineering.

Most of all, access to and experience of the new technologies provide students with the opportunity to get ahead, preparing them to take advantage of the jobs and careers available to them.

Industry partners

Industry also recognises the need to bridge the gap and facilitate the transition of its workforce and the way in which it collaborates with schools to forge and secure links to address the shortage and develop the skills needed for the future.

Some corners of industry are addressing this need by developing a new range of apprenticeships and on-the-job learning schemes.

What becomes apparent, is that STEM/STEAM learning should not just be an extra-curricular add on, or an afterthought to the curriculum; it should be front and central as the key to developing skills for the future in our industries.

The perception of STEM/STEAM career pathways amongst educators, parents and students needs to be altered.

Via the provision of technology-led capabilities and expertise, industry and education can work together to provide students with the opportunity to develop the skills required by industry alongside their standard curriculum delivery.

A key example of this would be how Ultimaker has worked with education and industry partners to develop a 3D printing knowledge skills framework for use in the classroom, which can be downloaded from www.createeducation.com/resource/knowledge-skills-progression.

Fully informed

This type of learning addresses the introduction of the new statutory guidance from the Department of Education (DfE) around offering career guidance linked to the Gatsby Benchmarks. It reinforces a further opportunity to forward thinking departments for linking their curriculum to careers (Gatsby Benchmark 4) alongside standard curriculum development/delivery.

As the industry landscape changes and a job for life becomes less and less of a certainty, students will require the mentality to adapt, upskill and reskill throughout their careers, with a need for continuous and agile learning with an understanding of how to apply digital skills.

Industry needs to support and enable teachers to have valid career examples to draw upon, and help them to understand the diverse range and wealth of opportunities to future workforces. With this information, they will be able to encourage and inspire students to want to develop the work skills needed, and to show the possibilities available to them through new technologies and innovation.

WORK SKILLS: THE INDUSTRY WISH LIST

In 2016, the World Economic Forum asked global human resources and strategy leaders to identify the most desirable work skills for 2020. They included:

- **Complex problem solving**
- **Critical thinking**
- **Creativity**
- **People management**
- **Co-ordinating with others**
- **Emotional intelligence**
- **Judgement and decision thinking**
- **Service orientation**
- **Negotiation**
- **Cognitive flexibility**
- **Developing creativity**
- **3D modelling**
- **Design thinking**
- **Problem solving**

ABOUT THE AUTHOR
Nicola Shaw is the Community and Brand Development Manager at The CREATE Education Project.

Are you a manager... OR A LEADER?

Brilliant STEAM provision needs an outstanding D&T department – and that depends on excellent leadership, argues **Andy Mitchell**

Effective leadership is vitally important In all walks of life. Recently, this country's governance at even the highest level has been in desperate need of exactly that, and found to be profoundly wanting. Here I want to reflect on educational leadership – and specifically, subject leadership in design and technology (D&T). Once an aspect to which great importance was attributed, subject leadership in some areas seems to have been deprioritised. Specialism is out and 'generalism' is in – and this is true at all levels from school upwards. Take for example the post of our Her Majesty's Inspector, National Lead for Design and Technology at Ofsted. This used to be a full-time role; but now only 30 days per year are allocated to the specific interests of D&T!

Many positions of curriculum responsibility in schools today don't even contain the name of an individual subject within them – and when they do, it's often only a smaller part of an overarching role. Whereas it was once commonplace – even in a small school – to have a D&T head of department on the same grade as the head of mathematics, these days, that role has been reduced in status and aspects of it subsumed elsewhere within a broader remit of responsibility for several subjects. What does this mean for the subject?

By design

Within the management hierarchy of any school the role of subject expertise and related leadership is absolutely critical. The headteacher, who is ultimately responsible for curriculum standards, cannot be 'expert' in every subject, so they will always rely on experts to guide, lead and manage the relevant curriculum area. Likewise, more junior teachers will look to the subject leader for guidance on a multitude of fronts. We must ensure that D&T continues to develop and embrace the many changes

our educational and technological world requires. To do this, we must also make sure that D&T and its teachers are not underrepresented, and that curriculum as well as logistical matters are dealt with professionally.

I attended a seminar a few years back, hosted at the Danish Embassy and chaired by Barry Sheerman MP. It explored how designers had been employed by the Danish Government to help design policy, making it more intelligible and acceptable to the public. (At a time when our country's leaders need to be developing creative solutions to a national crisis, one can only wish that our own government valued the contribution of design as highly!) Applied to the context of schools, approaching the development of a D&T department using leadership and management 'by design', ought to be something that D&T teachers are naturally good at. After all, the process involves resolving many conflicting issues and constraints, understanding and relating to people, securing resources and most importantly, possessing a vision.

Association support

Fortunately, there is help available from the Design and Technology Association in the form of the organisation's Subject Leaders' Files and online Self Review Framework, enabling you to understand how to develop approaches that will enable you to address the key responsibilities associated with departmental leadership. Collectively these provide a range of practical strategies, tips and ideas. The 10 individual files cover:

- D&T – understanding the National Picture
- Leadership of D&T: Vision, Mission and Policy
- Prioritising learning in D&T
- Planning a curriculum for learning in D&T
- Focusing teaching on learning and assessment
- Monitoring and managing standards
- Managing the D&T team
- Managing the learning environment for D&T
- Managing change and improvement in D&T
- Financial management

The Design and Technology Association's online Self Review Framework (SRF) has been designed to help you undertake a self-review process and develop D&T in your school. However, it also helps you evaluate your effectiveness with respect to each aspect.

The framework supports you scrutinising your current provision plan to fully address the National Curriculum programmes of study for D&T and related D&T activity. It explores three distinct domains in D&T: principles for learning; curriculum for learning; and environment for learning. It also requires you to develop your schemes of work so that they are 'learning driven' and contribute to a broad and balanced curriculum.

Subject leaders and their teams undertaking the review are guided by a series of questions in each domain, which will demand they engage in professional discussion with colleagues. Together they identify suitable sources of evidence to support responses. The E-portfolio amassed should present and illustrate where your department is with respect to its development, showing both strengths and areas to develop.

Ambitious vision

Perhaps the most important attribute a strong leader possesses is vision, coupled with ambition. Never has this been more important than when dealing with the vicissitudes affecting D&T in many schools today. As a D&T leader, you need vision for your students' learning, the department, the subject and not least, your own career. Staying ahead of the game and making sure all of those interests are met means keeping up to date, securing resources to provide a modern and relevant D&T curriculum, and most importantly, shouting about it! No subject has to work harder at convincing others of its value – but at the same time, no subject has such visually eye-catching and impressive outcomes to celebrate. Success breeds success. But success needs announcing, and a subject leader who does not take advantage of the opportunities D&T affords for this is missing a trick. Beyond the obvious methods of exhibiting work in school and on its website, representatives of the community, local press and the Subject Association all need telling about the good things going on in your department. Gaining public acclaim for your students can only do your department good; and don't forget to enter competitions, too.

Leading a department is very different from managing one. The former subsumes the latter, but without proactive and creative leadership a department will never fully reach its potential.

> *"No subject has such visually eye-catching and impressive outcomes to celebrate..."*

4 WAYS TO BE A PROACTIVE LEADER

- Read educational press and journals associated with your subject
- Take an active interest/get involved with the work of the D&T Association --your Subject Association
- As a member, benefit from the resources it provides to support you – in particular, the D&T Subject Leader's Handbook
- Identify a critical friend to discuss things with and possibly coach you – either within your own or a neighbouring school

ABOUT THE AUTHOR
Andy Mitchell is an independent educational consultant and until recently, was Deputy Chief Executive of The Design and Technology Association. He has substantial experience of providing CPD, advising DfE and leading government funded national D&T education support projects, including an MA in D&T Education

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First News Education is offering a prize of a year's access to their online iHub, the Bett award-winning news and literacy platform. Delivering weekly reading activities based on the latest news stories from First News, the UK's only newspaper created for children, the iHub's interactive comprehensions, vocabulary puzzles, polls and debates are created in three reading levels for KS2 and KS3 pupils. These engaging activities are automatically tailored to suit pupils' reading levels, helping them accomplish the best they can by scaffolding their understanding of news stories in the most effective way. With the flexibility to either select or automate which activities are assigned to complete at school or for homework, the iHub is an invaluable, time-saving tool for teaching professionals across English, citizenship, PSHE and subjects across the curriculum such as geography and science, where pupils are required to understand, evaluate and respond to information accurately. With the added benefit of instant marking on multiple-choice questions, the iHub not only supports teachers but encourages pupils' accuracy and precision, motivating them to develop their understanding of news stories while enhancing their core literacy levels. You can track the progress of your class through a reporting dashboard, meriting achievements and identifying where extra support may be needed, making the iHub a perfect solution for lessons, homework and intervention groups. Find out how schools are transforming their approach to literacy with the iHub, visit schools.firstnews.co.uk/case-studies

What's on offer?

- Access to the First News iHub for an unlimited number of teachers and 280 pupils
- Weekly, interactive reading activities tailored for KS2 & KS3
- Webinar training with a member of the First News Education Team

Learn more at schools.firstnews.co.uk

Enter now at teachwire.net/giveaways

* Competition is open to all schools. Closes midnight, Friday 11th October, 2019. The winner will be notified on Friday 25th October.

“Creative learning is easier than ever”

Joslyn Adcock, senior marketing manager at LEGO Education, talks LEGO® MINDSTORMS® Education EV3

30 SECOND BRIEFING

LEGO® MINDSTORMS® Education EV3 engages students in STEAM learning through hands-on learning and real-world robotics. It helps them build key skills and develop digital and engineering knowledge to help children for a future engrained in technology.

T&I What is LEGO® MINDSTORMS Education EV3?

JA LEGO® MINDSTORMS Education EV3 is a resource aimed at learning across all STEAM subjects at Key Stages 3 and 4. The resource has been designed to introduce students to computing, D&T, maths, engineering and science, and through hands-on learning, they are taught the curriculum while building and programming a robot. The combination of physical LEGO® bricks, standards-aligned activities, and an intuitive block-based coding environment means that interactive, creative learning is easier than ever to achieve.

Why should teachers invest in robotics?

The EV3 ‘Getting Started’ set provides teachers with everything they need for STEAM lessons – even those with no prior knowledge of robotics. It’s easy to use and is suitable for pupils of all abilities. It comes with curriculum-aligned lesson material, a user-friendly interface, introductory videos and step-by-step guides. The sets can be used across all subjects, bringing learning to life and motivating students to plan, predict, test, problem-solve, analyse, and explore, all while developing career-readiness skills.

What key skills and abilities does it help to build?

The robotics element of LEGO® MINDSTORMS® Education EV3 allows children to build core skills they will need for future careers. As well as technical skills including coding and engineering, students can develop resilience and communication, as well as the ability to hypothesise, collaborate, and think critically in a problem-solving environment; all invaluable skills and expertise that employers are looking for in the current industrial climate.

What sorts of activities can you do in the classroom?

LEGO® MINDSTORMS® Education EV3 is extremely versatile. Through various programming languages, including Python, students can build and code anything from space explorers and driverless cars to robotic arms and sorting machines. Activities include using sensors (colour, ultrasonic, touch or gyro sensors) as well as motors, which students can then program using the central “EV3 intelligent brick”, a small programmable computer that controls the motors and collects sensor feedback using Bluetooth or WiFi.

ABOUT JOSLYN:
Joslyn Adcock is senior marketing manager at LEGO Education

Find out more at:
legoeducation.co.uk
0800 5346 0000

What do teachers say about it?

Andy Snape, assistant head of faculty at Newcastle-under-Lyme College, says: “EV3 is fantastic. It gives me the opportunity to teach lots of different STEM subjects at GCSE level as well as cross-curricular sessions aimed at raising the aspiration and enjoyment of these subjects. The kits are versatile and engaging and the supporting curriculum content and software is perfect for helping and challenging learners. They benefit from the hands-on experience they get while putting the theory into practice.”

What’s the difference?

+ The kits can be used in any subject to bring lessons to life
+ Significant ROI; combining high-quality educational content and the ability to use the kits time and time again
+ Helping students to understand the purpose of what they’re learning through real-world activities

CLASSROOM INSPIRATION

Fresh ideas to take teaching and learning to the next level

STUDENT VOICE: Amelie Cooper, Y7

"Over the past year at Honywood, where I started in September 2018, I have found that having an iPad really makes a difference to the way that I learn. It has helped me to have a better knowledge and understanding of the things that we learn about. The apps which have helped me the most to organise my classwork and complete my homework with are: Book Creator – it is really easy to use and you don't have to save your work afterwards, it does it automatically, and you can also save it to Drive so that you can access it easily and upload it to Classroom; I have also found that Google Slides, Google Docs and Google Sheets have been helpful, as they are also extremely simple to upload to Classroom and share with the teachers, as you can just add them to the slides/docs/sheets.

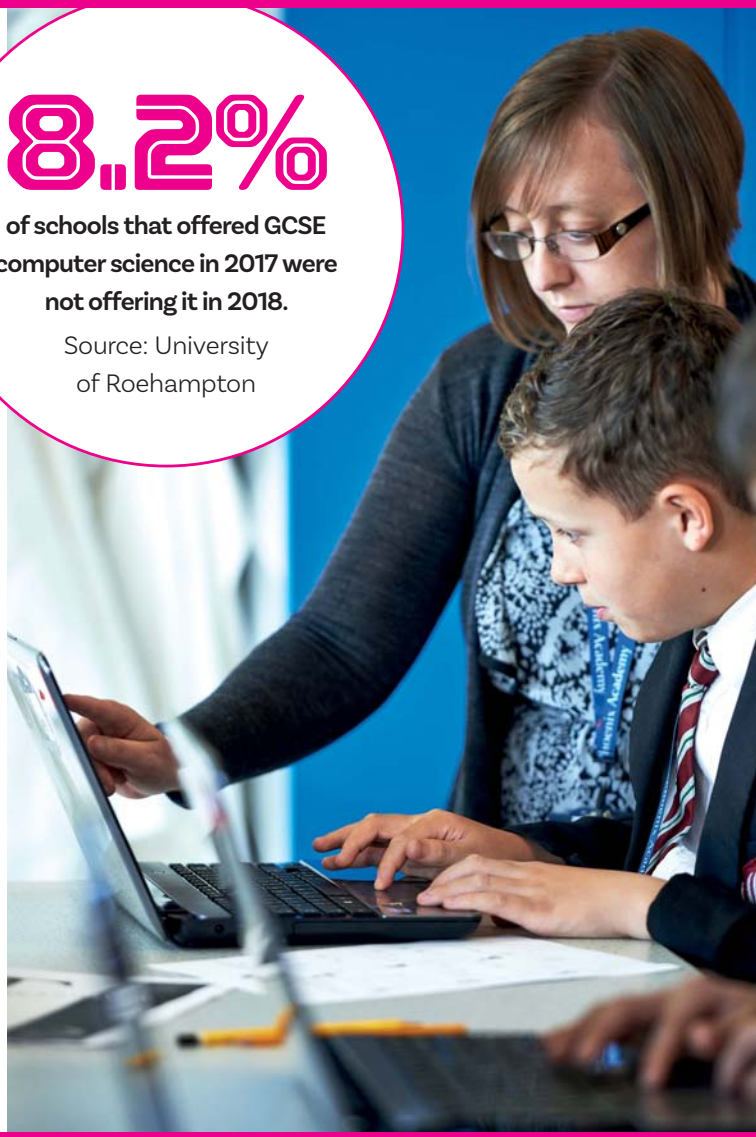
At the start I found it hard to upload to Classroom and use all the different apps, but the teachers have been very supportive, and as the year has progressed, I have gotten used to it and now it's hard to imagine working without them. This is because so much of the work that we do in school involves using technology. I find that by using the iPads and being able to research facts that I didn't already know, and then writing them in my books so that I can look back at them whenever I need to, I really remember what I have learned.

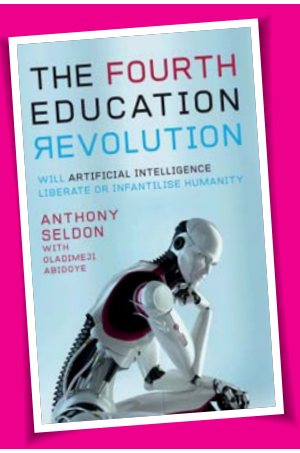
Using technology like we do at Honywood is very different from what happens at other schools, primary or secondary. I feel that I am very privileged to be able to experience how our school works, and to be able to have the technology that we use. I think that it is a unique and amazing way to teach and learn, and I think that it definitely helps me and the other students and teachers."

8.2%

of schools that offered GCSE computer science in 2017 were not offering it in 2018.

Source: University of Roehampton





RECOMMENDED READING

The Fourth Education Revolution (Anthony Seldon, with Oladimeji Abidoye, The University of Buckingham Press, £14.99)

The title of this book invites curiosity: what were the other three 'revolutions'? The subtitle hints at what the next revolution is: Will artificial intelligence liberate or infantilise humanity? Rather than launch straight into a discussion of AI and what it may offer to education, the author examines the various roles of education, and the tasks which have to be undertaken by teachers, and those that are the responsibility of students. With copious references and bang up-to-date examples, the book is both fascinating and instructive, although an odd omission from the index is 'parents'. As with many issues in education, there are always at least two opposing viewpoints, but Seldon performs a fine balancing act. Some of the models of education being tried out around the world may surprise you. The book's overall message is that some of the future is here now. What happens next is down to us.

Reviewed by Terry Freedman

EquatIO®

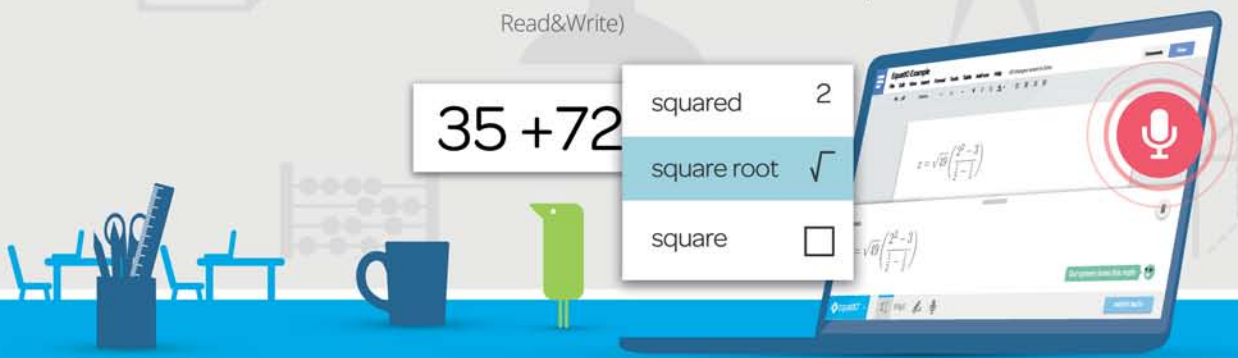
make math digital

the future of maths & STEM

Designed with students in mind, EquatIO is an equation editor which takes the pain out of creating equations, graphs and maths quizzes digitally.

EquatIO instantly understands what students are typing, dictating or handwriting, turning expressions into clear, accurate on-screen formulas.

- **Save time and effort** with no tricky coding or mathematical description languages to learn
- **Intuitive prediction** speeds up accurate entry of complex maths expressions
- **Create and manipulate graphs** using the graphing tool powered by Desmos
- **Integrates seamlessly** with Read&Write and Canvas LMS
- **Hear maths equations read aloud** and assist students with maths-to-speech (when partnered with Read&Write)



The good news is EquatIO is absolutely **free** for educators!
To get set up, simply visit **text.help/tech-innovation-sep**

texthelp®

5 REASONS TO TRY... EquatIO

Patrick McGrath, Education Technology Specialist, discusses how Texthelp has made maths digital, with EquatIO®.

30 SECOND BRIEFING

Made to help maths and science teachers and students at all levels, EquatIO lets everyone create mathematical equations, formulas, Desmos graphs and more on their computer or Chromebook. A perfect partner for today's tech focused schools, it helps students engage, explore and express maths on digital devices like never before.

1 IT LETS YOU CREATE ENGAGING MATHS RESOURCES - QUICKLY

Imagine a central storage space that allows you to create and save activity worksheets, which you can share directly with your students. Just like a virtual classroom, you can present a mathematical problem to every student at once, and have them work through it at their own pace before submitting their answers. I also love the Screenshot Reader which allows you to grab maths from your favourite web sources, and quickly repurpose for engaging and accessible classroom activities.

2 IT MAKES MATHS ACCESSIBLE

EquatIO enables students to convert inaccessible expressions or equations into accessible maths that can be read aloud. Maths-to-speech has been a game changer. It allows students to hear what they've typed and correct as needed. It's an ideal way to build the language of maths, and is perfect for students who are auditory processors or those with individual challenges.

3 ENCOURAGE A SUPPORTIVE AND ENGAGING ENVIRONMENT

I love the fact that EquatIO is interactive. It gives students that one to one connection with their teacher, whilst providing a platform for fun and creative learning. Activities created using EquatIO Mathspace can be used for collaborative group work, which allows for student interaction, creating a friendly atmosphere where students will enjoy learning.

4 BUILT WITH UNIVERSAL DESIGN FOR LEARNING (UDL) PRINCIPLES IN MIND

EquatIO supports a wide range of learning styles. The toolbar enables students to choose how they express their thinking with specific tools for showing work, such as handwriting recognition, speech input, graph editor (powered by Desmos) and manipulatives.

5 IT'S FREE FOR TEACHERS!

We know how hard educators work everyday to support their students. And as a thank you for your time and effort, we have made EquatIO FREE for teachers! This means you can get a premium subscription at no cost. Just visit **text.help/tech-innovation-sep** if you're interested in getting set up with a free teacher account.

Contact:
education@texthelp.com

Texthelp's literacy and learning solutions help people of all ages achieve their potential by understanding, reading, writing and communicating with greater ease and confidence.

KEY POINTS

VARIETY OF INPUTS

Try prediction, dictation or handwriting recognition to create maths in the equation editor and insert into a Google Doc.

DYNAMIC GRAPHS

Powered by Desmos, the graphing calculator makes maths visual. Simply enter any expression or data set into EquatIO and see it plotted instantly.

EXIT TICKETS

Create a maths quiz with Google Forms, and let students respond directly. The EquatIO integration means that you can enter detailed maths, easily.

EQUATIO MATHSPACE

Turn problem solving into problem sharing! Create an EquatIO mathspace to bring maths to life for the whole class.

Welcome to... THE WIREARCHY

Moving away from the 'command and control' method of management can create a more collaborative partnership, and drive positive change, argues **Denise Inwood**...

The growth in academies has seen the relationship between schools and local authorities change dramatically over the years.

Along with this, the decline in local government funded school improvement networks has led to far fewer opportunities for senior leaders to come together to discuss their experiences and share examples of best practice. This has left many heads feeling isolated.

While local authority networking groups offered headteachers an option for collaborating with their peers, they operated on a largely traditional, hierarchical model. So, senior leaders didn't have much control over the content of the meetings or what they wanted to achieve from them.

In my view, some fresh thinking is needed in the way headteachers connect and collaborate.

A fragmented sector

The issue was highlighted by ASCL's president, Richard Sheriff, at the organisation's recent conference, who observed that, whilst the education system was becoming fragmented – partly as a consequence of decentralisation – major opportunities were opening up for schools to work together.

As collaboration becomes ever more critical to successful school improvement, there is an innovative and effective way to bring educators together that should be considered – through a professional wirearchy (bit.ly/tandiwirearchy).

What is a wirearchy?

A wirearchy, as developed by the social architect Jon Husband, is an organisational principle built on the power and effectiveness of people working together. Its aim is to move away from a hierarchical method of top-down direction and supervision to focus on championing ideas and innovation through a more linear network.

> *"I believe now is the time to disrupt the status quo"*

Setting up a network based on the wirearchy approach would offer school leaders the opportunity to disrupt existing structures and preconceived notions about what interactions between headteachers should look like. They could create the network exactly how they want it to be.

As ASCL president Richard Sheriff pointed out, "The education system with its range of school and organisational models is uneven, but school leaders themselves still have the power to drive change across it."

The wirearchy method is designed to encourage responsibility, individually and collectively, for positive change, which could transform the way schools are managed. But this approach could be of great value to groups such as newly qualified teachers too, giving them the chance to benefit from shared knowledge and experiences.

Opportunities for all

When people train together at the start of their teaching career, they are beginning a journey. It's a time of excitement and expectation and trainees can become very close professionally. As they gain experience and new skills, however, they can move to different schools around the country or even travel abroad to teach. Inevitably, many lose touch.

A wirearchy for these new professionals would help them build resilience and feel supported by like-minded individuals as they progress through their careers.

In my experience, this is particularly important for teachers working in challenging schools. I have benefited greatly from sharing my experiences and challenges with peers in the support network I have been involved with. As a group, we provided encouragement and ideas we could bring back to our own classrooms. Without this support, teaching can become both demoralising and demotivating. A wirearchy could bring a more connected way of working to all areas of the teaching profession.

There are some small education hubs that exist online already among groups of teaching

professionals and senior leaders. However, you need to know where to find them and often someone has to be introduced to the network by an existing member.

Platforms such as LinkedIn, Facebook and Twitter provide facilities for these groups to interact, but in my experience, audiences can be broad and groups may not always have a strong education focus.

A generous approach

Professional generosity is central to the success of a wirearchy. As ASCL president Richard Sheriff underlined when he discussed the topic, "Professional generosity is the fundamental glue that holds collaboration together. You need a spirit of compromise and also professional kindness to make collaboration work. That's key to working in partnership, locally, nationally or globally. "The ethos of professional generosity would increase trust and lead to leaders, teachers and schools opening up our practice to one another in a culture of mutual respect, in which sharing is about learning, removing the judgement and critique."

Professional generosity, in the context of a wirearchy, enables knowledge and experiences to be shared amongst everyone, not confined to a select few. This approach provides an opportunity to build relationships, encourage and motivate a wide range of education professionals.

When people come together in this way, they may not know everyone involved. Contributors will likely work in different schools, in different places. So, it's crucial to recognise the different strengths and challenges people face. It's about being kind, supportive and non-judgemental.

For the future

I have pondered the concept of a wirearchy for teachers and school leaders and contemplated when the best time to start building one might be. According to Richard Sheriff, "To make sense of a fragmented system, we can wait for policymakers all day long. But the onus is on us to make a fragmented system work better." And so, I believe now is the time to disrupt the status quo. Now is the time for the education sector to drive a new style of connectivity and collaboration. Only by doing this, can we support the profession into the future.

GET STARTED:
FIVE TOP TIPS FOR BUILDING A SUCCESSFUL EDUCATION WIREARCHY

- Champion the view that all educators, both individually and collectively, are responsible for driving school improvement and raising pupil achievement for all
- Encourage an environment where you and your peers can connect and collaborate with one another, sharing knowledge and resources
- Explore the different technical platforms and tools available that could support a wirearchy for educators
- Keep an open mind and act with kindness and compassion
- Set a personal goal to continually develop your own knowledge and practice

ABOUT THE AUTHOR
Denise Inwood is a former senior school leader and managing director of BlueSky Education, whose IT solution for managing staff performance, professional learning and school self evaluation enables the sharing of education resources, research and knowledge. blueskyeducation.co.uk

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#succeed with dyslexia

5 REASONS TO TRY... Scanning Pens

Help all students discover a love of reading with the ReaderPen from Scanning Pens.

30 SECOND BRIEFING

Introduce your students to the ReaderPen, a text-to-voice scanner, filled with useful features including built-in dictionaries and a voice recorder to help students develop their vocabulary and reading independence. Support students with dyslexia and English Language Learners discover a love for reading with the ReaderPen.

1 READS OUT SCANNED TEXT IN A CLEAR ACCENT

The portable ReaderPen allows students to have scanned text read back to them at their own discretion. Reluctant readers can remain included in the classroom without disturbing the flow of the lesson with the headphones included. The ReaderPen comes with multiple English accents, giving students the option to choose a voice more familiar to them, including Scottish and Irish among others. Use the ReaderPen as part of a group project or allow students to bring them home for independent study.

2 OTHER CUSTOMERS LOVE THE READERPEN

Take a look at what a teacher from Harrow Way Community School had to say about the ReaderPen, just one of Scanning Pens' many happy customers: "The ReaderPen's very discreet. I would definitely advise it as a way to support students that needs some help."

A student from this school felt the same way: "It's helped me so much, I've just noticed a big difference in my English since I've been using it. I'd totally recommend anyone who struggles with reading to get it."

3 ALLOWS FOR QUICK DEFINITIONS

With the help of the ReaderPen's built-in dictionaries, students are able to instantly look up the definitions of any words to help overcome their reading challenges. Included in the ReaderPen is the Oxford Primary and Collins English Dictionary which allows for support that can be varied depending on student needs. Teachers can now take a flexible approach to the development of a student's vocabulary while saving time. Also incorporated in the ReaderPen is a French and Spanish dictionary.

Contact:
020 7976 4910
ukorders@scanningpens.com
readerpen.com
scanningpens.com

Scanning Pens has received feedback from customers stating how much the ReaderPen has benefited their students in every area of literacy, which was recognised this year when the company won the prestigious BETT award.

4 VOICE RECORDER HELPS WORKING MEMORY

Students are able to record lessons for review at a later date with the voice recording function. Teachers can log individual lesson objectives for students to listen back to during class activities. Use the ReaderPen's storage to aid students in overcoming barriers with their working memory. Students can take the scanned text from their ReaderPen and transfer it to their electronic devices. They can even scan directly onto electronic devices or into a document, making tasks like book reports much easier.

5 BUILDS USER CONFIDENCE

The ReaderPen's collective features allow students to approach their studies independently, making it a great alternative to a human reader. The ReaderPen is there to help dyslexics, English Language learners, and other reluctant readers develop an approach to the development of their literacy skills that they can use throughout the future of their education. After approaching their work with the support of the ReaderPen students will build up their independent reading confidence, which in turn improves their outcomes.

KEY POINTS

PORTABLE
Explore with your ReaderPen. The lightweight, portable design of the ReaderPen allows users to use it anywhere and anytime, whether they're studying or on a school trip.

DICTIONARY
The built-in dictionary for the ReaderPen helps students independently develop their vocabulary. Students can scan words and instantly receive their Oxford Primary or Collins definitions.

SCAN-TO-FILE
The ReaderPen has a good storage size as well as a feature that allows students to scan text directly onto their devices or upload previously scanned text.

VOICE RECORDER
Record individual objectives for students or full lessons for them to review at a later date. Listen back to these recordings at any time.

It's time to talk about THE FUTURE...

The DfE's latest EdTech strategy represents an ambitious vision, says **Patrick McGrath** – but it's one that schools and the industry should be ready to embrace

Published in April this year, the Department for Education's eagerly awaited EdTech strategy couldn't have come at a better time.

There's been a broadly warm reception for the strategy from teachers and educators, who've been waiting patiently for a clear signal that their day-to-day struggles are finally being recognised. And what's most refreshing in the report is its emphasis on practical proposals to realise the potential of technology in education, and how it can address these struggles, rather than abstract hand-waving.

It's encouraging to see that the DfE's wide perspective doesn't focus solely on the use of technology for delivering teaching and learning in school classrooms. It also pays attention to technology as an enabler in areas like supporting learners with additional needs, helping with timetabling and allowing more efficient parental engagement – the latter aimed at cutting related teacher workloads by up to five hours per term. Particularly welcome for teachers, of course, is a focus on helping reduce their time spent on lesson preparation, marking and assessment, plus the potential for more flexible workstyles.

Real-world challenges

Educators, tech providers and media observers have afforded the DfE's strategy a generally positive reaction. But amid the enthusiasm, we should be pragmatic about the real-world actions that need taking to realise the report's ambitious vision.

One of the goals highlighted in the report is rollout of full-fibre broadband coverage nationwide by 2033, giving all schools stable, high speed Internet connectivity that's still sadly lacking in many places, especially rural areas. That makes it a big ask to meet the target timeframe of 2021 for delivery of the report's key focus areas and other subsequent 'EdTech challenges' that address the key areas of

administration, assessment, teaching practice, professional development and lifelong learning.

Even with bandwidth obstacles overcome, it's hard to deploy truly effective EdTech strategies without the classroom devices to support them. And that's where it all comes down to the other big challenge – funding. While the £10 million EdTech innovation fund, administered through NESTA is certainly a welcome gesture for technology companies, there's still a bigger conversation to be had around the need for access to devices and the funding mechanisms for schools to achieve this.

Looking ahead

Rather than a 'strategy', then, maybe it's better to see the DfE's proposals as a vision looking out to 2025 and beyond: indeed as (now ex-) Secretary of State for Education Damian Hinds acknowledges in his introduction to the report it's just a first step. And therein lies the bigger challenge. Our leaders are right to recognise the importance of innovation, but their enthusiasm has to be taken in the context of the pressing challenges already facing today's educators. Vision takes planning... and implementation of that plan takes time.

We have some amazing school leaders, and some incredible teachers who are already delivering very effective practice through the innovative use of technology. Equally, we have technology companies providing powerful tools that are firmly grounded in academic research and supported by tangible demonstrations of efficacy. To accelerate the delivery of the Department's vision, a great first step is to get our leaders, our teachers and the technology community talking openly in order to identify good practice and effectively implement the great tools that we already have available.

Wise planning

Also, the Department's ambitious goals make it all the more vital that schools plan their current EdTech investments wisely. And for technology developers, that puts the onus firmly on us to clearly demonstrate the real-world efficacy of our products and solutions. This is where organisations like BESA (besa.org.uk/initiatives/lended) are playing a vital role in facilitating this dialogue, with its pioneering LendED initiative giving schools the chance to evaluate technology for free before they buy, evidenced by real-life case studies and testimonials.

As United Learning Trust's Dominic Norrish highlights in the report, there's no proverbial silver bullet for EdTech. Technology threads through all our daily lives, from the first moment we reach for our phones in the morning to check our news feeds, emails and friends' social updates.

Almost two decades into the 21st century, the DfE's clear-sighted vision finally acknowledges that technology's role in schools should properly reflect its ubiquitous presence outside.

Let's all take the conversation forward and make sure the future happens. It's about time.

9 WAYS TO GET STARTED

We know from our experience that the biggest impact for technology on student outcomes is where implementation and usage form part of a structured and focused approach to integration with learning. Best practice approaches include:

- Aligning the technology to both school and individual priorities
- Sharing the vision and purpose for technology with all staff
- Ensuring that platform technology (devices) is accessible on a regular basis
- Creating regular opportunities to use any technology where teacher or pupil may find it supportive
- Setting expectations for teacher and pupil outcomes to help provide approaches to lesson planning
- Allowing pupils the scope to personalise their learning by self-selecting their tools and being reflective
- Promoting learner agency and self efficacy
- Training staff and pupils in the context of, and the skills required to use technology
- Supporting staff and students technically and from a teaching and learning perspective throughout the implementation

"Our leaders are right to recognise the importance of innovation, but their enthusiasm has to be taken in the context of the pressing challenges already facing today's educators..."

ABOUT THE AUTHOR
Patrick McGrath is resident Education Technology Strategist at Texthelp. An Apple Education Mentor and Google Certified Educator, Patrick received the UK Digital Leader 100 award in 2016, and is an Honorary Fellow of the University of Ulster (School of Education).

STARWIND VIRTUAL SAN

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StarWind Virtual SAN (VSAN) is a software-defined storage solution that uses commercial off-the-shelf hardware. It delivers high performance and data high availability (HA) by mirroring internal hard disks and flash between hypervisor servers. Long story short, StarWind VSAN makes efficient virtualized infrastructure available to anybody.

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Q&A

"Information is the most valuable asset"

COO Artem Berman offers his opinion on the exciting possibilities Starwind can offer schools

30 SECOND BRIEFING

StarWind is a one-stop virtualisation shop and the only provider for full-stack data centre infrastructure a school needs; ensuring data is both available and secure, at a price that's affordable, and with full after-sales support.

T&I Can StarWind hardware and software solve common IT problems inherent to schools?
AB Similar to any organization's IT infrastructure, in the educational system, information is the most valuable asset. Data needs to be protected, updated and quickly accessed no matter what. Older hardware ages, so having high performance, reliability, and high availability becomes a luxury. Limited IT budgets prevent from building a scalable, cost-effective, centrally managed storage infrastructure with high DR capability. StarWind Software offers budget-friendly and straightforward solutions to all these problems.

How can StarWind deal with low performance of an IT environment?
StarWind will make the need for shared physical storage disappear like a bad dream, offering a much better and cost-efficient choice – StarWind Virtual SAN (VSAN). Overpriced components should no longer stand in the way of storage expansion, and 24/7 data availability 365 days has never been cheaper and more reliable. StarWind guarantees both high performance and high availability of all your applications with minimum resources needed.

Eventually, it gets too expensive to support the hardware needs of an IT infrastructure for a tight school budget. How can StarWind help?
The obsolete complicated hardware, multiple servers, and numerous switches are often too hard and too costly to replace efficiently, and excessive application downtime is not even a consideration. In this case, with StarWind, you can make your infrastructure operation more reliable and straightforward. Basically, thanks to StarWind HyperConverged Appliance (HCA), you can narrow the hardware of your entire system down a 2-node cluster and never look back.

How can StarWind guarantee the data protection and availability – which is essential for any educational institution?
Data protection is always a valuable asset, but for academic institutions the stakes are higher. StarWind software backup strategies can survive any disaster that may affect your infrastructure. Furthermore, data changes regularly, so IT administrators need a lot of time to maintain their storages in good order. StarWind can provide you with all-important performance, automated data management, and free up your IT specialists from their routine manual data management tasks.

ABOUT ARTEM:
Artem Berman, Chief Operating Officer (COO) at StarWind, is a world-renowned programmer and expert.

StarWind
Contact:
starwind.com
020 3769 1857
info@starwind.com

Why should educational institutions choose StarWind over other options?
The most exciting thing about StarWind is that once you start working with us, your IT team has nothing to do. StarWind Support deals with the issues before they become problematic. Constant monitoring ensures smooth running for your infrastructure without a hassle. All you're left to do is enjoy the ride. Considering how tragically outmanned and outgunned educational IT teams are, it is a perfect deal.

What's the difference?

+ Forget about downtime with a fault-tolerant storage solution from StarWind
+ With StarWind, your information is as safe as Fort Knox!
+ StarWind Support deals with any issues before they become problematic

A different STORY...

Students with undiagnosed reading difficulties often struggle to access the curriculum, says **Mark Fraser** – but edtech can help unlock their potential

Imagine being unable to complete an exam or finish a piece of coursework just because you can't get your answers written in the allotted time. You have a flair for the subject, know the content inside-out, and have some brilliant ideas, but when it comes to the crunch, your reading and writing skills let you down.

It's a scenario that's all too familiar for secondary school students whose reading difficulties are not spotted early in their education journey.

When problems such as dyslexia remain uncovered throughout the primary school years, students can face a multitude of difficulties in accessing their secondary education. The new English literature GCSE specification, for instance, involves reading a larger number of texts than previously, many of which deal with complex ideas, sometimes using highly unfamiliar language.

And it's not only English that can pose problems for a child with reading issues. Many subjects have become increasingly content heavy, and the lion's share of resources for subjects such as geography, history and modern foreign languages is made up of written material.

Limiting futures

Every day, students with undiagnosed reading difficulties are reading, writing and understanding less than their peers, and making up this missing ground becomes almost impossible.

It's often the case that poor reading skills are associated with low ability, and this can lead to an otherwise capable child being taught in a lower ability set where they are not challenged.

Students in this situation are less likely to access the higher level skills they need to realise their full potential, and the consequences of undiagnosed reading difficulties can be far reaching, restricting a student's options in their further or higher education or in their career.

It can be a challenge to support students with reading difficulties in other areas of the curriculum, particularly when there may be 29 other students in the class who also need targeted support. Teachers managing a hefty workload simply don't have the time it takes

to recoup a student's lost years of reading.

New possibilities

However, technology might offer a solution. As a teacher with a passion for edtech, I am hugely excited by the potential of artificial intelligence (AI). We are already seeing examples of how AI is having an impact on our lives by helping banks detect fraud, for example, or speeding up the process of diagnosing medical conditions.

There is enormous scope for AI to transform aspects of education, too. Not by taking over the role of teachers, but by saving teachers' time and helping them identify learning difficulties so they can be addressed early enough to make a difference.

Take for instance, a method called Lexplore that helps teachers spot which children are finding reading difficult by tracking the way a child's eyes move when they read two passages of text, one out loud and one in their head. This revolutionary eye-tracking technology records how long a child's eyes rest on one word, and how quickly they move forwards and backwards across a series of words. Children whose eyes rest longer than usual on one word, move more slowly along a line of text, or move back to an earlier word find reading challenging. Importantly, the AI technology can recognise problems before a child's reading is fully established because it is based on eye movement, and with this knowledge, schools can start to tackle these difficulties before they affect a child's learning.

An AI-based assessment has the advantage of providing an entirely objective view on whether a child has reading difficulties. It removes any underlying links with perceived intelligence levels and focuses completely on the reading skills.

> *"There is enormous scope for AI to transform aspects of education"*

That's a huge advantage, particularly when you come across students who have become experts in masking their reading problems over the years with coping strategies. An objective test uncovers difficulties that could remain hidden.

And as with any machine learning technology, the more that schools use the method, the richer and more nuanced the picture of pupils' reading attainment becomes.

Supporting learning

So once a student's reading difficulties are known, how can we help them get their education on track? An additional fifteen minutes of one-to-one reading every day makes a huge difference. However, it can be difficult to find the time or resources to implement this level of support in a secondary classroom, where there is a lot of content to teach. That's where engaging parents can really help so that they can support their child in achieving their reading goals.

Technology plays a crucial part here too. Dictation software has been used for some time by students whose writing is holding them back from completing essays or taking exams. But recent advances in voice recognition software have made the technology much more attuned to the user, by learning a user's way of speaking, adapting to their accent and blocking out background noise.

Similarly, text-to-speech technology has come on in leaps and bounds since its early days, and software can quickly convert a text document into an audio file. The technology can even help students with dyslexia to browse websites by converting the essential text from a webpage into audio.

I have seen the combination of parental involvement and technological solutions work wonders with students' reading and writing skills. I remember one child who came to our school aged 13, barely able to write his name correctly due to severe dyslexia, but very advanced in his intelligence and sensitivity to language.

The child's parents devoted a great deal of time to helping him boost his reading and writing skills in consultation with his teachers. This student also became adept at dictating his essays. So much so that he achieved three excellent A levels and went on to study English at university.

There's an important role for technology in schools, not just in making learning more engaging, but in identifying learning difficulties early enough to help students unlock their potential and thrive throughout their education and beyond.

FIVE WAYS TO BREAK DOWN THE READING BARRIER USING TECHNOLOGY:

1 Investigate new technologies to see how they can help to spot and address reading issues.

2 Explore how AI can enrich human assessment of children's abilities.

3 Ask your students for their opinion on the technology that supports their reading

4 Share the benefits of edtech with parents to engage them with their child's learning goals.

5 Ask other teachers which technology is making most impact on reading in their classes and schools.

ABOUT THE AUTHOR

Mark Fraser is an experienced teacher of 29 years, and was director of digital learning at Clayesmore School. He is now an educational consultant and learning designer at Lexplore. Download AI – the perfect teacher's assistant (bit.ly/tandilexplore) free of charge for more information.

Take it AWAY

If teachers are 'too busy' to engage with edtech, then we need to think differently about how we're introducing it, insists Microsoft UK's **Chris Rothwell**

It's a challenging time for teachers across the UK, with pressures increasing from all sides. Mounting workloads; data and safeguarding demands; equipping students with essential skills for the future and keeping pace with a changing curriculum are just some of the challenges teachers face. Put simply, today's teachers are being stretched to the limit.

The power and potential of technology to boost productivity and drive efficiencies for educators has long been understood. But, as the UK government outlined in its recent EdTech Strategy for England (bit.ly/tandimicro1), digital innovation is often seen as a real struggle for time-poor teachers, rather than something essential to enhancing their work.

As a result, teachers are being pulled away from the potential technology can have on education and aren't realising the benefits it can provide. To ensure the successful integration of digital tools, we must showcase the crucial role they can play in maximising productivity and efficiencies. For when they're truly able to visualise the personal benefits technology can bring to the classroom, teachers often feel inspired to develop more engaging classroom experiences.

Under pressure

Our research (it.ly/tandimicro2) reveals that a staggering 77% of teachers in the UK say they're unable to carry out their best work due to time and resource constraints, with 67% feeling forced to simply 'get through the day'. Despite this, the rewards of harnessing digitals tools are vast, with a recent study (bit.ly/tandimicro3) from Forrester highlighting how using cloud-based collaboration tools can decrease teachers' daily prep requirement by 40% and provide 30 minutes more in daily teaching time.

Whilst lesson plans are irreplaceable in teaching, I often hear that they represent a time-consuming task that can lack efficiency in some instances. Finding something that is the perfect fit for a class requires multiple drafts – and if you want to share it with colleagues, you spend time and money on printing. Cloud-based collaboration tools enable teachers to work on plans wherever they are, and collaborate with colleagues to create engaging teaching materials across subject areas. By weaving tools which facilitate real-time collaboration into writing lesson plans it can reinvigorate staff culture and boost productivity.

As the government's EdTech Strategy highlights, another pressing issue for many teachers is their marking workload. Here, innovations such as digital inking tools allow teachers to mark work far more creatively and informatively through annotations and diagrams, providing feedback in real time without having to trawl through piles of workbooks.

Learning together

Educators' lack of confidence with technology is another major obstacle in the adoption of new tools and technologies. Whilst 74% of teachers agree that technology aids students' learning, just 15% feel confident using it and only a third (33%) are receiving hands on training. It's no wonder then that many are being held back from capitalising on the benefits technology can bring.

To tackle this, it's important that institutions build a community that inspires its educators to embrace and experiment with technology. By creating an atmosphere where teachers feel encouraged to try new methods, to learn from failures and to share their experiences with their colleagues, they will feel supported and part of

"Using cloud-based collaboration tools can decrease teachers' daily prep requirement by 40%"

a school-wide initiative as opposed to struggling alone.

Take Broadclyst School (bit.ly/tandimicro4) for example – when a member of staff discovers a smart way to use technology, they encourage other teachers to sit in their lesson and see it in action, or hold a staff lesson to show how others can adapt the tool to suit their own needs. I have seen first hand how this approach builds a supportive and professional environment that can ensure the journey to technology adoption is shared across the staff

Modern environments

When I speak with teachers, they often also highlight the frustration that their classrooms aren't equipped to facilitate modern learning. Indeed, our research revealed that over half of teachers (52%) still mostly use analogue equipment and 54% of students lack regular access to devices.

Creating modern learning environments, which engage students in new ways and foster a culture of collaboration and experimentation, is essential in today's schools. However, as is so often the case for many schools, tightening budgets and other pressing priorities mean it can be difficult to allocate investment to wide-scale innovation.

Despite this, small changes and smart ways of using existing technologies already at teachers' fingertips can have a huge impact, ensuring staff and pupils alike feel set up for success.

An effective way to go about this, which we've seen work successfully in many schools such as City of Westminster College (bit.ly/tandimicro5), is by appointing digital ambassadors to help raise awareness around new and innovative ways to use existing tools, through tutorials, newsletters and trials of new tools within the classroom.

Empowering and enabling

Whilst it can be difficult for teachers to provide for individual student needs with the time and resources available, the key to maximising the benefits of technology is to find tools that empower every child to achieve their full potential.

As City of Westminster College has discovered, using technology in the classroom can really boost student engagement. Through the use of cloud based tools, students have the freedom to work and collaborate independently with their classmates, providing them with a sense of responsibility and ownership over their own learning.

Increasing accessibility in education is also a key incentive for teachers to experiment with new tools. In fact, 53% of educators highlighted in our research that technology can create a more inclusive learning environment.

HOW TO MAKE THE MOST OF EDTECH

- Ensure that a member of the SLT is championing the use of technology, and is connecting it to the overall strategy
- Nominate a staff and student digital ambassador to train others on best uses of technology and to ensure that adoption is school-wide.
- Dedicate time in staff meetings to highlight what technology has been successfully used and to promote a culture of digital conversation.
- Create a digital extracurricular activity which gives staff the opportunity to teach students key technology skills outside of lesson restraints; this also allows students to teach staff!

From dictation tools which convert speech to text to help pupils write freely, to colour changers which aid those who are colour blind or have visual impairments, there is a wealth of freely available assistive tools which can help teachers provide more empowering learning experiences, boosting performance and job satisfaction.

For technology to start being viewed as an enabler as opposed to a hindrance, we must encourage a process of trial and error for educators to experiment with new and existing technology and to learn from the experience. In doing so, teachers will soon realise that technology can allow them to reconnect with the enjoyment of working in education.

ABOUT THE AUTHOR
Chris Rothwell is the director of education for Microsoft UK. He oversees a team that helps schools, teachers, pupils and others embrace technology to achieve their goals.

KORA

Kora 3D PC Printer in Kora SC-01 Universal Safety Cabinet

Do you use **3D printing** as part of your curriculum?

The 3 Simple Facts about Desktop 3D Printer Safety – What you need to know

(1) The Law

If your organisation uses or creates substances, or carries out processes which might cause harm to health, the law requires you to control the risks to employees.

The Control of Substances Hazardous to Health Regulations (COSHH) apply to most harmful substances **http://www.hse.gov.uk/toolbox/harmful/coshh.htm**

(2) Desktop 3D Printer Emissions

When operating, ALL desktop 3D Printers emit nanometre size plastic particles that can be breathed in and ingested in to your body REGARDLESS of the filament type used.

See UK HSE Government documentation at **http://www.hse.gov.uk/research/rrpdf/rr1146.pdf**

(3) Additional Desktop 3D Printer Hazards

When operating, ALL desktop 3D Printers have areas on the machine that operate at a hot enough temperature to cause severe skin burns with skin contact and

ALL desktop 3D Printers have mechanical movement mechanisms that can potentially trap fingers/hair/clothing. For a list of further hazards, get in touch with us today!

For a free Risk self-assessment pack please contact

Info@kora3d.com or **0113 246 7230**

www.kora3d.com

SCHOOL SOLUTIONS

Innovations that reach into every learning space

STUDENT VOICE: Ethan Peacock, Y9

"My name is Ethan and I am currently in Y9 at Colchester Royal Grammar School. I was born with Norrie Disease which means that I am severely sight impaired and need to use braille to read and write. The Braillenote Touch is a braille tablet and is an extremely useful piece of equipment. It has access to the internet which allows me to look for information quickly and easily. It also allows me to read and send emails. The Braillenote is very useful for doing work at both home and school as word documents can easily be created and edited. The word processor application also contains many interesting and helpful features such as spell-check and Keymath; and Documents can be printed, copied, sent via email or shared. Being able to share my documents is extremely useful in school as my teachers are able to access the work that I upload for marking. I can switch between documents using simple commands and also type in different languages by downloading the specific language profile. The context menu provides a list of individual commands and their functions, and can be opened anywhere. This is extremely helpful as it allows me to access and remember useful shortcuts and their functions. The Braillenote Touch has a visual display screen which can be accessed by lifting up the keyboard, and a HDMI socket that allows a portable screen to also be plugged in. This means that in lessons, teachers are able to see what I am writing and give feedback. Although I cannot create PowerPoints from scratch, I can easily edit them if they are shared with me. This allows me to read PowerPoints that have been sent to me by teachers and to work on and present class projects in groups. Overall, the Braillenote touch is an amazing tool that is useful for school and for everyday life."

34%

of children have a social media profile by the age of 11

Source: NSPCC

RECOMMENDED READING

Mission Python: Code a space adventure game! (Sean McManus, No Starch Press, £24.99)

In this book Sean McManus has managed to put the Python programming language within easy reach. He has achieved that through several approaches. First, the book is presented as a cross between an astronaut's training manual and instructions for creating a game. This provides a context, in contrast to books that have you entering code for no apparent reason. The illustrations for the game's backgrounds are NASA photos, which provide visual interest too. The book is well-structured. Each instruction is explained carefully, with debugging built in to the text in the form of "if this didn't work, check..." Important notes are flagged up as Red Alerts, in keeping with the space theme, while challenges are presented as training missions. At the end of each chapter is a checklist of skills you should have acquired, followed by a Mission Debrief in which the answers to the Training Missions are given.

Reviewed by Terry Freedman

WHY I LOVE...

Richard Ward discusses how GCSEPod helped his school improve from 28% to 84% Grade 4+ English and maths in the last 3 years

ABOUT ME:

NAME:
Richard Ward

JOB ROLE:
Assistant Principal and Director of Science

SCHOOL:
Manor Croft Academy, Dewsbury

FAVOURITE FEATURE:
ReadySetGo, making science assessments easy

TALKING ABOUT: HOW GCSEPOD CAN IMPACT THE WHOLE SCHOOL

When we launched we clearly outlined all benefits to parents

Our strategy was simple. We launched with clear expectations, a plan to integrate with existing resources and to support homework, and we embedded GCSEPod effectively into the school's rewards system. Our students buy in, and so do their parents. When we initially launched we had an evening for parents which clearly outlined all of the features and benefits of GCSEPod. We had iPads set up so they could try the new resource for themselves and understand how it works, we set expectations, how it was going to be used by the school, and how we expected the children to use it.

In November 18, the Pods had been viewed a staggering 45,000 times by students since September

KS4 homework is set via GCSEPod assignments, and parents know to expect this. All departments are united in setting four Pods and a set of questions per week. We have a successful initiative called Pod Points, where students must watch a video and then write down three Pod points in their workbooks. These are essentially three facts they have learned from the Pod, ready to discuss in lessons. GCSEPod has become such a popular teaching and learning tool at Manor Croft, that to the end of November 2018, after only launching in September, the Pods had been viewed a staggering 45,000 times by students in the upper three years.

gcsepod
education on demand

Contact:
Find out more at **GCSEPod.com**.

It makes total financial sense

We had no trouble getting the financial backing needed to subscribe to GCSEPod. Once teachers had a go at it and saw what it could do, the benefits became obvious. There is a cost attached to GCSEPod, but it is nothing when you consider what a fantastic shared resource it is; and that cost is minimal compared to the resources needed to buy inch-thick revision guides for a whole year group – where you can easily be looking at spending between £5,000 and £10,000. Within weeks of launch it had a phenomenally positive impact on our year 9, 10 and 11 students.

It has greatly reduced teacher workload

There are many reasons why I love GCSEPod – it promotes independent learning, the sheer professionalism of the website, the ease of use and the tracking software that goes with it. Plus, it enables us to interleave lessons, and interleave our learning within the curriculum. There is a clear correlation between usage and results – GCSEPod provides instant feedback, and we have greatly reduced teacher workload as assignments can be set and checked rapidly with little effort.

WILL IT WORK FOR YOU?

+ Check & Challenge
Formative diagnostic assessment with scaffolded support

+ Paper to Pods
Documents linking specific exam questions to relevant Pods

+ Achieve Maths and English Pods
Targeted courses to support lower ability students

+ Quiz, Practice and Apply workbooks
Help students apply their knowledge

The Help Desk

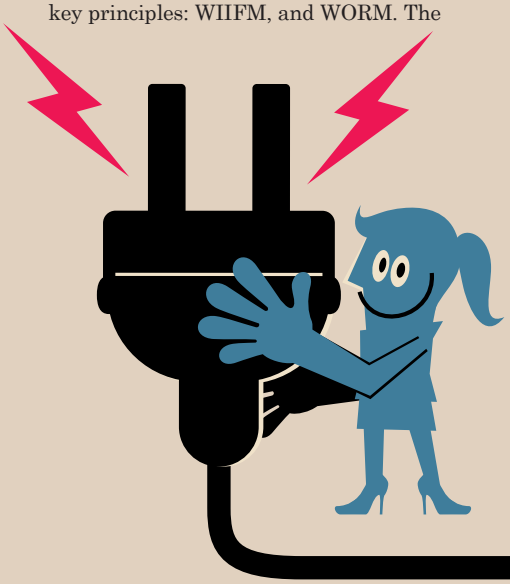
Terry Freedman addresses your queries about technology in the classroom – and beyond it

"They don't trust tech"

Q **I am taking over as head of the maths department in a reasonably sized 11-18 school from September 2019. As a self-confessed spreadsheet geek, one of the things I am most looking forward to is updating and streamlining the multiple systems we currently have in place for planning, homework setting, feedback, resources and so on (the complexity and disorganisation of which have been driving me mad since I joined the school six years ago). However, I know that many of my colleagues are considerably less digitally-inclined than I am – and a few are actively sceptical about the ability of technology to do anything other than make life harder. Any suggestions as to how I can get my department functioning for the 21st century, without losing any members of staff in the process?**

A The best way of tackling this issue is to lead by example: devise a spreadsheet that encapsulates all of these functions, and use it. Bear in mind two key principles: WIIFM, and WORM. The former stands for What's In It For Me? In this context, if you can demonstrate that your spreadsheet enables your staff to get done what they need to get done, preferably with less effort and using less time, you're on to a winner. WORM means Write Once, Read Many – the idea being that if someone enters some data they shouldn't have to enter it again. For instance, nobody should have to enter a pupil's name more than once.

Make the spreadsheet easy to use. For a start, make the interface less daunting by getting rid of the formula bar (go to the View menu). Also, create an interactive index of all the sheets in the workbook, using the free ASAP Utilities (bit.ly/tfASAP). Use the Data Validation options in the Data menu to create drop-down lists for teachers to select rather than having to enter data manually. And ideally, if there are any reports to be generated, design one of the workbook's sheets as a template, so that no other applications are involved.



"It's not my job!"

Q **Up until recently, I believed that the school where I teach history – a small academy in a large town – had no IT support department. However, I have now realised that it does. Me. And I have to be honest, I'm not happy about it! The truth is, because I'm interested in technology and computing, and have taught myself a lot about things like programming and maintenance, I have become the default first port of call for my colleagues when they have any IT related issue at all. I don't want to be rude, but sorting out problems with Mr A's laptop, and Ms B's latest app, is starting to take up a considerable amount of my time, which I can ill afford to lose. Should I start refusing to help? Introduce scaled consultancy fees? Help!**

A Unfortunately, all my suggestions will require a bit of work on your part, but hopefully the time spent will prove to be an investment. The first thing to do is put an end to the corridor culture, in which a teacher grabs you as you're passing and says "Could you just...?" They think it's a reasonable request because it will just take five minutes to fix – but you only need half a dozen of these 'just five minutes' to use up a whole free period.

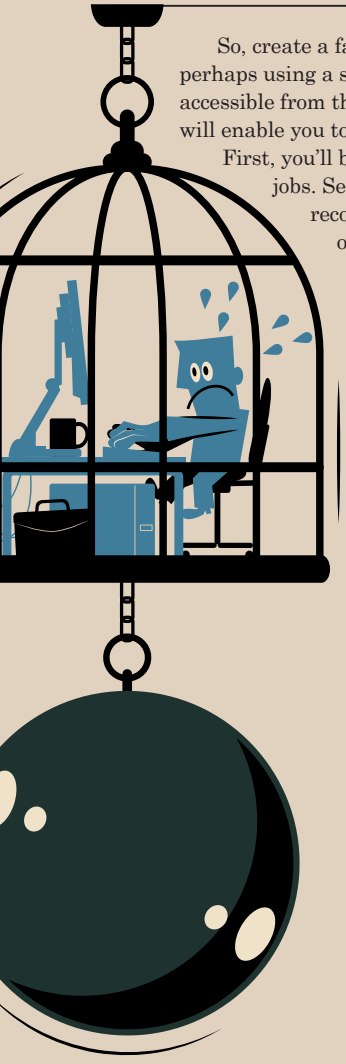
"Our kids just aren't ambitious"

Q **I teach computing at KS3 and 4 in a comprehensive school that's located in a coastal area of England. The kids are, on the whole, pretty bright and enthusiastic about their learning, but most of them come from challenging backgrounds, and I would say that their long-term aspirations are quite limited. Few seem to have considered computing-based career paths, for example, with most of them expecting to work in retail, hospitality or manual labour environments when they are finally done with school. I really want to open doors for them; other than making my lessons as exciting as possible, what else can I do to get them thinking about computing as a route to a potentially more fulfilling future?**

A Unfortunately, kids have a tendency to believe people they don't know rather than teachers! In other words, you need some outside support. A good starting point is Google. Do a search for "Digital x", where x is the name of your town, or the nearest urban centre. Chances are you'll discover an organisation that works with schools with the aim of getting students interested in computing and related careers.

If you can, organise visits to organisations that rely heavily on computing staff but whose main business is not computing. For example, the Press Association could hardly function if its computing systems broke down, yet computing is not the first thing that comes to mind when you mention its name.

If organising visits are difficult, look into forging links with local companies. Some of them may send visiting speakers to schools, or run activities in schools. Also, if there is a local computer hub (bit.ly/tfCSHubs) in your area you may find other teachers and schools to collaborate with, or be able to pick up some ideas. Also, bear in mind that large national companies may have useful educational material you can obtain free of charge.



So, create a fault-logging system, perhaps using a spreadsheet accessible from the staffroom. This will enable you to achieve two things. First, you'll be able to prioritise jobs. Secondly, if you keep a record of how long each one takes to fix, you will have solid data with which to approach the headteacher with a view to ending this situation. (If staff object to using the spreadsheet, as it's easier to nab you in the corridor, just blame it on your appalling memory.)

Ideally, the head will agree to buy in tech support. If not, propose getting in someone like a local retiree to operate a helpdesk. One school found that by doing that, 98% of problems could be dealt with this way.

"We need devices"

Q **As seems to be happening very widely now, our school has recently banned mobile phones for students completely. I'm broadly in favour of this in terms of behaviour management; however, we are not well equipped in terms of devices like laptops/tablets that learners can access during lessons, and I am already missing being able to ask my class to 'get your phones out and look up x/y/z'. I think that we really need to think about investing in more communal mobile devices, but the SLT is not convinced. Do you have any killer arguments I could use to persuade them that such an investment would not be a 'luxury'?**

A Draw up a list of things the mobiles enabled the pupils to do and, if possible, how that impacted their exam results. Point out that, given the school's dearth of tablets and laptops, having another loanable set of devices would ease the pressure from other classes on those resources. Moreover, explain how modern tablets designed for school use are small and light enough to be used anywhere, with a long battery life.

Propose a process of evaluation. One school arranged to borrow several different devices, and had the students test them against a range of criteria based on the aforementioned list. (This is a useful project in itself anyway.) If you can get a couple of key members of staff involved in the process that's even better. Why? Because hopefully once they see how much better the modern devices are than the older ones the school has, they'll be on side.

"There is plenty of research available on the benefits of mobile devices"

There is plenty of research available on the benefits of mobile devices in the classroom, especially for tackling real-world problems in a real-world way. A good starting point for evidence-based articles is Mal Lee's website at bit.ly/tfMalLee, while a useful guide for policy-makers is UNESCO's *The Future of Mobile Learning* at bit.ly/tfUnesco.

ABOUT THE EXPERT
Terry Freedman is an ed tech consultant and freelance writer. He publishes the ICT & Education website at www.ictineducation.org.

A universal APPROACH

Assistive technology can transform learning – and not only for students with SEND, says **Julia Clouter**...

Building assistive technology into a future strategy for your students is an integral part of designing your curriculum for the year. Schools will have committed to planning a structure for homework, of course, and frameworks aiming to deliver spiritual, moral, social, and cultural knowledge, all essential to the healthy development of a child. If, however, edtech planning is not in place, then you could be heading in the direction of a strategic learning gap. Assistive technology in education can give every student an advantage – it's no longer just for those with additional needs; it is a tool to raise achievement for all. Indeed, there is a wealth of technology to embrace, and from which all learners can benefit. As you plan your strategy, then, it is important to ensure nobody's needs are left unsupported. We all know that value for money is an essential factor in our planning; so too is finding ways to maximise the benefits of our spending decisions. With this in mind, here is a list of four assistive techs that are SEND specific, but could be used as part of an effective schoolwide learning strategy.

1 AI teaching platforms

In recent years, teaching with the support of AI (artificial intelligence) has become increasingly prevalent in schools. This kind of technology is highly likely to become an integral part of all education at some point in the future, and it's already a fantastic tool for supporting SEND students. With the help of this responsive tech, we can quickly and clearly identify and address the weaker areas in their knowledge.

Platforms like CENTURY, for example, allow for a real-time analysis of student performance by creating sophisticated algorithms based on his or her responses. Teachers can access this information at any point in the pupil's learning. Not only does this make it easy to track the success of SEND students, it can be used for all learners. This whole-school approach allows for a quick overview of usage and progress made.

2 Online learning portals

Online learning portals are a great way to keep track of your students' progress while constantly updating their curriculum and extracurricular needs; and those available to schools these days offer hugely impressive functionality and flexibility. Such portals can be used from home – and even on the move, via a young person's personal mobile device, and are the perfect tool for students who may have extended periods out of school for medical (or other) reasons. Not only will they not miss out on their learning opportunities, they can even collaborate with peers from home. This can

obviously be enormously beneficial for every pupil in school, not just those with extenuating circumstances.

One fantastic feature of online portals is the manual control teachers can have over each student's learning strategy, as work, assessments and even revision can all be uploaded and tracked. Moreover, in programs such as Moodle and Show My Homework, deadlines and important dates can be assigned and highlighted in an online calendar; a useful feature, the importance of which is highlighted in the next section...

3 Time schedulers

A skill that we often find underdeveloped in many students at all Key Stages is their time management. Knowing when a test is coming and how long they should spend studying for their various subjects is essential understanding that can make a huge difference to progress and outcomes.

Abilia, an online scheduler, is just one example of great assistive tech that could inspire a whole-school approach. This support was originally developed for students with ASD and ADHD. By scheduling their day to day activity, learners are able to become independent where they otherwise may have struggled.

Previously, ASD students might have had a serious anxiety attack if their daily pattern or routine were to change without warning. With the help of a detailed online scheduler, they can now be informed in real time of amendments to their day. A change in a regular teacher, form of transportation, study time, and any other daily activity can be updated well in advance to leave these students well prepared for what lies ahead. And the software doesn't just allow teachers and family to update their schedule, students can also manage themselves, while informing others.

This approach to independence and self empowerment could easily be introduced schoolwide, with easily downloadable planning apps for tablets and mobile phones.

4 Assistive Readers

Very few assistive technologies are accepted in examinations. Often, they require lengthy paperwork to be completed and need to be arranged and validated long in advance of the exam. However, there is an exception that can give many students a boost without the need for any additional accommodations to be made, not even a Form 8. Where learners have weak literacy skills, text-to-speech scanners like the ExamReader from Scanning Pens are the exception. Provided the pen has been used in advance of the examination, and has become a normal way of working, it can be used in any JCQ exam to support reading fluency.

The ExamReader also gives struggling readers the confidence to approach their exams independently. It reads aloud, or via headphones, any text scanned, in a clear and natural voice. Students in the UK can sit any of their exams with their peers, and without any extra accommodations or a human reading assistant. This inclusion tool gives independence and provides a boost to student mental-wellbeing during exam periods.

For students with reading difficulties like dyslexia, this kind of edtech allows them to comprehend questions that they may otherwise have answered incorrectly. We also know that students reject human support because they are too embarrassed to ask repeatedly for help. And anyone is welcome to use this tool, meaning that undiagnosed or borderline dyslexics, as well as those learners with weak literacy or slower processing speeds, can benefit.

Assistive technology is at the heart of the technological revolution ahead of us. So, while you count your coins and choose your strategies, consider the maximum impact for all. Think universal, and think smart!

ABOUT THE AUTHOR
Julia Clouter is head of education at Scanning Pens, and a qualified SENCo.

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Up to 1.7x Optical Zoom • Auto Projection OFF
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NEED TO KNOW- Q&A

"Sharing work is fast and frictionless"

Alan Garratt explains how Casio is working to make collaborative learning easier.

30 SECOND BRIEFING

Casio projectors deliver better brightness, less maintenance and more focus on enhancing education environments. The company's latest range of education solutions includes forward-thinking features which encourage collaboration and active learning in the classroom.

T&I Why is collaborative learning so important?
AG We live in a business environment where soft skills like collaboration and problem-solving matter significantly more than the ability to retain information. Therefore, if primary and secondary education is going to properly equip pupils for the world of work, the focus needs to be on creating classrooms which cultivate these skills rather than the outdated 'chalk and talk' teaching style of yesterday.

How can a Casio projector help with this?
Our full range of projectors have long championed a very low maintenance design, quick start-up time and a light source which produces no brightness drop off, which allows teachers to focus on the lesson. Recently, we've developed a new range of educational solutions, packed with features to encourage collaboration in the classroom, most notably our exciting one-click connect feature.

Tell us more about 'One Click Connection'
One-click connect allows up to 40 devices to connect wirelessly to the projector and then, using a moderator smartphone app, a teacher can select up to four devices to screen share with the projector, enabling pupils to share work with the rest of the class. It completely eliminates the hassle of using cables and makes sharing work fast and frictionless, encouraging collaboration, original ideas and generating more opportunities for sharing.

What other features make your products so powerful in the classroom?
Thanks to our laser and LED light source, our projectors have a very low total cost of ownership and market-leading green credentials which is especially important when rolling out a fleet of projectors across multiple classrooms. With no consumables such as lamps or filters to replace, and an expected lifespan of 20,000 hours, users can simply fit and forget. Coupled with a range which can be tailored to all types of classroom environment and new connectivity functions, we are leading the way for classroom display technology.

ABOUT ALAN:
Senior National Account Manager Alan Garratt heads up the sales, marketing and operations functions of the projector division at Casio UK.

CASIO

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What's the difference?

+ One-click connect enables wireless screen sharing with up to 40 devices
+ Lampfree technology and low power consumption for excellent total cost of ownership
+ Low maintenance design and long lifespan means users can truly fit and forget

Visible ENGAGEMENT

From collaboration in the classroom to remote access for education, interactive visualisers have plenty to offer as a 21st century teaching tool, says **Rene Buhay**

Implementing a flipped learning approach can be a daunting project for any school or teacher to undertake. Creating an effective future/smart/elearning/digital classrooms requires not only appropriate training and technological know-how, but also the right equipment. Interactive visualisers are suggested necessary parts of the flipped classroom, and can prove to be a core tool in the successful implementation of this advanced teaching strategy.

Interactive visualisers can be a real boon in the classroom when it comes to presenting learning material to students. Equipped with high-end zooms and up to 4K resolutions, they provide teachers and students with an all-new way to display classroom experiments or work. Most important, however, is their ability to help increase young people's engagement with activities in the classroom.

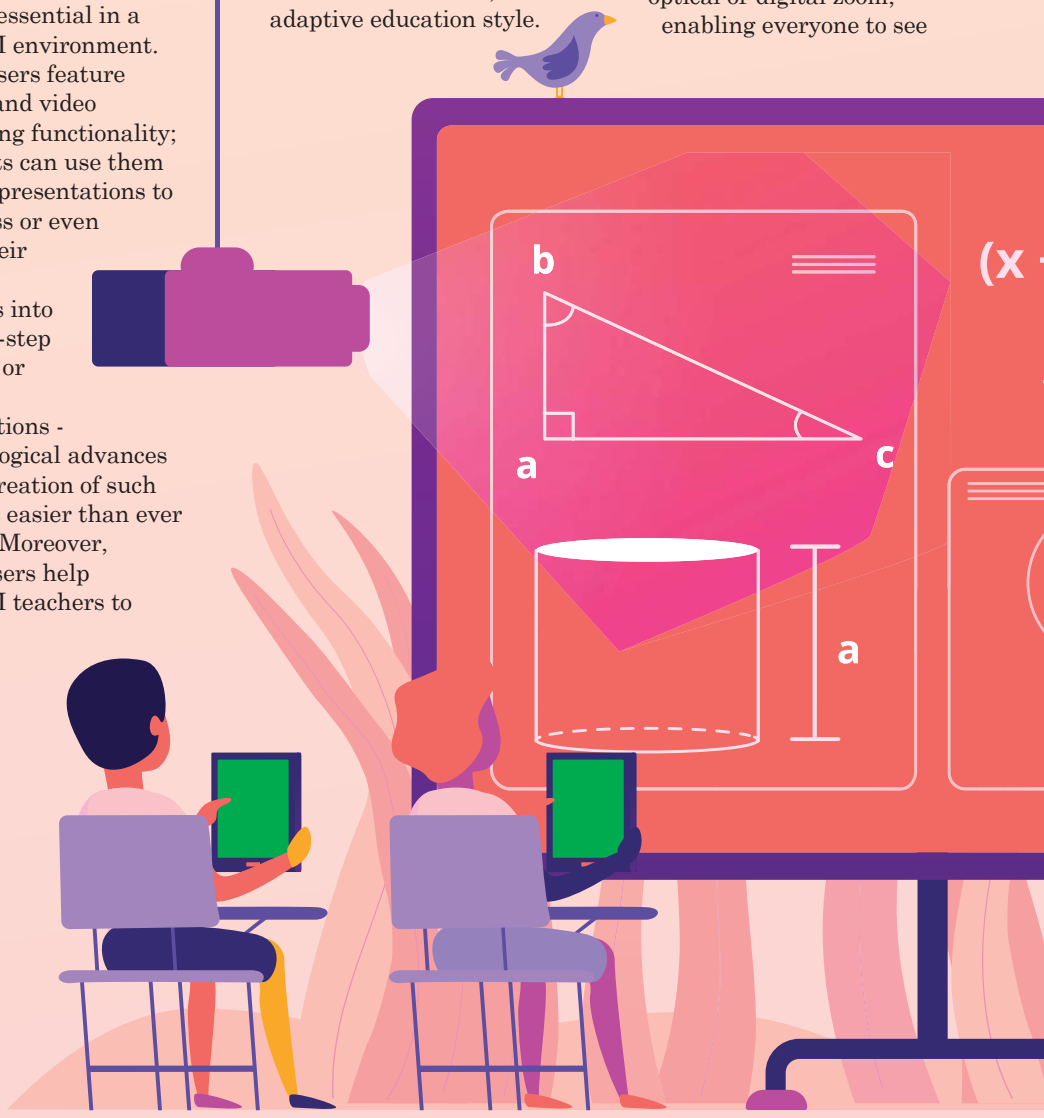
Evolved behaviour

STEAM teaching and learning will be changing the behaviours of educators and students considerably over the next few decades. Teachers are already starting to find even more ways for pupils to learn or express their creativity through innovative teaching programmes as the understanding of these new tools becomes greater. We can also expect the presentation and display equipment available to teachers and students to change greatly. For example, right now interactive visualisers fill this role quite well; but as display equipment evolves into the virtual and augmented world, presentation equipment will also need to evolve to cope with this new technology.

A visualiser is designed to enable the interactive connectivity that is essential in a STEAM environment. Visualisers feature image and video capturing functionality; students can use them to give presentations to the class or even turn their science projects into step-by-step picture or video instructions - technological advances make creation of such content easier than ever before. Moreover, visualisers help STEAM teachers to create engaging lessons that can live forever online - even when they're teaching remotely. It's highly likely that remote learning will become more commonplace as we move forwards, and teachers and/or students could well be calling into classes from hundreds of miles away. It is up to schools and teachers to find curriculums that can make the most of this new, adaptive education style.

Collaborate and change

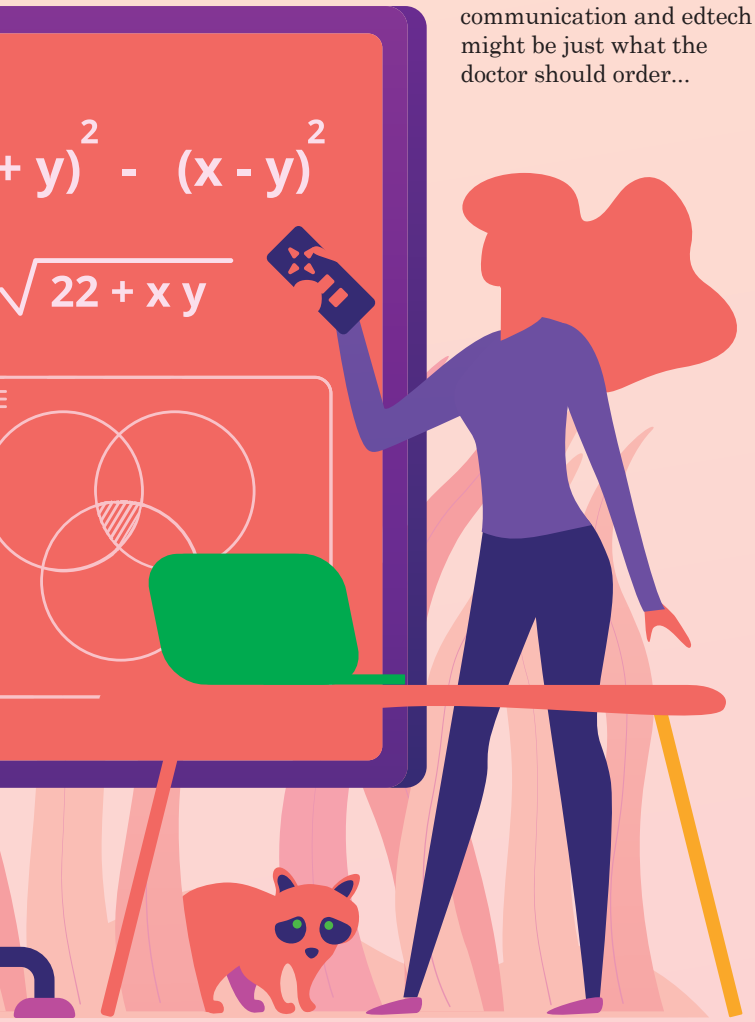
Whether you are looking to project work, implement distance learning or develop classroom collaboration through STEAM or AR/VR, what will make the difference is cutting-edge camera technology. A modern, interactive visualiser will be able to focus in on samples using optical or digital zoom, enabling everyone to see



"STEAM teaching and learning will be changing the behaviours of educators and students considerably over the next few decades"

the details, learn together, and share ideas with others. In addition, most visualisers can be used together with software installed in mobile devices, laptops and interactive screens, further enhancing teaching and learning. Collaborative techniques such as annotating, presenting, sharing and polling among the class can be done with ease - even if your students aren't physically in the room with you.

The classroom is changing. Technology is helping to alleviate some of the problems that are raising their ugly head due to supply/demand and funding issues - and finding the tools and techniques that can best improve students' learning is of the utmost importance if we are to provide our young people with the education they so richly deserve, not to mention a future that is brighter than the past. A combination of communication and edtech might be just what the doctor should order...



BUY SMART: 4 QUESTIONS TO ASK BEFORE INVESTING IN A VISUALISER

1. Can things be seen in detail and during process?
Good visualisers are a great equaliser when it comes to experiment viewing. Since they are able to project the activity directly to the front of the class, they allow everyone to take part in the process from their seat. Say goodbye to that crowd of learners all fighting for the best view; a visualiser should make sure every student gets a front row seat in the excitement, and help to engage them in learning about something exciting.

2. Can lessons be recorded for review and live streaming?
Nothing sets a student further back than missing a lesson. Whether it is for a sick day or some other scheduled leave of absence, you can't make up for missing out on the actual class. Interactive visualisers help to lessen the effects of absenteeism with the ability to record lessons for later distribution amongst students. Not only do they have real time recording, but with features such as A+ Suite teachers can stream video on their chosen media sharing platform, so students who aren't in class can still participate in real time.

3. Can it be integrated with interactive flat panels and touch screen annotations?
The flexible and compatible nature of interactive visualisers allows them to be connected to a range of classroom devices, but none provides a better place for engagement than connecting with an interactive flat panel. Interactive flat panels are a great way to present any type of material to a class and are especially effective when used with a visualiser. One of the biggest benefits interactive flat panels bring to visualisers is access to easy-to-use annotation abilities. Combined with video from the visualisers, teachers are able to point out key moments of an experiment or emphasise a noteworthy piece of information. Furthermore, teachers can invite students up to the front of the class to interact with the flat panel and video, making a fun and engaging exercise for learners.

4. Can every detail be shown from every angle?
Visualisers are versatile, but they also come in many different designs. Each type of visualiser tells you a little about what purpose it can play in the classroom. For example, flexible necked and mechanical armed visualisers are great tools for teachers presenting to a class, as they provide a sturdy platform for reviewing experiments or working over math problems to display the results. USB visualisers bring highly portable presentation capabilities and are simple to use and install, so teachers can take it with them wherever they go. And wireless visualisers play a key role in engaging teams of students at their desk and are a great way to get students to show off their work or their own experiments.

ABOUT THE AUTHOR
Rene Buhay is VP of Sales and Marketing, AVer Information Europe B.V.; 25 years' global channel experience, road warrior, has travelled to 70+ countries.

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AVer

Contact:
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Store, secure, charge, and manage your class' mobile devices with AVer Charging Solutions. Designed to meet the needs of classrooms of all sizes from 20-bay to 36-bay trolleys, Aver Charging Solutions help you support flipped learning in the classroom. Equipped with intelligent and smart cycle charging technology, AVer Charging Solutions automatically regulate charging to protect from overcharging and circuit overloads.

COLLABORATION BOX

AVer Collaboration Box is an indispensable, stand-alone Android module for easily converting your traditional classroom equipment into powerful student engagement tools. Take out your smartphone, tablet, or laptop and begin brainstorming, then easily share it with everyone wirelessly. Get rid of cables and begin remotely mirroring content from your devices!

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AVer's Professional PTZ Cameras provide you with high-grade video quality and versatility. Easily record or share your presentations and events around the world with the PTZ Series. For advanced purpose of tracking people, PTC Series are perfect for capturing live lecture courses, seminars, and live events. Three tracking modes fulfill all your needs to become a professional presenter.

Shared SUCCESS

Active learning leads to better outcomes, says **Alan Garratt** – so how can you get it happening in your classroom?

In light of new technologies, faster internet connections and the rise of BYOD (bring your own device), active learning is now a reality. While the movement is decades old, technology has for the first time enabled us to make the theory a reality, harnessing the power for real time sharing and collaborative learning.

Universities are leading the way, incorporating technology which is now commonplace in the workplace including video conferencing, live presentation tools, collaboration technologies and the use of smart software to speed up the process of turning ideas into presentable documents. Areas including 3D printing are bridging engineering and material science with design and creativity, showcasing interactive and rapid learning at its best. Having started in the 80s and now reaching new heights in space, 3D printing is a prime example of how technological advancement is proactively and positively developing the education sector.

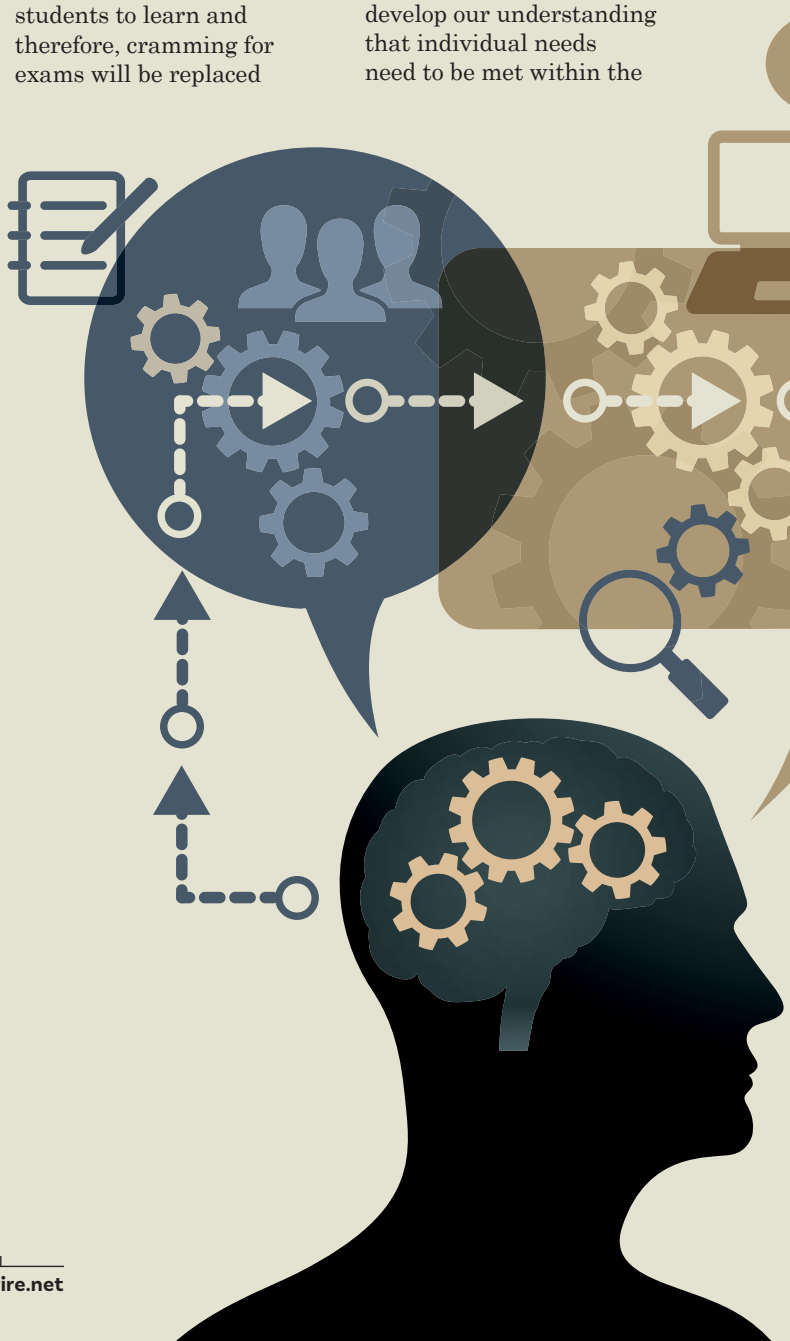
Connect & collaborate

The trends we are seeing in technology include systems which enable rapid screen sharing, allowing small groups of students to share work with the rest of the class quickly and easily. Meanwhile, WiFi connectivity is core to this working effectively and the trend towards devices which connect without hardware is a major step forward to increased usability for the teacher. Enabling live feedback and minimising time lost in switching between input devices for example, during a series of class presentations, ensures that teachers can do more in lesson time, with students staying actively engaged. In a world where the technological landscape is constantly changing, it is shown that the introduction of these facilities continues to keep engagement levels high and educational outcomes improving.

Active learning stems from a broader idea: that we learn about the world by building new information onto our own personal structures of understanding, connecting new information with preexisting knowledge.

The future development of the curriculum will progress in tandem with our new information gathering systems. 77% of teachers say that technology in the classroom motivates students to learn and therefore, cramming for exams will be replaced with the ability to effectively locate, refine and understand information which is readily available. To ensure this doesn't affect the quality of young people's interaction in class, it's more important than ever that this can be done collaboratively and as a group, making visual displays a cornerstone of effective classrooms.

With the success of technological integration becoming more apparent, it is more important than ever to look at the benefits produced by incorporating these facilities into educational environments. As we develop our understanding that individual needs need to be met within the



"Research shows that 70% of the information we absorb is through visual cues"

classroom, technology allows greater accessibility of information and adjustment of curriculum to suit the immediate needs within a setting. The opportunity for more accommodating and adjusted teaching is particularly prominent in AI technologies – and in fact, a UK startup has recently started a national roll out of an AI teaching solution in Belgium.

Support strategy

A relatively recent offshoot of active learning is technology-enhanced active learning, or TEAL. And TEAL is where the innovation really is right now. In an attempt to encourage active learning at MIT in America, for example, classrooms have been designed with 13 tables that seat nine pupils in clusters, surrounded by a whiteboard for each group. Projectors and screens are spread around the room's perimeter, encouraging students to use the technology and move around the room. Research in American universities showed that when STEM classes adopted active learning methods of teaching, there was a 12% drop in that class's failure rate. By adopting these technological advancements and using initiatives to further educational progression, the results show that engagement with technology and STEM has positively impacted educational outcomes.

Earlier this year, the UK government produced a report recognising the value of technology in education and established a strategy to support the industry. The report acknowledges technology's capacity to reduce teacher workload and increase accessibility, as well as improve pupil outcomes. A key feature of the strategy is the government's willingness to support faster and more reliable internet connections in schools, which is an integral part of enabling educational technology roll-outs across the country.

Despite conventional understanding, evidence shows that we don't in fact have a specific learning style (visual; auditory; kinaesthetic) which needs to be matched in the classroom. Rather, we are all multisensory learners who learn best from rich experiences which stimulate us in a variety of ways and connect up with preexisting information. Using technology in the classroom to communicate information in this way is an effective route to produce learning experiences which are more likely to be processed deeply and retained for a long time, and therefore creating a more engaging and more active learning environment.

FOUR WAYS TO ENCOURAGE ACTIVE LEARNING IN THE CLASSROOM

RESEARCH TASKS
Incorporate current examples by utilising the latest news or findings found during the lesson, allowing pupils to generate original content and ideas. Technology which allows for instant sharing means a topic can be searched and discussed in real time.

UPGRADE CLASS PRESENTATIONS
Encourage the use of tools for presenting back to class in a variety of ways. Pupils can use free software like Canva or simple gif creation tools to overlay images and text, creating visually engaging content. Similarly, producing video presentations for the class to watch back is an engaging medium and makes a change from live presentations.

KEEP IT VISUAL
We are all multi-sensory learners, but 70% of information we absorb is through visual cues. This means teachers need to ensure lessons are as visual as possible if they are going to have an impact. An effective way of doing this is with classroom technologies such as visualisers, projectors and interactive whiteboards.

USE VOTING TOOLS
A great way to get all students involved is through enabling live voting on a question or topic – especially a controversial one! Shared alongside learning materials, this kind of activity can be a fun and inclusive method of testing recollection from previous classes, before kicking off a new lesson.

ABOUT THE AUTHOR
Alan Garratt is senior national account manager for Casio Projectors (casio.co.uk/products/projectors)

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Let education speak

NEED TO KNOW - Q&A

“It’s based on 10 years of education experience”

Luuk Loeff describes how Prowise Presenter could transform your classroom

30 SECOND BRIEFING

Prowise Presenter is the result of ten years of education experience – it’s free software that’s full of educational opportunities, and now it’s been totally renewed to support an even richer, more collaborative teaching and learning experience.

T&I What is Prowise Presenter?
LL The Prowise Presenter software has something for everybody. Naturally, you can use the classic whiteboard functions such as writing, erasing, drawing lines and creating shapes. And of course you can add videos, images, backgrounds or audio clips to your lesson or presentation. But there is so much more that Prowise Presenter has to offer.

What are the underlying developments?
Prowise Presenter is the result of ten years of education experience, countless discussions with teachers and the full-time commitment of our development team. Development of the countless 3D models, educational tools and collaboration options took us almost two years.

How does Prowise Presenter help the teacher?
Prowise Presenter is equipped with a large number of 3D models. This way you can add more depth to your lesson in an appealing way. For example, we have 3D models of an engine, a Roman soldier and the human ear that bring theory to life in the classroom. The many available tools, specially designed for all ages and subject areas, offer a world of teaching and practice material for your lesson. Directly integrate the ready-made tools or adjust them to suit the level of your class.

Can pupils get started as well?
Everybody (pupils, teachers and even parents) can create an account, totally free of charge. With ProConnect, you can link tablets, smartphones and other devices live with the Prowise Touchscreen. Share screens between device and touchscreen, follow the work of your students live, hold a class vote, collect input from pupils and have them challenge each other in educational games. The well-known Touch Table tools that stimulate games-based learning can be opened directly from the media library and used on every computer, tablet or laptop.

ABOUT LUUK:
Luuk Loeff is Development Director at Prowise.

Prowise

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What’s the difference?

+ Developed as a result of ten years of education experience
+ A large number of 3D models bring learning to life across a wide range of subjects
+ Makes collaboration possible at any time, from anywhere and on any device

"We're teaching the YouTube generation"

Matthew Everett explains how using a mixed-media approach can get students hooked on literature...

In 2017 Amanda Spielman, HM chief inspector of education, children's services and skills said that "tests and exams are becoming more important in some schools than making sure children get a good grounding in a wide range of subjects", airing her concerns that schools are focusing on preparing pupils for SATs and GCSEs at the expense of giving them a "rich and full knowledge".

Of course, all schools are under pressure to achieve good SATs and GCSE results, but in English literature, I have found that 'teaching to the test' is the least effective way of drawing my students into the stories, poems and plays to which they are introduced.

As English practitioners, we are always looking to ensure we are encouraging our students to delve as deeply as possible into their learning. For subjects such as the sciences this is possibly easier to achieve; getting hands-on with experiments and using numerous edtech resources. There are very few such resources for literature, however, so I am always open to looking at how to bring a Shakespearean play to life without simply reading it line by line, which is certainly not what it was intended for!

See it first

In some circumstances, I use short videos that give an overview of the plot; something that has been very successful as a starting point for deeper debate and discussion at my school, Cardinal Wiseman, in terms of learning and revision.

The students love it because learning is delivered in a way that is familiar and meets the needs of a 'YouTube generation', who expect content on demand wherever they are. Let's take Charles Dickens' *A Christmas Carol* as an example. By watching very short videos of the key narrative of Ebenezer Scrooge's vision of the ghosts and his reaction when he sees the ill Tiny Tim, my students are naturally more able to appreciate the plot, as they have something to pin their prior knowledge to. The video files highlight what pupils need to know, but more importantly, they provide teachers with a platform for a broader discussion on issues such as morality and the spirit of giving. By the time they come to read the associated chapter, students already have a strong foundation for learning; it's about giving them the confidence to read the story and igniting each individual's independent willingness to learn.

Added to this, research shows that students who visualise information are far more likely to retain it and be able to apply it in a meaningful and relevant way. For all these reasons we use high-quality short videos of three to five minutes, of actors playing out the plots and storylines to stimulate the imagination, enhance involvement with information, and improve students' mental imagery. Even the most able students need to see the storylines visually to really grasp them fully.

> ***"Using video technology my life has become a lot easier and my feedback considerably more effective"***

Each day the opening lesson is a recap of the previous lesson, usually a quiz or short questions, but which may take the form of playing one of the videos and discussing what was taught previously to see if it has been learned and retained.

Workload bonus

But isn't this teaching to the test? Well no, it's actually quite the opposite. The videos we use cover all aspects of the stories and we tend to use those that address the more difficult to understand sub-plots to help students grasp a deeper and broader understanding. There are many audio-visual clips on the internet, although it is wise to be careful, as they often focus on generic overviews and have little benefit without an explanation of their purpose, and where they fit into the story. We use video pods specifically designed for the GCSE curriculum to support a developed interpretation. In addition to the pods' power in the classroom, they also form the perfect homework and revision resource.

As an English literature teacher, marking homework, which used to

come in the form of extended essays by each student, was always a huge drain on my time compared to the impact that it had. Using video technology my life has become a lot easier and my feedback considerably more effective; once we have studied an aspect of the text and discussed it as a class, I set the students assignments and homework based on any gaps in their knowledge with related videos as support, and the relevant pre-loaded multiple-choice questions in the system we use. The marking is done for me, but with the assurance that I am automatically notified of any students who have not grasped the learning objective. This tells me in a much more meaningful way how much knowledge each student has, and I can then spend time later on, supporting them in crafting an extended response.

By following this teaching pathway, our students develop an in-depth understanding of the wider context of plays, their themes and the complexities of their characterisation and purpose.

Improvement journey

Back in 2017 Cardinal Wiseman was an inadequate school, with one of the major issues being the consistency of our teaching. By ensuring all teachers use curriculum based technology, we have been able to standardise content, minimise planning time and ensure our students get consistent delivery of the highest quality of learning. We are now no longer an inadequate school.

By seeing the plots and sub plots visually, learners at Cardinal Wiseman experience literature made real. The students appreciate its meaning and how the storylines evolve and relate to the world around us. This is a big part of making our wonderful subject truly engaging for today's students.

Since introducing an edtech-based approach, we have certainly noticed a significant increase in our students' interest in, and appreciation of English literature, particularly in our lower attaining boys, who previously would not engage with other forms of independent learning. These students are now willing to watch the video pods at home and school, and their results reflect their additional study time. It is my strong belief that today's video technology is ideal for grasping attention in most areas of learning – but for me it's proven to be ideal for judicious use in English literature.

ABOUT THE AUTHOR

Matthew Everett is senior assistant principal at Cardinal Wiseman Catholic School, in Coventry, which uses GCSEPod for its cross-curricula videos and supplementary learning content.

Unlock their POTENTIAL

Design education is key to equipping young people for a changing world, says **Helen Charman** - and the V&A is here to help...

From Extinction Rebellion to the Fourth Industrial Revolution, no one can deny that the world in which we live is changing, fast. Young people are at the epicentre of this change. It is a world they inhabit and will inherit. It is a world in which they must be the change-makers.

Design education plays a pivotal role in equipping young people with the skills to grapple with this fast changing world. Design education unleashes imagination and fosters ingenuity – the twin pillars of the V&A. What would our planet look like if people decided they didn't want to make things, mend things or invent things? Creativity in all its forms and outcomes is essential – and teaching young people key design and technology-based skills is more important than ever.

But just as the case for creative education is most compelling, creative jobs are in record demand and the sector is celebrated globally, creativity's place in schools looks increasingly uncertain. An August 2018 report by the Cultural Learning Alliance showed a decline of -35% in the number of arts GCSE entries in England between 2010 and 2018. Within this, the uptake of the Design and Technology GCSE had declined by a staggering -57%.

A civic duty

I believe that museums have a civic duty to fill this void, and at the V&A we certainly have a social and cultural imperative to address this crisis. The V&A was founded with a mission "elevate the Art-Education of the whole people", with an educational reach that extended right across the country. One of our founding forces was the system of design schools that emerged in the mid-19th century. The 1836 Select Committee on Arts and their Connection with Manufactures was adamant that "The principles of design should form a portion of any permanent system of national education." And the South Kensington Museum was to act as the hub of this design school movement – training teachers, reforming curricula, and lending its collection across the country.

Today, the V&A welcomes over four million visits across all of its sites each year. It represents a world-class collection of over 2.3 million objects; a centre of excellence for innovative curatorship, conservation and research; a place for brilliant exhibitions, displays and events; thought-provoking permanent galleries; and, most pertinently, the nation's foremost resource for design education. Two programmes for schools have particular bearing in this context.

The first is DesignLab Nation – launched with the help of our Art Fund Museum of the Year 2016 prize money – which supports the teaching of the relaunched Design & Technology GCSE. Object loans from the V&A are now on display in Blackburn, Coventry, Sheffield, Sunderland as well as in Stoke-on-Trent, where we are collaborating with secondary schools and local industry to explore the industrial heritage and support the creative industries in each of these areas.

Ambitious intent

The second is V&A Innovate, launched this summer and designed to be a powerful addition to our national educational efforts. This ambitious new programme is poised to drive forward design education nationally, available to every secondary school in the nation. Grounded in the V&A's world-leading collections, exhibitions and cutting-edge industry practice, V&A Innovate has been created with teachers, young people and designers, to equip young people at KS3 with the confidence and skills to develop design solutions for real-world issues inspired by themes from our collection and exhibitions chosen for their relevance to the lives of young people.

KS3 is a pivotal point in young people's education. With the pressure to take up Ebacc subjects, and the narrowing of KS3 to two years in many schools, too many students miss out on studying art and design. Teachers tell us that without access to Design Technology subjects at school, young people miss out on valuable opportunities to broaden their horizons, see the world in new ways, and even to identify future career aspirations. Let's not forget that studying Design Technology subjects – which includes STEM subjects – also supports the development of other key skills including communication, critical thinking, collaboration, problem solving, self-organisation and project management. All are integral to young peoples' development and longer term outcomes.

Designed to be as flexible as possible, V&A Innovate is a free online teacher resource hub with toolkits, animated video guides, and a range of inspiring activities to unlock the creative potential of the next generation of designers, makers and creatives. It includes a challenge element which invites students in state funded education to submit their projects with the chance to have them showcased at a special awards day hosted at the V&A in early 2020. Finalists will pitch their ideas to a panel of judges who include leading creatives and designers in the areas of fashion, sustainability, manufacturing, art and design.

V&A Innovate can be delivered over one term or in a carousel model to prepare young people for the new D&T GCSE, in an after-school club over a few weeks, or intensively over one day. It introduces young people to core design principles: design as an empathic, user-centred and problem-solving activity that responds to need through iteration (trying things out, embracing experimentation and failure as part of the creative process). It is underpinned by a professional development programme for teachers to complement in school projects and the annual awards for schools, teachers and young people.

Creative power

Design and Technology has the power to unlock and unleash a generation of creative producers and problem solvers. It has the potential to build a creative workforce for the future, embracing the opportunities of the creative industries as the fastest growing sector of the UK economy. But none of this will happen without rethinking and reinvigorating design education for the 21st century. This is why we are calling upon every design and technology teacher nationally and as many young people as possible across England to roll up their sleeves and get involved with V&A Innovate (bit.ly/tandivanda) to design for change and help create a future they want to see.

GET INVOLVED

1 DesignLab brings schools together with museum educators, practising artists and designers and the Museum's collections to work on projects, through a programme of in-depth projects that explore new ways of engaging secondary school students with design. It also provides teachers with training and CPD opportunities to develop new and innovative ways of teaching design. Find out more at: vam.ac.uk/info/designlab

2 The V&A National Schools Challenge – part of V&A Innovate – invites KS3 students in state-funded education to submit their projects from September onwards, with the chance to have them showcased at a special awards day hosted at the V&A in early 2020. Finalists will be invited to pitch their ideas to a panel of judges who include some of the most high-profile creatives and designers in fashion, sustainability, manufacturing, art and design. To access V&A Innovate's online resources and to sign up to the V&A National Schools Challenge visit: vam.ac.uk/innovate

ABOUT THE AUTHOR
Helen Charman is Director of Learning & National Programmes, V&A

Is your school FOR HIRE?

Canny education establishments are sharing their facilities with the community, and bringing in new income, too, says **Chris Smith**...

With the rise of the twenty first century classroom, individual mobile devices and interactive whiteboards have become a common feature of the education landscape, and UK schools now spend £900m annually on edtech. However, whilst the adoption of modern learning tools has been widespread, schools are only just beginning to understand the powerful potential of technology in education to transform not just the way students learn, but the learning environment itself – and even to generate fresh revenue.

Launched this year, the government's Education Technology strategy outlines how technology can reduce teacher workload, boost student outcomes and help to level the playing field for those with special needs and disabilities. The introduction of interactive apps and immersive, VR learning can help teachers bring education to life, increasing pupil engagement and delivering better outcomes.

Edtech is also driving efficiencies in how teachers' days are spent, helping to liberate them from time intensive tasks such as preparing and marking homework. This means that more time can be dedicated to providing supportive and successful learning environments.

This is all hugely positive; but efficiencies can be achieved beyond the classroom, too – and schools should be encouraged to consider how technology can not only help them to save time, but also create additional revenue.

Beyond the classroom

Education establishments are home to some of the UK's best facilities, from sporting fields to swimming pools, and all have access to spaces such as classrooms, car parks and main halls. Some even benefit from state-of-the-art offerings, such as performing arts spaces and recording studios. But after the school day and during holidays, many of these assets are woefully underutilised.

By simply hiring out these facilities for use by local community groups, such as dance and sports organisations, social clubs, holiday camp providers and charities, schools can generate significant annual revenues.

Technology is forming a critical part of this opportunity. By implementing a simple, online booking tool, educational institutions can centralise what can be a complicated administrative process, from booking to billing.

Driving efficiency

Handling the logistical, legal and financial aspects of hiring out school facilities can seem like a time consuming and burdensome task, which can divert resources from core school business. However, space lettings software can provide total administration systems, including a room booking tool, white-labelled website, automated invoicing, online payments system and automated communications. This empowers schools to let out their facilities in a time, resource and cost effective manner.

"The ability to open up our facilities for use by local groups and clubs is important to us and we have a surprising number of staff involved in managing the bookings of our facilities," observes Sasha Chard, marketing and development officer at Haydon School. "Since adopting an online lettings platform, not only has it delivered significant time efficiencies for staff involved, it has meant that we can be much more efficient with hiring space. This in turn has freed up valuable time, which can be dedicated to educational-related tasks and the further development of educational opportunities outside the classroom."

"We have seen our revenue increase upwards of 200%!"

There is also a compelling financial rationale for schools to open their facilities to other institutions and the local community. Schools using online booking tools can generate average annual revenues of £70,000; and up to £470,000 per year for larger secondary schools. The fresh revenue can be reinvested into school's facilities, staffing or even to offset existing deficits. At a time of intense pressure on educational budgets in the UK, many schools would benefit from capitilising on existing resources.

"Since investing in an effective online lettings tool to hire out space in Bushey Arena, our state-of-the-art £30 million multi-purpose venue, we have seen our revenue increase upwards of 200%!" confirms Clive Hibbert, venue manager of Bushey Academy. "This additional revenue made from hiring out our facilities to the local community can be reinvested back to the Academy to improve teaching facilities for our students, and provide them with the best possible opportunities to learn, develop and grow as people."

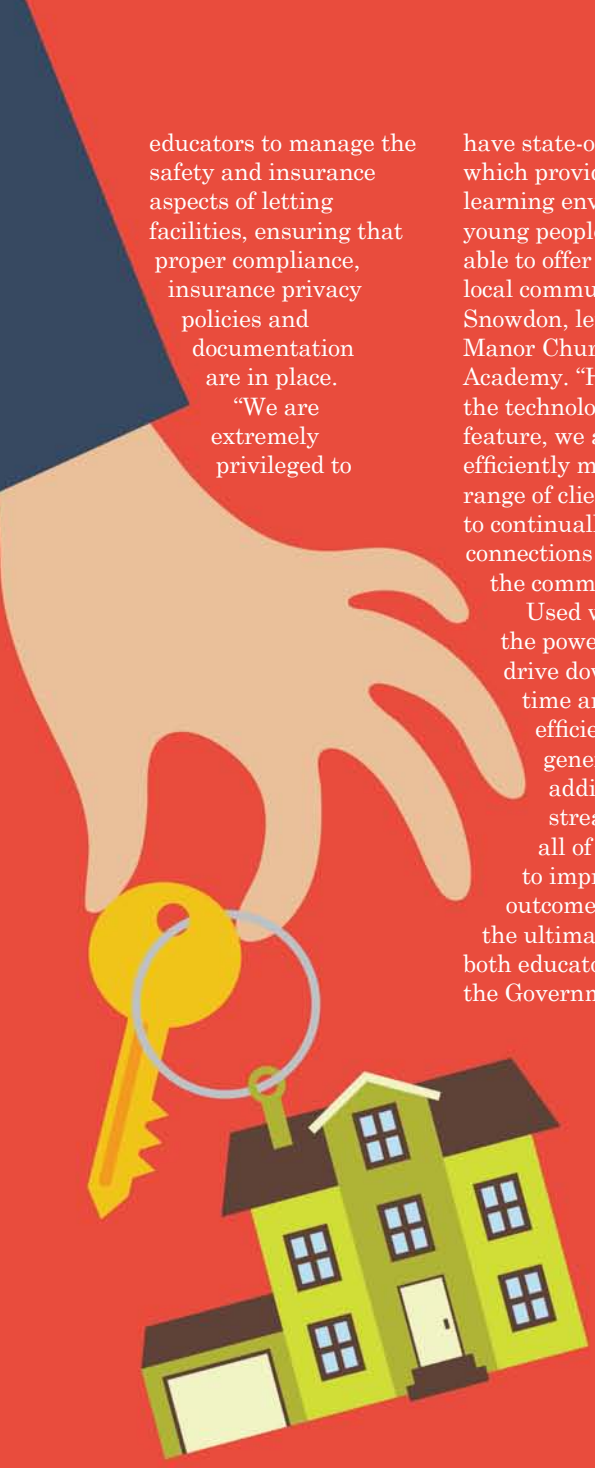
Heart of the community

Opening up facilities for use by local clubs, charities and business promotes community cohesion and integration, helping to reduce societal boundaries and barriers. Technology can help

educators to manage the safety and insurance aspects of letting facilities, ensuring that proper compliance, insurance privacy policies and documentation are in place.

"We are extremely privileged to have state-of-the-art facilities, which provide the best learning environment for our young people, and that we are able to offer for use by the local community," says Rachel Snowdon, lettings manager at Manor Church of England Academy. "Having introduced the technological lettings feature, we are now able to efficiently manage our diverse range of clients and allows us to continually grow our connections within the community."

Used well, edtech has the powerful ability to drive down costs through time and administrative efficiencies, and generate important additional revenue streams for schools – all of which contribute to improved learning outcomes for students; the ultimate goal for both educators and the Government.



ABOUT THE AUTHOR
Chris Smith is head of community at Kajima UK (kajima.co.uk)

7 WAYS TO ADD VALUE TO YOUR FACILITIES

When hiring out your space for community use, the following tips will help you to develop a business that is as seamless and efficient as possible:

- **USE ALL OF YOUR SCHOOL'S ASSETS**
Anything from car parks to classrooms can be let out, and every asset owned, including overhead projectors and interactive whiteboards, can increase a school's lettings value significantly .

- **APPOINT A LETTINGS COORDINATOR**
If possible, nominate one person to take responsibility for lettings – this could be the business manager, or a dedicated manager who will take ownership over your lettings.

- **MINIMISE ADMINISTRATIVE BURDEN**
Adopt an online bookings system which can holistically manage the four essential elements of lettings – marketing, bookings, payments and communication – to ensure a streamlined and efficient approach.

- **MARKET YOUR SCHOOL**
Marketing will support sales. Some online booking systems provide expert marketing advice, with in-built features such as SEO (search engine optimisation), enabling schools to maintain a strong, targeted web presence, promoting your facilities to potential hirers.

- **STAY AHEAD OF REGULATORY DEVELOPMENTS**
Regular software updates to your online booking system should ensure that you are fully compliant with legal, regulatory and technological developments.

- **BE PRICE SENSITIVE**
This is important for you and your clients. Price your space competitively, and be aware of other facilities in your locality and what they are charging to ensure you are offering reasonable hire rates.

- **PROVIDE A GREAT CUSTOMER EXPERIENCE**
Although much of the lettings administration process can be automated, via convenient lettings software systems, someone should always be available to answer questions and respond to queries. Ensure your site team are offering a top-quality service to customers and users whilst on site.

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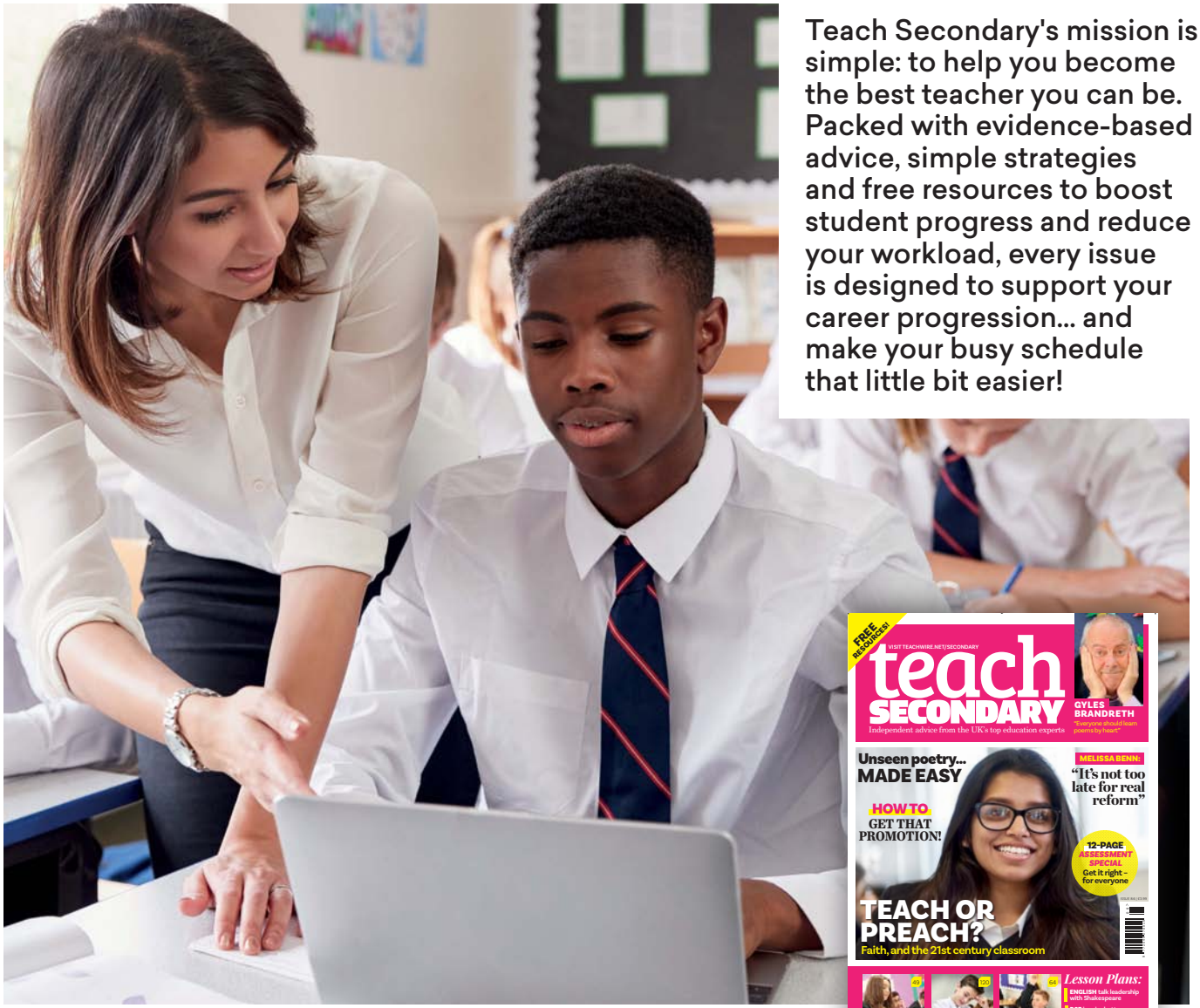

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TECH IN ACTION

Stories from schools with technology at their heart

STUDENT VOICE: Oliver Minter-King, Y10

"Reflecting on my revision (or lack thereof) for the 2019 GCSE exams, I now realise how incorporating technology into studies makes the act of revising far more bearable to students. This is due to the one dominating factor that all modern gadgets and gizmos possess… convenience.

With the internet now acting as a pseudo second life for thousands upon thousands of children, teenagers and young adults alike, I am very happy with the amount of educational websites and sources that exist for anyone to obtain and utilise in their studies. I, for one, certainly can't imagine a time where having to take numerous library visits to drag myself through multiple books would be the only option for out of school revision or homework.

Furthermore, the majority of the revision sites out there incorporate a 'bite size' focus, meaning short, easily digestible clips or scripts that are designed to quickly dispel queries, with practice exam questions to boost your confidence. This is a method that has long been lauded by teachers for being the optimal way to revise; "little and often" was a fairly common phrase to hear whilst everyone bundled into the bus home. Some examples of great sites that follow this mentality would be freesciencelessons, BBC Bitesize and mathsgenie.

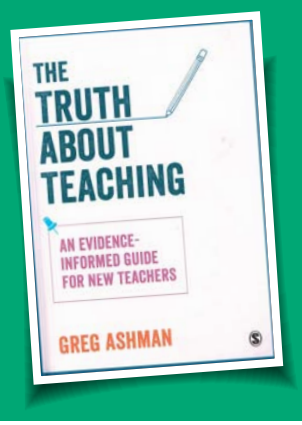
Finally, with the popularity of podcasts on the rise, the website GCSEPod produces a variety of snappy, five-minute 'pods' to download, covering subjects from English, maths and science to IT and drama. The pods are brilliant to use for brief note taking or on the go revision (and particularly great for the exam day commute… or so I'm told…)

In conclusion, the educational aspect of the internet cannot be understated – it has greatly assisted me in my studies so far, and I've no doubt it will in the future as well."

48.4%

of pupils have access to an iPad or laptops at school.

Source: National Literacy Trust



RECOMMENDED READING

The Truth About Teaching (Greg Ashman, Sage Publishing, £18.99)

Subtitled 'an evidence-informed guide for new teachers', this is a very welcome addition to the growing library of such books. So what makes it any different? First, although it is very heavily research-based, with copious references at the end of each chapter, it is both easy to read and highly pragmatic. The gist of Ashman's approach may be summed up as: "One study says X, another says Y. What does this mean for what you do in your classroom?" Secondly, the book covers a diverse range of topics, including behaviour management, learning, lesson planning (which can sometimes be a bad thing!), assessment and using technology. Thirdly, the author blasts a few myths, such as 'enquiry-based learning good, explicit teaching bad'. Well-structured, with bullet points at the start of each chapter and a conclusion at the end, it's a must for all teachers, whether new to the profession or not.

Reviewed by Terry Freedman

Work smarter, NOT HARDER!

Philippa Stevens explains how technology is enhancing teacher wellbeing and increasing student confidence at St James School in Exeter – especially in maths

When I joined St James School in 2015, the department had just introduced learning on tablets in maths classrooms. This was certainly causing a buzz amongst the learners – but I was a little anxious about how I would manage. I'm a confident user of technology; but it's one thing to engage with social media or download apps, and quite another to use iPads to teach 30 children in every single lesson. I was concerned about WiFi reliability and battery life. I worried about how students were going to show their workings, and whether they would treat the devices respectfully – and in truth, I couldn't quite see how I'd use them as the primary means of teaching maths.

However, it really didn't take long for me not only to get used to this way of working, but actively to embrace it – because it's clear that if you get the right technology solution, the whole school will reap the rewards. At the beginning, connectivity was a bit hit and miss, but now it's absolutely reliable. It's no big deal to give out and collect devices – it takes the same time as handing out books. And it's easy enough to lock down devices to that students aren't distracted by illicit apps, or browsing the web.

Prepare to succeed

The real lesson in implementing any tech, though, is to make sure your provider is focused holistically on the whole teaching and learning experience – not just on student engagement. New software should be designed to help teachers as much as learners, enabling them to work smarter, not harder; and that's certainly been my experience.

"Edtech should always complement book work, not replace it"

Maths has been a key focus for the implementation of edtech at St James, where we use a personalised learning solution both in the classroom and as homework across years 7-9. It's provided by Sparks, which is a company that's dedicated to working in classrooms with teachers to hone the software, and has also built a community of educators who come together to offer insight, advice and ideas.

Where this edtech really comes into its own is the level of personalisation we can achieve without having to deviate from a core lesson plan. In our classes we can now differentiate with at least four different levels, so staff can scaffold learning where needed, and there are extra activities to challenge students and extend their mathematical thinking.

The schemes of work are flexible, but there is a basic structure to each session. There is a starter activity, materials for me to teach the concepts – which we work through together – questions, feedback, and videos that students can turn to if they are stuck.

Building confidence

Our students enter year 7 with a wide range of ability. We have around eight different sets, including a Fast Track group of children who are working at below the expected level, and benefit from additional maths and English support.

Edtech should always complement book work, not replace it. In our maths lessons, students must write down their workings and answers in their book, and several times during the session the software will ask them to re-enter one of their previous answers into the tablet in order to continue with the lesson.

Immediate feedback is important, especially in building confidence – and the software facilitates this. It is powerful for students to see straight away if their answer is correct, and similarly, with this immediacy, I can see on my tablet what every single

learner is doing, and whether they are struggling or indeed, excelling.

Technology helps focus my attention appropriately. When I am supporting an individual pupil, the rest of the class is busy and no one is waiting to have work checked. As soon as a student has completed the core tasks, they are presented with new activities so there is no slack time, and this reduces the incidence of disruptive behaviour. The lessons tend to be fast and focused.

It's great to see our students become more confident, especially in attacking word-based questions, having been exposed to them throughout the year and watching videos on how to tackle them. They are now confident, more resilient and have developed problem solving skills – some are getting top grades already. In the past, only the top set in year 9 would have been considered for the higher tier assessments throughout that year. This year, all the learners in the top two sets are working towards the higher paper; I have been blown away by their level of achievement.

Extra time

I work in a very happy department which, in terms of results and progress, is one of the most successful in the South West. A lot of this is down to the time-saving nature of technology.

I work part-time and my free periods used to be taken up with marking, making resources, photocopying and planning. Now I have extra time to support individual students and help other staff members. These days, I don't feel harassed and there is a relaxed atmosphere about how we work together and with students. In fact, we are now doing more teaching and less resource-gathering, which is better for everyone.

Some schools are anxious about introducing technology into the classroom and sometimes teachers who don't use it seem to think it's some sort of a fad. 'What will you do when they get bored with tablets?' they ask. I find this odd. After all, we have had decades of using chalk and talk and of having maths textbooks. Technology is not a game, an entertainment for school students; it is a new medium for teaching and learning and it is here to stay.

5 THINGS TO CONSIDER WHEN TEACHING WITH TECH

- Make sure devices can be locked down so students are not going off to look up things on the web during lessons
- Check that any software has lesson plans and not just student resources
- Make sure the software is suitable for all learners, from the weakest to the strongest
- See if it will generate different questions, so individual learners aren't getting the same challenges as their neighbour
- Look at the online explanations. Will the students be able to understand them?

At the Education Resources Awards on 22nd March 2019, Sparx and the Ted Wragg Multi Academy Trust won the 'Collaboration Between School and Supplier' Award.

ABOUT THE AUTHOR
Philippa Stevens is second in the maths department at St James School in Exeter.

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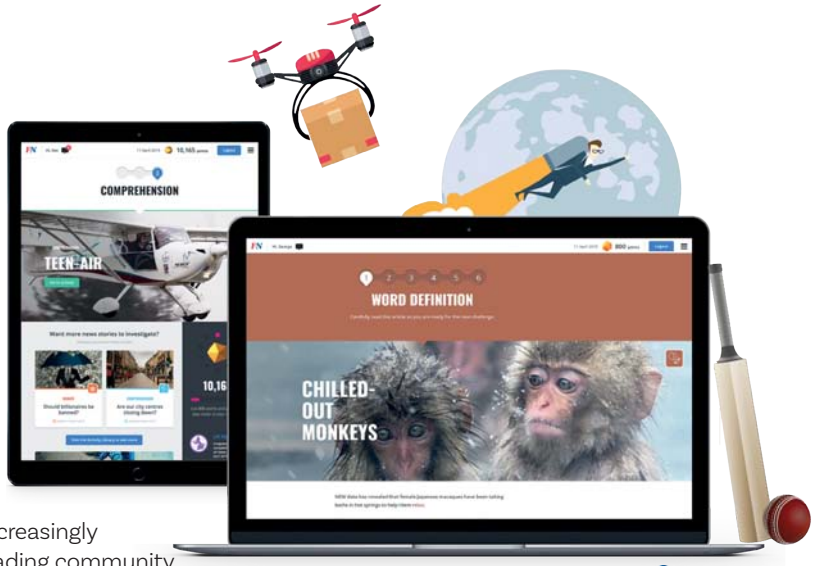

STARTING POINT

With a shortfall of non-fiction texts in our library and the recognition that we were struggling to engage all our Key Stage 3 students in reading fiction (in print) we knew that there was a gap in our provision with regard to interest and motivation, both in terms of reading for pleasure and for information. At the same time, some of our students had also been involved in a government commission into the teaching of fake news and critical literacy skills, helping us understand that there was an imperative (now more than ever) to support our students in becoming readers of news and to take a more active interest in the world around them. Through platforms like Twitter, we had become increasingly aware of *First News* and what it might offer our reading community.

IMPLEMENTATION

So we invested in a package from *First News* consisting of 12 copies of the weekly print edition of the newspaper as well as access to the brilliant interactive, online learning platform, the iHub. We immediately had an abundance of additional reading materials at our fingertips that would be updated on a weekly basis, offering our students engaging articles on local and global issues, comprehensions, vocabulary puzzles, polls and debates. The iHub has such an inviting interface for students; attractively designed with powerful and appealing images of news and a very clear layout including a section of incentives to support student reading which displays points earned and other awards including gems and badges. Reading the news online (and in print) therefore became a weekly expectation for our students, both out of class and through the curriculum in school.

OUTCOME

The First News iHub, and its accompanying print newspapers, are something we now couldn't be without; we feel we would be doing our students a disservice by not opening up such opportunities to read and engage with the news. Through the iHub, we have seen some of our most reluctant readers of fiction become some of our most avid readers of news with an increasing confidence to express opinions about the issues that concern them and their futures. There are those students whose motivation for reading has also increased because they have a preference for reading in a digital format and also due to the points and badges incentives, receiving recognition from the school through awards assemblies and letters home to parents. The key outcome is that news is now part of a weekly conversation in the curriculum between staff and students and that we are starting to develop a community of more globally aware and responsible, active citizens.

Richard Long, English Lead Practitioner, St Michael's Catholic School

Did we mention?

You can take a free 30-day trial of First News Education's iHub, to explore all that this award-winning digital tool has to offer. To get started visit **schools.firstnews.co.uk/edtech** and see how you can transform your students' attitudes to reading through interactive, news-based learning.

Turn to page 41 to enter a giveaway to win a year's access to the iHub for your school, for up to 280 pupils!

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THE PLACE: St Michael's Catholic School is a unique school in Buckinghamshire offering a Catholic education for children from the age of three in the Nursery to nineteen in the Sixth Form.

THE CHALLENGE: To offer a broader range of reading experiences to students (to include a digital platform) that also supports students in becoming more critically literate readers and more globally aware, active citizens.

A commitment to INNOVATION

At West Exe School, high expectations and a discerning use of edtech are driving improvement for staff and learners alike

Marking and reporting: two words that can strike fear (or at least frustration) into the heart of any staffroom! As teachers, we enter into the profession to make a positive impact on learners and inspire the next generation to be empowered members of society. But, more often than not, non-teaching tasks like marking and reporting get in the way – meaning we are left with precious little time to focus on ensuring individual student progression.

Three years ago, West Exe School decided to make a change. As part of our commitment to fundamentally change and improve the educational experience of our students we set about finding a way to improve our processes, in part through technology.

We came across Wand Education, a platform which provides automated marking and one-click reporting in our classrooms. It has been the spearhead of a wide-scale transformation project at West Exe and has helped us to drive sharp improvements in our quality of teaching. We are proud to be one of the many successful schools belonging to the Ted Wragg Multi Academy Trust and we celebrated our best-ever exam results in 2018.

The Trust and all of the staff at West Exe School continue to focus on what will have the greatest impact in supporting our students to achieve success. The clear and tangible results speak for themselves – not only vastly improving student outcomes, but also the work-life balance of our teaching staff.

Only the best

We are a school with very high expectations of and for our students; only their best is good enough. By reducing teacher workload we are able to provide learners with opportunities to shine, through excellent teaching and innovative practice. The school has a rich extracurricular provision and a curriculum that challenges and inspires from the start of year 7 and is increasingly personalised as students move up through the school. We believe in ensuring that our young people achieve a good range of qualifications but also develop the skills to use these to move on successfully to a destination of their choice. West Exe School is a vibrant community united in its commitment to creating opportunities for students and staff to achieve success.

Technology has been a vitally important part of this for two key reasons. First, it has improved our ability to accelerate students' learning. The analytic tools allow for quick diagnosis of whole class and individual student learning needs and deficits in their knowledge acquisition, a key component in the new style GCSEs over recent years. Secondly, technology has aided our drive to reduce teacher workload. At a time where 40% of teachers are cited as wanting to leave the profession within the next five years, West Exe School is proud of the positive and optimistic feedback received from all staff. Whilst we recognise the need to use conventional written tests to assess how students can apply the knowledge accumulated in each subject, this is limited to three times annually. In between, our staff can assess students' knowledge retention with a few clicks of the mouse. They do not need to spend hours and hours marking tests.

"By reducing teacher workload we are able to provide learners with opportunities to shine"

The right tools

Using the Wand platform, each student receives one test from each teacher at the start and at the end of

each cycle (week one and week ten of each term). After learners take the first test in week one, teachers get access to PLC Charts that highlight exactly what they know at question and learning objective level. They get actionable data and insights on where the learning gaps are.

After students take the second test in week ten, teachers and senior leaders get access to progress and attainment reports. These show a wide range of data, including student progress and attainment, and results at subject level, teacher level, year level and school level, whilst comparing various student groups (for example, boys, or disadvantaged students). This allows for early intervention and better transparency when it comes to student progress.

In terms of benefits, the time savings have been enormous. We also have better visibility of student and teacher activity – as well as actionable data on student progress. And our use of technology doesn't stop there. We incorporate a wide range of different e-learning platforms and software packages in our planning. At KS4, for example, we utilise GCSEPod for revision activities and to support home learning. This has been integrated in Class Charts for the tracking of homework and merits and demerits. We have areas of the school where Moodle, which is also supported by the H5P plugin, provides automated assessments in the platform.

Within maths, we also use Sparx, Heggarty Maths and Pin Point learning to support automated assessment and digitised online home learning. This just scratches the surface – but you get the picture.

Facing challenges

It's a familiar issue for almost every head teacher, of course, but West Exe faces a challenging budgetary situation. A robust financial plan for the next five years and integration into the Ted Wragg Multi Academy Trust has allowed us to circumvent many of the issues that might otherwise allow the financial constraints of the current educational climate to impact upon learning – but we have also been very careful with the technology and software packages we have bought into, with competitive pricing a priority.

As with many other schools, we also face challenges related to academic outcomes. As one of the fastest improving schools in the area, we aim to continue the school's upward trajectory. In order to do this, we recognise the importance of our staff, and work hard to maintain the sound work/life balance that has been established – reducing meetings, marking and other onerous tasks which otherwise detract from outstanding classroom teaching.

We also know how important it is to pool best practice from around the UK education sector and actively invite high performing schools to share their practices with us, whilst also visiting top performing schools for continued inspiration. We believe that our innovative use of technology is also something that many schools can learn from – and we look forward to working collaboratively with other educators in the future.

4 WAYS TO REDUCE YOUR ADMIN TIME...

- Attend fewer low impacting meetings
- Provide fewer 'skills application tests' and more automated knowledge tests
- Use pre-planned and co-created schemes of learning
- Systemise homework for low teacher maintenance

ABOUT THE AUTHOR
Alex Kirkbride is deputy headteacher and head of computer science & e-learning at West Exe School.

Teaching with THE TIMES

Next time you're getting frustrated with the latest new-fangled edugadget, remember, the chalkboard was once a new invention, suggests **Adam Riches**...

I sometimes wonder what a teacher from 100 years ago would make of our classrooms today. A mystical box which projects its images onto (a pen smeared) wall; a non-tangible place where information can be interacted with through handheld devices with no physical connection with each other; and a magic pen that has no ink… the time traveller's mind would be blown. But how much has technology actually changed our teaching? And is it as important as we think it is?

As technology becomes more prevalent in our lives, we have seen it creeping ever further into the world of education, with certain innovations becoming commonplace. Almost every classroom in the country now has a computer and a projector in as standard, for example, with a number also boasting interactive whiteboards, visualisers and audio equipment (whether any of this is working is another story). It's rare these days to see a lesson that doesn't rely on PowerPoint or Prezi, with some newly qualified teachers looking at you in awe when you say that you just use a pen. It's always quite telling when there's a technological glitch in a school – the internet going down or a system failure; because you see the panic set in on the faces of those who have forgotten what it is to teach in a classroom with no technology.

Here to stay

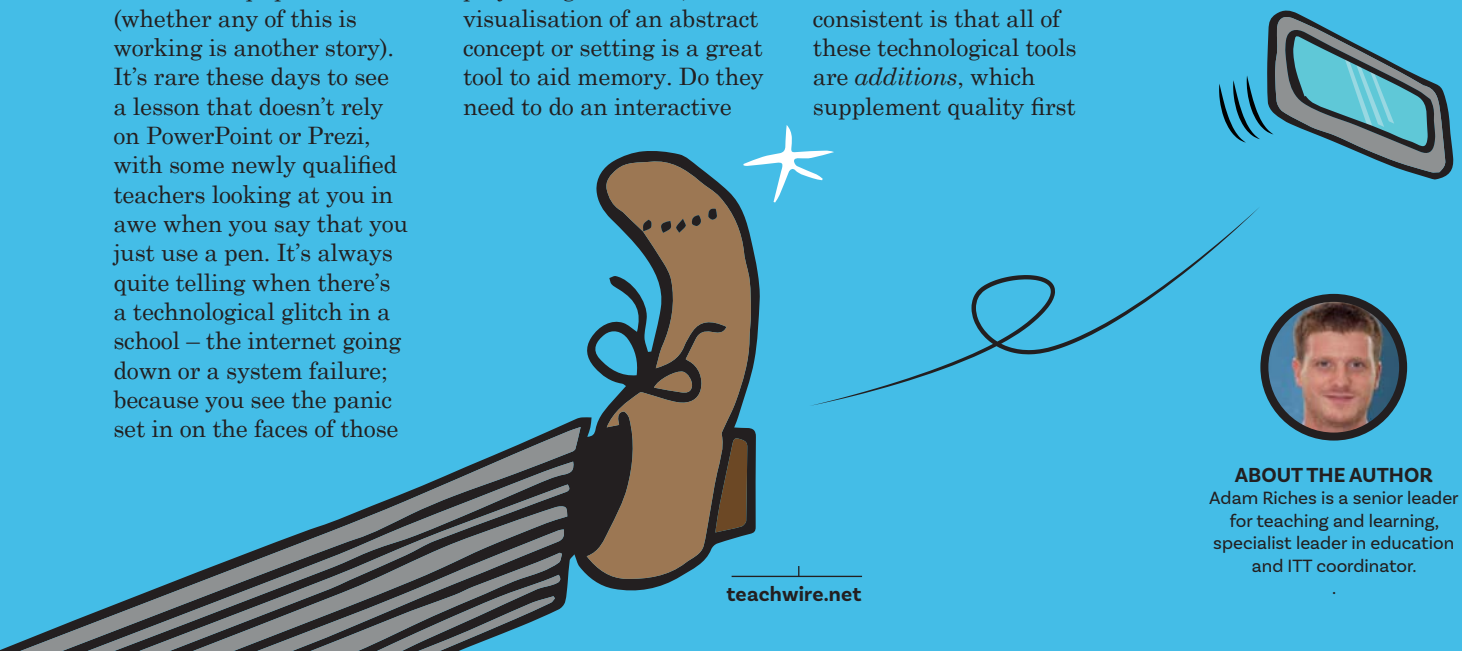
On top of this, tablets and even mobile phones are often used to further engage and immerse learners in the topic content they are studying, perhaps in an attempt to ensure that learning stays with the times. Online resources continue to emerge, VLPs, assessment tools and study guides… edutech is everywhere and no matter how much traditionalists try to escape it, it's here to stay. We don't need a Terminator-esque rebellion against technology in the classroom (damn Cyberdyne Systems) – it just needs to be managed, understood and applied properly.

Do students require VR headsets to understand the implicatures of Macbeth's monologue in Act 2? No, but it's cool to see the play being acted out, and visualisation of an abstract concept or setting is a great tool to aid memory. Do they need to do an interactive quiz on their phones for GCSE P.E.? Again, no, but it breaks the monotony of studying using books and it gets student buy-in through competition. Technology allows us to explore learning in new ways, with new tools – and most importantly, it helps us keep learners engaged in an ever changing world. At some point, the chalkboard would have been a new invention; imagine how hard it must have been to get people to buy into that at the start – some lunatic writing on a piece of slate when everyone else relied on talking! But before long, *not* using chalk would have been seen as the crazy thing. It's similar with tablets and phones. Why wouldn't these technologies be exploited in classrooms if they are readily available?

Quality first

Gimmicks and inventions come and go – or in some cases pile up in the corner – but what remains consistent is that all of these technological tools are *additions*, which supplement quality first teaching. A visualiser is no good without someone to talk through the example piece; an interactive whiteboard won't write on itself; and Alexa won't pick the best recital of a poem. Edutech is a cruel mistress and if an invention doesn't aid learning enough, it won't stand the test of time.

Luckily, we're no longer in the era of Ofsted looking (allegedly) for flashy lessons – no, the 'innovation' craze has somewhat mellowed on that front. Instead, technology is now being used in classrooms in a much more sustainable way; a way which means that learning is more effective and efficient. It allows teachers to help students explore concepts and ideas in realms and realities that educators in times past could only dream of… that is, of course, if they can manage to switch the contraption on!



ABOUT THE AUTHOR
Adam Riches is a senior leader for teaching and learning, specialist leader in education and ITT coordinator.

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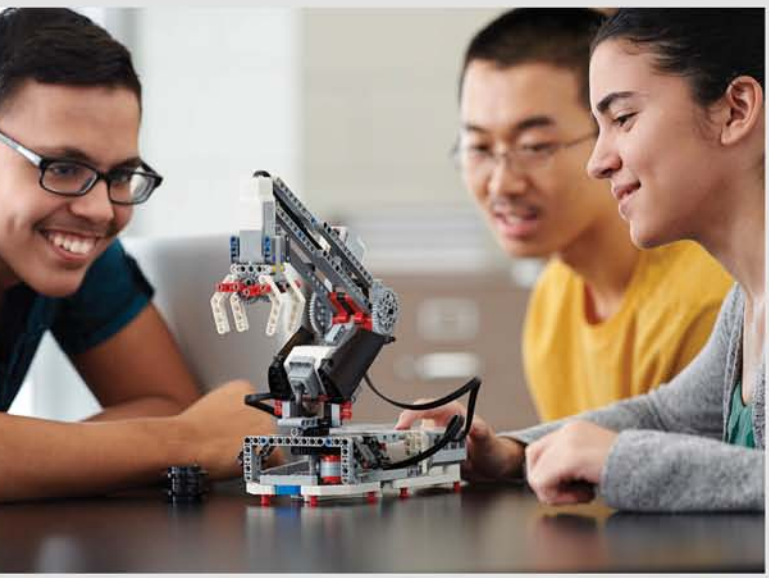

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