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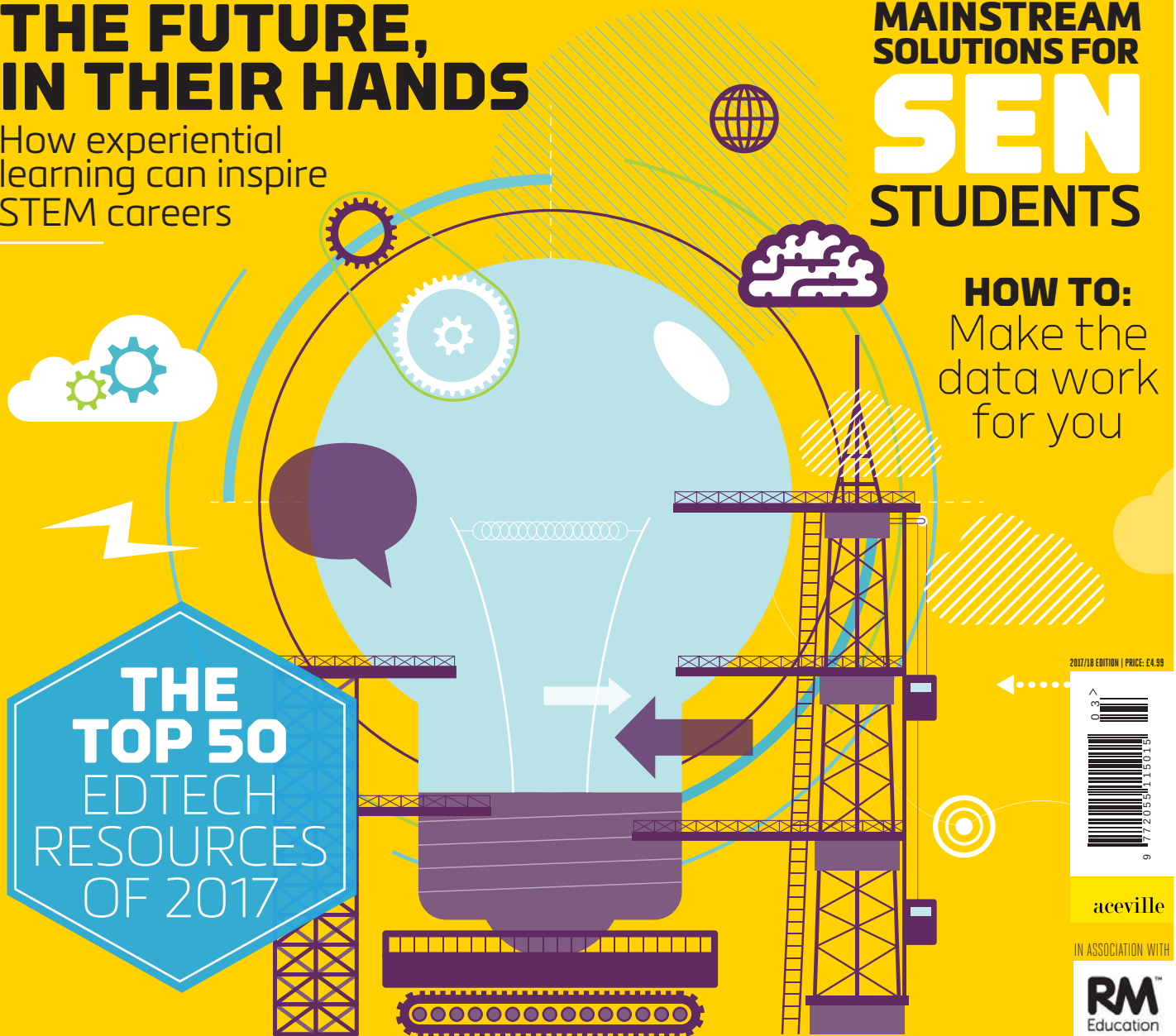

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Q&A: ROBOTICS

VEX IQ

Niels Puttemans from James Montgomery Academy Trust and **Andrew Duffey** from Henrietta Barnett School explain how VEX IQ is helping their students rise to the challenge of engineering and computer science

T&I: How are you using VEX IQ as an extra-curricular activity?

NP: A primary school in our academy acquired their first VEX IQ kit to stimulate a few SEND children during lunch times. Within a few months, 3 of our schools had after school robotics clubs and we've been growing our teams ever since. Currently every school in our academy has multiple VEX IQ teams who typically meet once or twice a week to work on their robot.

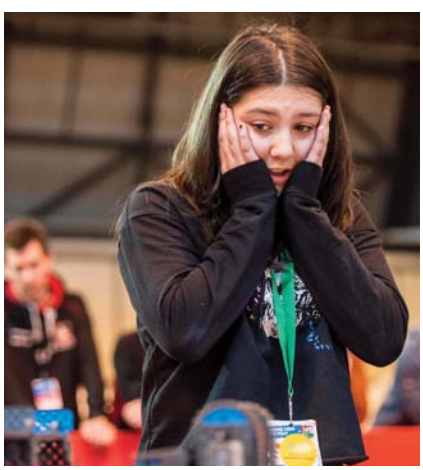
How do you feel VEX IQ fits into your current curriculum?

AD: VEX IQ is a perfect fit for both the D&T and Computing schemes of work for KS3 an KS4. It teaches the students to be creative, innovative, resilient, reflective and evaluative learners and they begin to understand the value of iterative design development. They really love the competitive element and it means that we really do get the most out of each and every student.

How have your students responded to VEX IQ?

NP: The students really thoroughly enjoy their time using VEX IQ. This goes from the very start and excitement of design, build and driving the robots to new friendships across year groups and schools. Both our regional competitions and having had the opportunity to share a coach when travelling to the UK final have created friendships and friendly competitiveness across our different schools.

AD: The response has been overwhelmingly positive. VEX IQ is easily accessible to all students which is great, but the program allows for complex systems and sub-systems to be built which means we can challenge the students at every level of ability.



How has VEX IQ changed your student's attitude towards STEM subjects?

AD: We have experienced a big increase in our student uptake at KS3 and KS4. We now attract around 45% of students into STEM subjects at KS4. Many of our A-Level cohort are planning on going onto University courses focusing on Design Engineering, Engineering or technical design.

Has VEX IQ developed students and influenced the way they work both in and outside of the classroom?

NP: It became apparent that the students got way more out of VEX IQ than just STEM skills. Thanks to the Engineering Notebook, STEM Research Project and the need for a team rather than individual work, there are some very obvious cross-curricular benefits. We have students develop their communication skills and confidence, their interest in various parts of the curriculum has increased and gender stereotyping has gone down.

Rapid education

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Welcome back...

...to another school year, and the latest edition of *Technology & Innovation* magazine. So come on – what's new in your classroom for 2017/18; and, crucially, are you and your students ready to make the most of it?

When I was going through secondary education, September always meant pristine exercise books, freshly sharpened pencils and, of course, yet another cheap maths set from which one of the set squares would inevitably and mysteriously disappear by Easter. Now, as I support my own 12-year-olds preparing to move into Year 8, it largely involves making sure they have charging cables that function properly, and only school-approved apps on their iPads; checking that they've remembered their passwords for the various platforms through which they are encouraged to access the curriculum and share their work - oh, and topping up their smart cards for lunches and snacks.

Much has changed, then - and yet, as every educator knows, the fundamentals of teaching and learning (not to mention learners themselves) really haven't. Technology may have altered the way young people seek out information; but they still need to assimilate it, weigh the evidence and understand how to draw reasonable conclusions from what they see and hear. Exciting, hands-on lessons with robotics kits (p.46) and 3D printing (p.52), or the chance to explore ancient Egypt through virtual reality (p.36), can definitely raise engagement – however, if such experiences are to have a real effect on long term outcomes, evidence shows time and time again that it remains the teacher in charge of delivering them who makes all the difference. Have a read of what educational futurist Dr Sonny Magana has to say about that on pages 10 and 11 of this issue, and see if it inspires you to become just a little more disruptive in your approach.

As we find ourselves saying increasingly often in the T&I office: what matters in education, is what works. Ultimately, that's the key to every product we feature; all the advice we share; the discussions we encourage; and the stories we bring you from classrooms across the country. It's also the principle underpinning our list of the 50 best edtech resources of 2017, which starts on page 13 and is an incredible celebration of innovation with proven impact.

Whether you're an ardent technophile or rather more anxious about joining the digital revolution, we're sure you'll find something here that will, at the very least, make you want to investigate further; in the meantime, though, if anyone comes across a set square with built in tracking device, would they please let me know?

Have a great year

Helen Mulley, editor @Teachsecondary

MEET THE EXPERTS


Andy Mitchell is the deputy chief executive at the Design & Technology Association.


Craig Ring is pastoral leader for Year 7 at Rooks Heath College, Harrow.


David Weston is the chief executive of the Teacher Development Trust.


Geoff Worth is head of science at Pate's Grammar School in Cheltenham, Gloucestershire.


Gurpal Thiara is learning leader of design technology at Seven Kings School.


Julie Murray is an ex-head of history and politics.


Dr Kevin P Stenson is chief executive of national education charity, The Smallpeice Trust.


Matt Lovegrove is a teacher, and ambassador for the National Crime Agency's CEOP Command.


Sal McKeown is a freelance special needs journalist and author.


Dr. Anthony J. "Sonny" Magana III is an educational futurist, author and pioneering educational tech researcher.


Steve Manderson is an assistant headteacher at Trinity Catholic School, Aspley.


Terry Freedman is a freelance writer, speaker and trainer, and publishes the ICT & Computing in Education website.


Mark Chambers is CEO of Naace.

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> GEMS Education

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Q&A: VLEs

Fusion

Alan Sawyers, Managing Director, explains how Fusion can pull all your school's digital needs together...

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Learning Platforms. Evolved.

T&I What are the main advantages for schools of introducing a VLE for their community?

AS The current issue is the vast range of apps and cloud services available for schools, each requiring management, subscriptions and logins. The key benefit of a Virtual Learning Environment (VLE) is that it brings together the whole school community in one secure, online space; student homework – monitoring, grading and feedback; statistics and reporting; parent portal and communication. Integrated MIS features make setup a breeze and provide information where it's needed.

What is so special about Fusion?

Traditionally, VLE, LMS and MIS operate as standalone products, it is rare to find a single platform that brings all these together. Fusion is one of the few products which successfully combines all the digital needs of a school into a single entity. It supports 114 languages and operates upon any internet connected device. Its main strength is in versatility, providing schools with a range of individual tools they can select and customise to meet their needs. Fusion can connect to Office 365, Google Drive and Dropbox and also provides integrated access to over 70 well known content providers.

How does it enhance the teaching and learning experience offered by other providers?

The system is designed by teachers, for teachers, and we are constantly consulting with our schools to review and improve the tools and features to support ever changing educational needs. Over 80% of features are those which have been directly requested by schools. Fusion supports the learning cycle by enabling teachers to set, mark, grade and provide feedback on students' work, engaging parents and communicating with the whole school community. Teachers and school leaders can monitor, track and report upon student outcomes via the comprehensive reporting module.

How easy do teachers and students find it to start using the system?

The simplicity of the system allows users to get up and running quickly and easily. With four different interfaces and a range of themes, the system grows with your students. Students' personalised learning is fed straight to their dashboard. With tools such as Homework, Task Lists, Blogs, Forums, File Sharing, Quizzes, Surveys, Calendars, Grading and Markbooks there is plenty to explore. Because Fusion operates in 114 languages it also has a natural appeal to anyone whose first language isn't English.

Do you have any evidence of the impact of Fusion/ on progress/outcomes?

The best evidence comes directly from our users:

"The students are benefitting from a much greater use of IT and becoming more adept at using a range of technologies."
– Belmont Preparatory School

"The first thing that strikes you is how intuitive it is, how user friendly it is."
– St Gregory's Catholic School

"Important areas of the curriculum combine seamlessly with modern technology to provide a wonderfully engaging experience for our students."
– GEMS Education

What are you able to offer schools by way of training and support?

Teachers are typically up and running within one initial training session, supported by a comprehensive knowledge base that includes short, informative help videos, instant Live Chat, email and telephone support. The product contains context-sensitive help which knows where you are on the system so that we can assist more easily. Our trainers regularly visit schools to ensure our customers are aware of the full potential of the system.

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RSL: 21st Century Music Education

It's what musicians recommend to friends, teachers prefer for their students, educators select for their classrooms and pupils love to learn.

RSL's continued commitment to motivate and support students and teachers alike has seen us innovate in many new and exciting ways over the years. By continuing to create engaging, contemporary qualifications we have expanded operations from Graded Music Exams to the inclusion of **Teaching & Performance Diplomas, Vocational Qualifications** and **Performance Arts Awards**.

Going into the 21st century, our goal remains the same. To continue to create benchmarks, not boundaries.

Rockschool

From a small office in West London, Rockschool staff had a dream to change the entire landscape of formal music education. As players, students and music lovers - we were frustrated by the options we had with the pathways provided. So, by working tirelessly to imagine, create, and deliver material that people truly connected with, Rockschool sought to become the first viable alternative to the traditional offerings available at the time.

To simultaneously fill the void and satisfy a demand that they knew was out there, founders Norton York and Dr. Simon Pitt, initially developed a guitar, bass and drums syllabus for the contemporary musician. Rockschool began offering these exams in the summer of 1991, making in the world's first graded exam syllabus for popular music.

Rockschool has come a long way since those humble beginnings. As of 2017, we now offer Graded Music Exams in **Drums, Bass, Electric Guitar, Acoustic Guitar, Vocals, Piano, Ukulele** and **Music Production**. Each syllabus is developed with the care, skill and expertise to ensure that every addition is creative, innovative and academically attentive.

Each and every student that successfully navigates Grades 6, 7 or 8 finally earns **UCAS** points playing the music relevant to them, on the very same instruments played by their cultural heroes. Nobody thought this possible at the time - they do now.

Vocational qualifications

Dedicated to meet the demands of the ever-evolving arts industries, our vocational specifications allow each institution to build qualifications which reflect the needs of learners who desire to transition directly into the industry of their choice. With flexibility of choice and multi-discipline learning at their core, RSL VQs are the most relevant, accessible, and practical qualifications available in the sector.

Performance arts awards

We believe that giving teachers the freedom to create their own content gives them, and their students, the best platform to succeed. Designed for Musical Theatre, Jazz and Street dance, PAA examinations contain three core elements: 'The Performance', 'Technical Skills' and 'Understanding & Reflection'.

The combination of these elements aids the development of well-rounded performers, equipped with industry relevant skills and knowledge, whilst enabling teachers the creative freedom to build a bespoke curriculum around their own teaching styles and existing programmes.

21st Century Music Education

By giving birth to popular music examinations, Rockschool started a revolution throughout the world of music education, empowering a new generation of teachers and students across the globe in the process. From a small number of domestic exams, we have now gone on to examine over 400,000 students, in over 1000 delivery centres, across 40+ countries worldwide.

The responsibility to ensure that qualifications of this kind are available to all-comers remains as vital to RSL's DNA as it was in 1991. Recognising music production's rapid growth in the education sector, RSL knew that the advancement of a formal suite of graded Music Production exams was as necessary today as contemporary Graded Music Exams were all those years ago.

Purposefully designed for both instrumentalists and non-instrumentalists, the aim is to allow access to contemporary arts education for the widest, most diverse audience possible. As with all RSL syllabi, the material was informed by experienced industry specialists as well as some of the leading lights of contemporary music education.

In September, 2016 - 25 years after the release of our pop exams - RSL proudly released the world's first graded music production syllabus. Whether you're a budding producer, mixer or sound engineer, you can now receive formal recognition from level 1 onwards, meaning that Music Production education is now available at all levels, not just on higher education courses. All major DAW providers are permitted for use, ensuring that navigation during the exam is as smooth and familiar as possible for each entrant.

"Creating benchmarks, not boundaries."

RSL's vision has always been to increase accessibility to students from a diverse range of backgrounds, ensuring that willing students - regardless of orientation - have the knowledge and skills they need to pursue their goals with confidence. If they're practical, robust, and personally rewarding - then we've achieved our goal. All with the hope, that one day they can achieve theirs.

For further information go to www.rslawards.com

IT'S TIME FOR **Disruption**

Technology alone won't transform education, argues **Dr Sonny Magana** – we need a whole new approach to teaching and learning

Teachers are like pipers at the gates of dawn. Educators and educational leaders bear enormous responsibilities for orchestrating and shaping the future. We do so by empowering our current students to interact and develop deeper connections with knowledge, each other, and themselves, in a modern world context.

Arguably, the modern world is experiencing a profoundly disruptive period. Across the globe, digital technologies have enabled radical transformations in nearly every imaginable endeavour from archeology to zoology. It stands to reason that educators must effectively manage modern teaching and learning tools and processes in order to better prepare students for social and professional success many years down the track. Towards that happy occurrence, national educational systems have optimistically invested billions in tax revenues to digitise traditional classrooms. School infrastructures have been updated, new and emerging tools are regularly purchased, and teachers are trained on how to use these new tools.

Meagre impact

Sadly, the evidence on the impact of these investments does not match the optimism. Despite decades of evidence-free propaganda bombarding teachers and decision makers about the inherently transformational nature of digital tools in schools, the reality simply does not match the hype. In fact, the average impact computer technology has had in education has been downright dismal.

A meaningful way to look at the evidence of technology's impact in education is to use John Hattie's effect size measurement. In 2017, after reviewing over 160 meta-analyses from over 10,000 studies on the impact of computers in education, Hattie observed that the average effect of digital tools in schools is an anemic 0.34 – well below the zone of desirable effects (0.4 and above). Worse still, this meagre impact has not changed in over 50 years – despite vast leaps in digital technologies since the swinging 60s. The meter for innovation in education appears to be stuck on low.

Perhaps the main reason for this disappointing impact is that the inclusion of technologies in schools has done little to change the 'tell and practise' approach to teaching and learning – the predominant pedagogical practice of our time. In this model, teachers tell students what knowledge is and what is worth knowing; meanwhile, students invest their limitless capacity for investigating, thinking critically, creating, hypothesising, and collaborating by memorising and practising what they're told.

One implication of this problem is that if the tell and practise model remains steadfast, then we can expect the impact of new and emerging technologies – like VR (Virtual Reality), AI (Artificial Intelligence), and the Internet of Things – to be about 0.34 for the next 50 years or more. And that my friends, is double trouble.

Looking through a new lens

Fortunately, there is cause for renewed optimism – once again based on evidence provided by rigorous research. After more than 30 years of investigating the wicked problem of advancing technology and innovation in education, I've observed that when technology tools are used to enhance innovative practices that are grounded in sound research and theory, one can expect large to very large gains in student achievement and learning productivity.

I've synthesised my life's work into a new book, *Disruptive Classroom Technologies: A Framework for Innovation in Education*. My overarching goal is to disrupt the predominant use of educational technology tools by using the T3 Framework for Innovation in Education as a lens through which to view schools and schooling. The

> "The meter for innovation in education appears to be stuck on low"

T3 Framework is an evidence-based model which increments technology usage in schools into three distinct domains: T1: Translational, T2: Transformational, and T3: Transcendent.

The impact of the T1: Translational stage of technology use – that is, simply automating teaching and learning tasks, or consuming content knowledge and information through digital tools – has been historically low. Rather than placing a greater burden on teachers, advancing from the T1: Translational phase of technology use to the T2: Transformational stage engenders shifting the loci of learning experiences from teachers to students. While there is no common definition for this shift, I suggest the following: "Transformational technology use in education reflects the intentional application of digital technologies to unleash students' learning expertise, in ways not possible without technology, to achieve ever higher levels of knowledge and mastery."

The two elements of this stage are: T2.1: Production, and T2.2: Contribution. In the former, students leverage technologies to produce digital representations of what they know (declarative knowledge) and what they can do (procedural knowledge), as well as to capture and make their thinking pathways explicit. In the latter stage, students use digital tools to design, create, share, and scale digital knowledge products with the purpose of teaching others what they know.

Solve wicked problems

In this digital era, it is no longer appropriate to ask students what they want to be when they grow up. There is a far more important two-part question to put to them: "What wicked problem matters to you... and what are you going to do about it?" Thus, the final stage of technology use, T3: Transcendent, begins with student passion and concludes with students engaging in designing original lines of inquiry and applying social entrepreneurship strategies to solve wicked problems that matter to *them*. Doing this at least once a week – say, on Wicked Problem Fridays – will give your students ample opportunities to explore, interpret, discuss, and critically analyse knowledge and information that is important to them. Moreover, doing so will empower your students to become leaders for action who make a significant contribution to their local and extended communities.

The strategies associated with the T2: Transformational and the T3: Transcendent uses of digital tools, as I've defined and identified in *Disruptive Classroom Technologies*, have an impact on student learning that is equivalent to three or more additional years of student achievement in a single academic year, perhaps even more.

No one can predict the future. However, I will make a bold forecast: that together, we can build collective efficacy in our learning systems by using the guidance provided by the T3 Framework to not only disrupt the historic pattern of low technology use in education, but to unleash students' limitless learning potential. That is arguably a set of ideas worth pursuing and sharing by today's pipers at the gates of dawn.

ABOUT THE AUTHOR

Dr. Anthony J. "Sonny" Magana III is an award-winning educational futurist, best-selling author, and pioneering educational technology researcher.

Working the crowd

Finding the funds to invest in new technology can seem like an impossible task for schools – but could technology itself hold the answer?

T&I spoke to Sarah Palmer, headteacher, to find out how the school used crowdfunding to raise funds to replace its failing whiteboard system with the latest Plus Series interactive screens from Clevertouch

T&I Why did the school need to upgrade its existing technology?
SP The school has seven classrooms with seven-year-old interactive whiteboards and projectors. The whiteboards had served the school well over the years, but were at the end of their life and needed replacing.

Why did you come up with the idea to raise money through crowdfunding?
The school has a very active Community Partnership Group comprised of parents, staff and governors. The group is tasked with establishing links with the local community and finding ways to enhance the children's learning experience at school.

The group applied for an Aviva Community Award hoping to secure funding for the technology upgrade. We received 20,000 votes – an amazing achievement for a school of just 220 pupils. Although we missed out on the big prize, we were awarded £500, which motivated us to find another way to get this project off the ground.

We had seen an article about how schools were using Crowdfunding to generate income and decided to give it a go.

Were you surprised by the amount of support and donations received?
Camelsdale is a small but popular school with great support in the community. Although we weren't surprised by the level of engagement, we were blown away by the community's generosity.

Through the combined efforts of our PTA, crowdfunding, an Aviva grant and a donation from an anonymous donor, we managed to raise enough money for seven Plus Series screens.

Would you advise other schools to do this? If so, do you have any tips?
For any school looking to secure funding outside of the normal education budget avenues, I would advise building good ties with the local community.

School leaders need to be very creative and willing to try non-traditional methods. If you're asking individuals, businesses or applying for grants, it helps if you can pinpoint exactly what you want the money for. In our experience, the community reacts best when raising funds for something that will have a positive impact on the entire school.

Keep abreast of the latest technology changes – we go to BETT every year, which is where we first saw Clevertouch.

Tell us about the technology you use and how it has changed the classroom dynamic?
The previous whiteboards were prone to failing mid-lesson and required constant recalibration.

The new screens have transformed the classrooms. They are bright and colourful; the imagery is sharp and clear. The children enjoy interacting directly with the screen, which allows multiple children to use it simultaneously.

The Plus Series comes preloaded with education resources and teachers were able to transfer all their old lesson plans over, so there was no disruption.

Is it important for kids to use technology in school, and why?
Technology is hugely important in schools. To avoid a digital divide between the home and school, the classroom equipment needs to be as good if not better than what they use at home.

We want our children to experience a school culture that encourages creative ideas and learning – and we need to ensure we have the tools to do this.

Why did you choose Clevertouch Plus?
We saw the Plus Series being demonstrated at BETTand were impressed with the functionality. It was also recommended by our installer with whom we've worked with for many years.

Was it as a smooth transition from the old to the new?
It couldn't have gone better.

The Clevertouch training is a must. Our trainer was excellent and our teachers are quickly gaining confidence in using their new screens.

CLEVERTOUCH

Technology for sharing

Clevertouch.com info@clevertouch.com +44 (0)208319 7777

50 BEST edtech resources of 2017

"Because what matters in education, is what works"

Right from the start, *Technology & Innovation* magazine has always been on a mission to stay on top of new developments, particularly in terms of identifying exactly what does and doesn't have a positive impact on teaching and learning at secondary school level. We're as excited as the next geek about clever gadgets and cool designs, of course – but at the same time, we understand that education is all about improving outcomes for young people. There's no space in anyone's schedule for flashy gimmicks; in these times of increasingly tight budgets, schools need to be certain that every investment they make will have a clear benefit for learners – whether it's by freeing up teachers to spend more of their time actually teaching, improving access for all, or enabling students to take greater control of their own learning, in a way that gives them the best chance of success.

To that end, earlier this year we invited the edtech community to share with us what they considered to be their very best products and resources, with the aim of putting together a list of innovations that are already making a real difference in classrooms across the country. And now, after analysing and assessing hundreds of entries (and mountains of evidence), we are delighted to be able to bring you – in no particular order – the final 50. There's a huge range of ideas here, from revision apps to storage solutions for mobile devices; it's a true celebration of edtech excellence, and we hope you find it both useful and inspiring!

1 GCSEPod

GCSEPod provides focused subject knowledge in a highly accessible digital format for 20 GCSE subjects, all filtered by exam board so students can see what is relevant to them. The content is delivered via 'Pods' – highly concentrated, 3-5-minute bursts of learning covering all key aspects of a specific topic in a memorable and engaging format. The testimonials from teachers, leaders and students really do speak for themselves; this is an innovation that is making a demonstrable difference to young people's results – and, of course, understanding and enjoyment – and is itself constantly seeking to improve.

Cost: £10 per student in KS4

2 Satchel: Show My Homework

Starting off in 2011 as a simple – if brilliant – online homework calendar, Show My Homework has evolved into something considerably more powerful over the years. Intuitively built features allow teachers to track, monitor and enhance homework so that students are more effectively engaged in home learning. Young people's independence is promoted, and detailed instructions and deadline reminders help them plan their work and raise attainment. Parents have their own accounts, too, so they can better support their offspring's learning at home. Created by teachers, for teachers, Show My Homework helps schools maintain and improve standards by giving them complete control of homework.

Cost: £2–3 per pupil per year, dependent on length of licence

TIME BUSTER

"We've saved 95% of time spent tracking homework on a termly basis"

I. Graham, Assistant Headteacher, Sir Frederic Osborn School

3 pi-topCEED

The Raspberry Pi was a fantastic innovation, in that it offered an affordable and effective way to teach coding concepts in a challenging and dynamic way. However, it was not without its drawbacks. pi-topCEED is a hugely user-friendly modular desktop device powered by a Raspberry Pi – it arrives pre-assembled and with the pi-topOS software suite pre-loaded, so the user simply switches it on and starts teaching with the ready-made worksheets and lesson plans; making it easier than ever for teachers to engage learners in STEAM education.

Cost: £119.99 with Raspberry Pi, £91.99 without Raspberry Pi, £5.59 PROTO, £15.99 Speaker (prices current at time of submission)

TRY THESE TODAY!

4 Pupil Prime Minister

Pupil Prime Minister is a two-week resource for KS2 classrooms. It combines English, citizenship and computing through learning about politics, persuasive writing and how to produce a party political broadcast using digital skills.

Cost: £1

5 TECbook

The first real alternative to printed books in the classroom, TECbook starts with the books you all know and love, and builds a powerful educational platform around them. It's supported by the majority of the major education publishers.

Cost: cheaper or the same price as a printed book

6 Sumaze FREE

A free, fun maths app which teaches about powers, logarithms, inequalities and more as a hugely engaging - and addictive - game. Available in the App Store for iPhone and iPad and in the Google Play Store for Android.

7 Mathletics

Mathletics is an award-winning digital maths resource that's proven to increase levels of pupil engagement, confidence and motivation, and improve results in maths. Mathletics contains thousands of adaptive activities aligned to the UK curricula, printable eBooks, fun games and videos and interactive rich learning tasks. It helps students to make learning choices, seek assistance when they need it and reflect on their learning by being able to visually track their progress. The powerful Mathletics Teacher Console provides live data, enabling quick and easy viewing of students' progress and improvement. Teachers can easily assign targeted and personalised learning pathways to address the needs of every student.

Cost: Pricing is banded but starts from £5 per student on average

8 Oaka Digital (SEN KS3 Topic Library)

SEN SUPPORT

SEN pupils are currently often expected to use the same resources as their fluently reading peers, or are presented with material that is too young for their age group. Oaka Digital provides a wide range of KS3 resources, written by subject and SEN teachers, to enable SEN pupils to access the curriculum in an engaging, active format with information that is appropriate for their age group (not restricted by their reading or processing ability). Online activities and resources include annotated 3D science images for pupils to investigate as well as drag and drop exercises to encourage pupils to 'have a go' with no fear of being told they are wrong.

Cost: The entire library is available for use by up to 300 pupils at one school site for £149 for a 12-month subscription

Want to try it? Access sample materials at: oaka-digital.oakabooks.co.uk

IMPACT: PROVEN

A recent study conducted by the University of Oxford concluded that schools who made regular use of Mathletics (as little as 20 mins/week) did significantly better on a range of measures, compared to schools that did not use Mathletics (uk.mathletics.com/advantage).

9 ActivPanel

The ActivPanel is an advanced interactive flat panel display (IFPD) which is powered by ActivConnect, a revolutionary, upgradeable Android-based Mini PC. The simplicity of operation means that the core teaching features can be used even without connecting to a laptop, including instant whiteboarding and content mirroring to student devices

Cost: From £3,000 excl. VAT

10 iMO-LEARN

According to research, "Sitting in chairs for more than ten-minute intervals reduces our awareness of physical and emotional sensations and increases fatigue". The iMO-LEARN is a smart cube that promotes 'dynamic sitting' and encourages students to move as they learn. Moreover, when the seats are equipped with the custom-designed motion sensor, they can be easily linked to online software, which provides instant feedback to teachers and pupils. Quite a leap for the average secondary classroom, perhaps – but definitely worth exploring for break-out/nurture spaces.

Cost: The costs for the iMO-LEARN start from approximately £100 and the software license costs from £25

11 Studytracks

Think about how easy it is to remember the chorus to *Purple Rain* by Prince or *Umbrella* by Rihanna... now imagine if your students could recall cell structures in biology or key themes from Romeo and Juliet like that? The brainchild of Ivor Novello award-winner George Hammond-Hagan, Studytracks puts the curriculum to music that young people will actually want to listen to; check out some of the sample tracks at **studytracks.education**.

Cost: Freemium (free with £0.99 per subject or £5.99 per student per year for schools)

12 VIP Studio Sessions

EDTECH FOR MUSIC

VIP is a comprehensive, accessible online resource to support the teaching of contemporary music genres across KS3 and KS4.

Cost: £395-£595 per year subscription depending on number of students

13 PG Online

AA multi award-winning, no-frills and non-subscription teaching solution comprising digital lesson materials to cover the new computer science and design and technology curriculums. Each digital teaching module covers a specific section of the new GCSE specification, providing six weeks teaching to fit neatly into a half term.

Cost: A single unit of six weeks of lessons costs £120 +VAT for a lifetime site licence.

"We use PG Online materials at every key stage of our teaching. The standard of resources are so good that it's improved the confidence of all staff delivering lessons, even non-specialists."
Bryan Owen, computer science teacher, The King Edmund School

SEN SUPPORT

14 Aisoy1 KiK

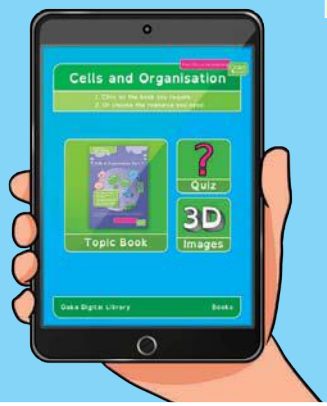
Aisoy1 is a 'social and emotional' robot – in other words, it 'feels' emotions and shows them just as humans do. How you deal with it affects its mood, decisions and reactions; this makes it an especially powerful tool when working with young people who have autism.
A range of apps are also available for learning across the curriculum, including coding, maths and English.

Cost: From £263

Oaka™ DIGITAL

Fresh Focus on Learning

Oaka™ BOOKS

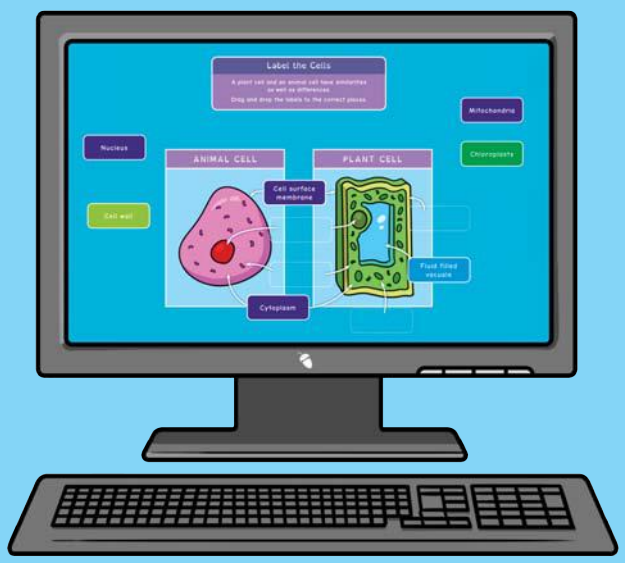


50 KS3 TOPIC PACKS IN

Science | Geography | History | French

ONLINE SEN LIBRARY FOR KEY STAGE 3 PUPILS

£149 for up to 300 pupils (12 month subscription)



Oaka™ Digital can be used on computers, laptops and tablets.

WHAT IS INCLUDED WITH OAKA™ DIGITAL?

- Over 250 online resources
- 3D images
- Interactive activities
- Topic Booklets
- Quizzes with recordable results

TRY OUR 30 DAY FREE TRIAL!

info@oakabooks.co.uk | www.oakabooks.co.uk | 023 92 388 519

No quibble cancellation policy.

No learner left behind

Kate Doehren, head of learning support at Hurstpierpoint College, explores the importance of digital resources in maintaining motivation for SEN students

How will your SEN pupils access KS3 resources?

As teachers know all too well, effective teaching means being able to engage every pupil, irrespective of their ability. But, with a broad range of abilities in each class, how can you ensure that your SEN pupils have the right resources without busting your budget? Maintaining their motivation through KS3 is vital if key information is not to be missed leading up to their GCSE courses.

Individual learning styles need to be catered for in the classroom and digital resources can be a great way to achieve this. Every class will have a mix of visual, auditory, reading and writing, and kinaesthetic learners.

Digital resources designed specifically for SEN pupils can help bridge the attainment gap. They offer the means for pupils to work independently, help reinforce learning in different ways but without the pressure from their peers.

Let's get visual

Visual aids are a highly effective way to engage with visual learners, students who have dyslexia or those who struggle to process large amounts of text. Presenting information through images, colours, 3D, animated drawings, graphs and mind-maps, will be a lot more appealing and easier to absorb.

Digital resources can allow pupils to 'have a go' at activities or answering questions without the stigma attached to getting an answer wrong. When written with SEN pupils in mind, such resources will focus on presenting information in a clear, concise and easy to digest format.

Resources that allow pupils to look at the same information in different ways can have a big impact on memory retention. Despite a move away from pupils simply regurgitating facts, they still need this information to be able to construct effective arguments with confidence.

And confidence is key to progression. We all want to feel we are good at something. Having resources in the classroom to enable struggling pupils to access the curriculum in different ways is a vital part of every classroom setup.

It might well provide that 'lightbulb' moment that turns a disengaged student into a motivated one. Such a turnaround will be because the pupil, possibly for the first time, feels that they can achieve. From that point on, anything is possible.

Accessible information

One publisher addressing this need is Oaka Books, specialising in topic packs for SEN pupils. Founded by Bambi Gardiner, herself the mother of a dyslexic daughter, Oaka produces revision topic packs to support the KS3 syllabus in sciences, geography, history and French.

The company works with subject teachers and SEN specialists to create topic booklets, games and activities that enable struggling pupils to read, process and understand the curriculum in a visual and kinaesthetic way.

Part of its product range is Oaka Digital, an online resource library for KS3 SEN pupils. With 50 topics and over 250 KS3 resources, Oaka Digital enables pupils to access online topic booklets, active learning activities, 3D images and quizzes to record their progress.

"If you are a struggling reader or have a slow processing speed, using resources full

of big words, complex sentences and long paragraphs will, not too surprisingly, be a big turn off," explains Bambi. "Giving pupils lower ability books is a no go. What self-respecting 12 or 13 year old wants to read a KS2 book just because it is easier? Oaka has taken key modules from the core KS3 subjects and turned them into clear, concise and simple topic packs full of colour, illustrations and active learning activities."

For children who struggle with their learning, for whatever reason, KS3 is vital for them gain their best possible outcomes at GCSE. If they have not embedded core information and skills at KS3 then their GCSE courses will be a huge mountain to climb. They all deserve the best possible help at school - and digital resources can help deliver this in a highly cost effective way.

Visit: oakabooks.co.uk Email: info@oakabooks.co.uk Call: +44 (0) 2392 388519

15 KAZ Typing Tutor

Keyboard skills are increasingly important in our digital world, of course – so this accelerated learning typing tutor, developed by the same course team responsible for producing over 55 RSA/NVQ level computer and office skill courses, is definitely one to explore. Its unique accelerated learning teaching method uses 'muscle memory' and 'brain balance'; and has proved so effective, that it has taught millions of students in schools, colleges and universities around the world to type.

Cost: From £100 + VAT (annual online licence for up to 50 users) to £500 + VAT (whole school roll)

EDTECH FOR HISTORY

16 60 second histories

60 second histories is a unique online teaching resource for schools, providing National Curriculum history support for Key Stages 2-4. Film is a powerful tool that helps students retain concepts and ideas; and 60 second histories uses this to engage all abilities, with over 250 short history video clips, plus teacher notes, lesson plans and a virtual classroom function.

IDEAL FOR:

- lesson starters
- introducing, supporting and recapping topics in the classroom
- revision, homework and lesson-flipping

Cost: £80 per year for a whole-school licence

"The clean, engaging style of the clips increases our students' motivation to learn, they encourage debate in the classroom and there is a significant improvement in concentration and attention when watching the films."
Dave Whineray, head of history, Hounsdown School, Hampshire

NO-COST SOLUTIONS

17 BBC Bitesize – Revision app FREE

The BBC Bitesize – Revision app has everything 14-16 year olds need to get revising, wherever and whenever they need it. Created for students studying for their GCSEs, TGAU, Nationals or Highers, the app is available for smartphones (Android and iOS), and has the key information students need, broken down into brilliant, easy-to-understand, bite-sized chunks

18 XL Catlin Oceans Education pack FREE

The XL Catlin Oceans Education pack is a unique learning journey that takes students to the heart of our amazing oceans, from the frozen Arctic to the coral reefs. It includes different modules that offer geography, science, technology and design teachers the flexibility to choose what and when to teach, selecting from 200+ lesson plans, activity sheets and multimedia resources, including 360 degrees videos, photos and Google Expeditions..

19 Clevertouch Plus

A key selling point for the Clevertouch Plus interactive screen is that it's completely system agnostic and compatible with any connected device. It is designed for in-class collaboration across multiple student devices – bidirectionally mirroring content and, crucially, touch. It comes with its own free app store full of many of the most popular education apps – all of which have had all advertising and in-app purchases removed, allowing educators to use them in the classroom with confidence.

Cost: on request from resellers/installers

"I kept expecting hidden costs, but there really aren't any"
Stockwood Park Academy

20 LiteracyPlanet

LiteracyPlanet brings together evidence-based and best practice literacy education content with the latest digital technology, to provide an effective curriculum resource for the contemporary classroom from Reception to Y9. It's suitable for all abilities – including SEN/EAL learners and those with exceptional learning potential – and offers a fun and engaging learning experience for students as well as user-friendly planning and management tools for teachers.

Cost: Variable – visit literacyplanet.com/uk/schools/school-prices/ for more information

21 Gratnells PowerTray

The PowerTray is a simple, cost-effective solution providing intelligent charging and storing for up to ten USB devices, each of which can be charged at the most efficient rate.

Cost: £250 - £329

22 BCS Glossary of Computing

The BCS Glossary is the most authoritative and comprehensive work of its kind on the market today. Written in a style that is easily accessible to anybody with an interest in computing, it is specifically designed to support those taking computer courses or courses where computers are used, including GCSE.

Cost: £23.99

23 Modi

Harnessing the Internet of Things and Robotics in Education, Modi is a unique hardware system that enables everyone to be a programmer. Instead of having students make prepared projects with all the parts given to them, MODI encourages students to find solutions to a real-world problem. Using materials surrounding them – paper boxes, plastic bottles, 3D printing or LEGO blocks – they can imagine, design and make their own creations. Its software coding tool, MODI Studio, utilises an intuitive, drag-and-drop interface, with minimal wording.

Cost: from £149

24 Read&Write

LITERACY SUPPORT

Read&Write is a software toolbar with the literacy support features you need to deliver a personalised learning experience to all students – and help every member of the class meet their full potential. Read&Write is great for all subjects and lesson plans, and you can use it with virtually any kind of schoolroom content: websites, Word files, PDFs, Google docs and more. The software's simple to install, it's easy for pupils to use independently, and it works smoothly across all your school's hardware.

Cost: From £800

25 IsoSketch 3D Drawing Tool

NO SCREEN REQUIRED!

IsoSketch is a pupil-friendly 3D sketching tool, designed for the classroom. As T&I's regular reviewer, John Dabell, points out: "The shatterproof drawing stencil has been expertly crafted and created by a teacher and designer and is ideal for use in D&T, engineering and maths. It measures just 12cm by 9cm and is a thing of beauty that enables you to draw cuboids, isometric circles, arrows, rounded corners, smooth edges and extend shapes without the trauma or breaking into a sweat."

Cost: £4 / £60 for a classpack

IMPACT: PROVEN

In a study by the University of Bath, children using DoodleMaths for 20 minutes per week over the summer were 4x less likely to suffer learning loss on returning to school in September, than their peers; their normalised scores increased by 4.6% (non-users' scores decreased by 4.7%).

26 DoodleMaths

DoodleMaths is a cross-platform application that rapidly accelerates children's progress in maths. Its content consists of 20,000 carefully-graded questions, and as with other systems, teachers can set and monitor work from a dashboard. But crucially, this content also works alongside an adaptive learning engine which identifies a learner's unique zone of proximal development and creates a daily-practice work program based around it, filling in gaps and guaranteeing progression.

Cost: single class – £179 per year; whole school – £5.50 per child per year

"The DoodleMaths interface is beautiful. Nothing else on the market touches DoodleMaths as a tablet resource."
Gayhurst School, Buckinghamshire

GREAT VALUE!

27 HUE HD Pro Classroom Camera and Visualiser

This lightweight, portable, colourful and characterful USB camera is ridiculously easy to use; just plug the flexible neck directly into your computer or via the base. The Pro has a wide angle lens and a built-in microphone; you can record sound and video, take snapshots, use for WAGOLL, CPD and flipped learning... and it's small and light enough to carry in a handbag or briefcase.

Cost: £44.95 + VAT

28 The CREATE Education Project FREE

This collaborative platform is designed to provide free resources and support to help educators introduce and embed 3D printing and scanning technology in the classroom. These include professional development resources, lesson resources, technology and curriculum guides, project ideas and inspiration. Membership is free and all the resources are free to download for members.

Community members can even access a no-obligation FREE 3D printer loan scheme, where they can borrow an Ultimaker 3D printer for one month to deliver a project in their school. Find out more and sign up at createeducation.com

31 Bettermarks

Bettermarks is an online platform for GCSE maths, which uses sophisticated technology to ensure personalised, adaptive learning for students and teachers. The resource is unique in that it offers students a second chance to correct their answer – much more than automarked questions.

Cost: dependent on size of school/classes

BOOST PARENTAL ENGAGEMENT

32 SIMS Parent app

The new SIMS Parent app allows schools easily to communicate with parents and students. Whether it's sharing information such as attendance, or school reports, or sending reminders for homework tasks, all of the information is instantly accessible from the convenience of their phone, tablet or PC.

Cost: on request

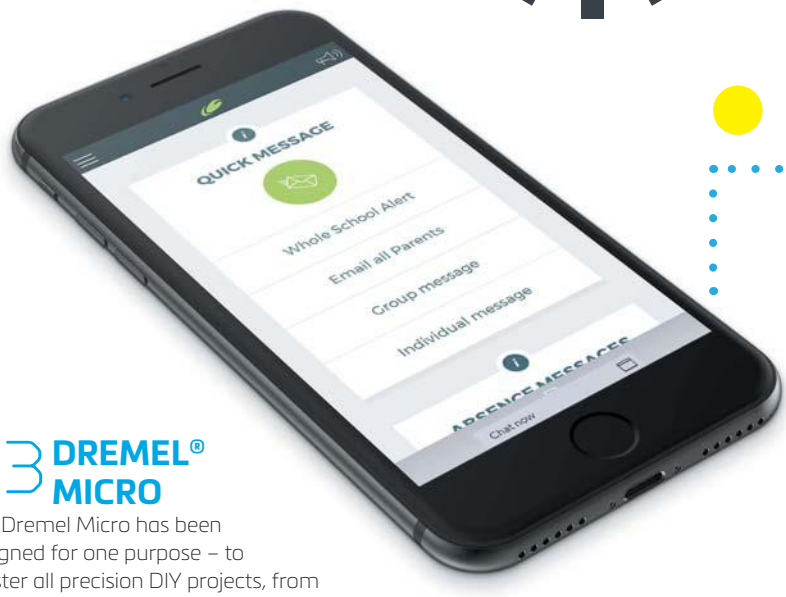
FREE... AND EASY!

29 BP Educational Service Science Explorers FREE

Free, high quality videos and resources to help schools run a science day or week around the intriguing topic, 'how human changes to environments affect living things'.

30 Bettyforschools.co.uk FREE

Student-led, innovative, refreshing and honest digital lessons about periods, developed in consultation with teachers and pupils.



33 DREMEL® MICRO

The Dremel Micro has been designed for one purpose – to master all precision DIY projects, from sanding to cutting. Its compact, streamline design means it can be held like a pencil for perfect control and manoeuvrability; perfect for your D&T classroom.

Cost: £114.38

34 Netop Vision

Thousands of institutions rely on Vision – classroom management software for Windows, Mac and Chromebooks – to ensure students make appropriate and effective use of technology, and give teachers the tools to not only keep students on task but also to foster improved collaboration and communication

Cost: From £18 per machine for Perpetual licence. From £7 per machine for Subscription licence.

36 Casio's Lamp-Free Projectors (Core Series)

Casio's lamp-free projectors, the Core Series, are revolutionary display products for the education market, solving the high maintenance issues of traditional projection in the classroom and enhancing the picture quality and ease of use for teachers. No more breakdowns; no more lamps to replace – and definitely no loss of brightness or picture quality.

Cost: on request

BOOST PARENTAL ENGAGEMENT

37 Groupcall Messenger

Messenger gives schools the ability to send personalised text messages (SMS), emails, automated voice calls, push messages and tweets (via Twitter) to the mobile phones and landlines of parents, staff and key contacts. They can manage their entire parental engagement strategy with one product.

Cost: £1 per child, per year

"Messenger has resulted in a resounding saving for the school. Within 12 months, £6,000 has been saved on postage alone with further savings on consumables, time management and reduced telephone calls."
The Warriner School

38 UZBL Shockwave iPad Case

One of the toughest and most durable iPad cases on the market – it's not the cheapest, but a lot of research, care and drop testing has gone into making sure it's up there with the best.

Cost: £31.40

35 Zzish

Zzish is an education technology platform that allows teachers to discover, buy and use educational applications effectively in order to 'move the needle' on learning. Essentially, you can think of it as a 'virtual teaching assistant' – an intelligent, real-time agent that understands each student's personal learning needs and can tell the teacher who needs help, what they need help with, and how you can help them.

Cost: free for the basic platform and features, premium offering for a one-off subscription fee (£56 annually for teachers, £2 annually per student)

TIME BUSTER

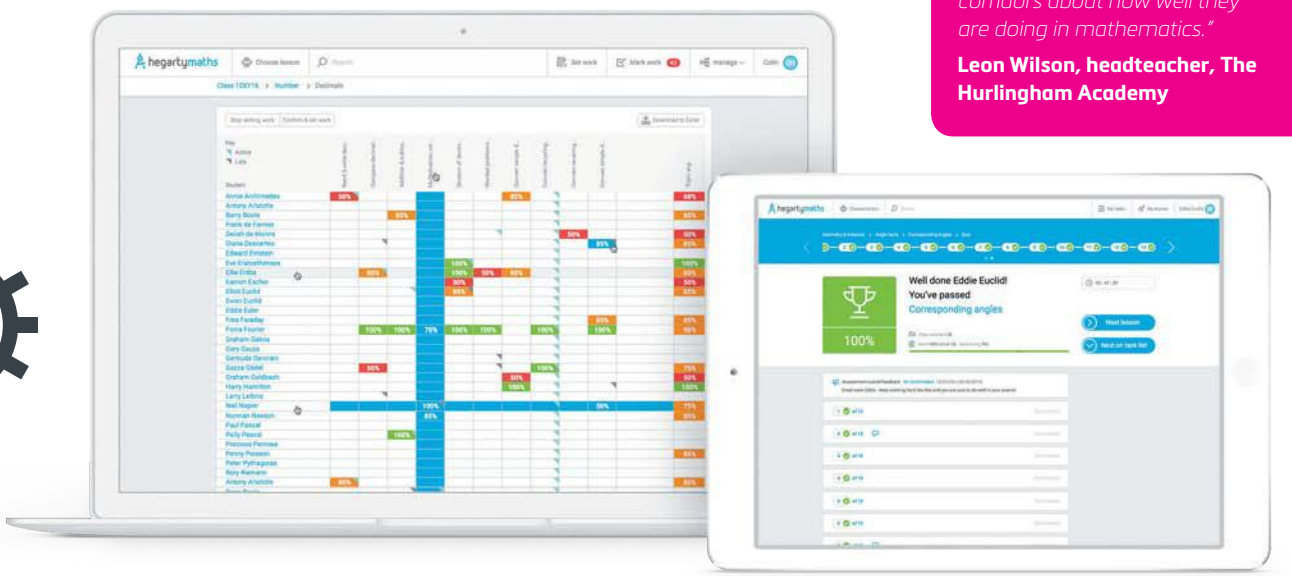
39 HegartyMaths

HegartyMaths is a revolutionary online maths platform that teaches, trains and tracks students. It has been created to give students access to world class maths tuition, irrespective of their background or prior attainment – whilst saving teachers time so they can concentrate on what they do best – inspiring and motivating young people to be the very best they can be.

Cost: £999 + VAT for a one-year subscription

"Students receive instant feedback on how well they are doing on every piece of work. As a headteacher, I can monitor the progress of all students across the school. The students are always amazed and excited when I speak to them in the corridors about how well they are doing in mathematics."

Leon Wilson, headteacher, The Hurlingham Academy



SAFEGUARDING SOLUTION

40 InVentry

Designed with and for education, this fully-equipped MIS integrated solution allows schools to accurately monitor who is onsite at any one time. InVentry speeds up the sign in process, keeps identity information secure, and leaves schools feeling confident that their students are safe.

Cost: £3,000

"The InVentry visitor entry system has paid dividends in terms of safeguarding; OFSTED inspectors loved it."

St John Fisher Catholic High School, Dewsbury

42 Secondary Language Link

SEN SUPPORT

Although Speech Language and Communication Difficulties (SLCN) affect at least 10% of secondary pupils, secondary schools receive very little access to specialist speech and language services and so resources to support both these young people and the teaching and support staff are limited. Secondary Language Link is an SLCN training, curriculum- linked intervention and screening package, developed to support the language and communication needs of pupils aged 11-14, to have a positive impact on teaching and learning and to make a real difference to the life chances of identified adolescents.

Cost: The average size secondary school (939 pupils) pays an annual subscription of £1220

43 Firefly

This online tool empowers teachers, students and parents to learn more together; schools can set homework, track progress, create rich resources and engage parents.

Cost: Around £10 per student

41 BBC micro:bit

The BBC micro:bit is an innovative project drawing inspiration from the original BBC micro and building on its legacy. The project is revolutionary in its approach, providing up to 1 million free, pocket-sized programmable devices to students and schools across the UK with the aim of kick-starting a passion for coding. A not for profit foundation has now been established that will ensure the aims of the BBC micro:bit are promoted for years to come.

Cost: Up to one million free devices were given; it's now available for retail

What's the legacy?

84% of those using the device say it was fun and exciting to use

88% said it showed them that coding is not as difficult as they thought it was

39% of girls that used the micro:bit said they will definitely do ICT/ computer science as an option. A previous benchmarking study of year 7 girls showed this was only 23%.

IMPACT: PROVEN

At Latymer Upper School, 5+ A*-C GCSE increased from 62% to 100% within one year of starting to use Firefly

"EDVirtual is quickly becoming a whole school learning platform rather than an isolated resource. It's been a real success; we had over 500 students use it for the maths intervention alone. We're now looking to use it for set texts within English, to help our students with core knowledge which they will need to recall in their exams."

Andy Percival, deputy headteacher at Rodillian Academy, Wakefield

44 EDVirtual (from EDLounge)

EDVirtual is a virtual classroom in which teachers and support staff can help disengaged, and/or out-of-school students gain qualifications and achieve their goals. It was specifically created to target those hard-to-reach students, using a school's own staff, mentors and support staff (alongside EDLounge teaching staff, who are uniquely trained and have extensive knowledge on qualifications, methodology, exams, coursework and practical elements) to educate learners in any situation.

Cost: £1,000 per seat

45 Groupcall Emerge

Emerge 5 is a powerful platform designed for educators to view and interact with their core MIS data anywhere, anytime, across a variety of devices. It exists to make the lives of teachers easier - giving them the freedom to manage their marking, take registers, analyse their data and more, wherever they are, on whatever device they choose.

Cost: From £199

"I have found it invaluable when meeting parents. I can show them behaviour, achievement and attendance information when we are talking; and when looking up other relevant information, it is immediate."

Stoke Damerel Community College

46 E-safety Support

This unique service puts up-to-date e-safety training, policy documents, assessment tools, lesson plans and other teaching resources and practical guidance at your fingertips, making it easy to share e-safety policy and practice with pupils, parents, teachers and other members of your school community.

Cost: £599 for secondary schools

47 Kramer VIA Go

This wireless presentation solution could represent a revolution in connectivity in the classroom. It allows a teacher or student with any Windows PC, Mac, Chromebook, Apple tablet or phone Android tablet or phone to connect wirelessly and present; up to two participants can be displayed simultaneously.

Cost: £449

48 NetSupport Notify

SAFEGUARDING SOLUTION

NetSupport Notify is a simple, low-cost, one-way messaging and alerting tooll that delivers effective one-way communication that must be read, whether in the classroom or across the whole school. The messages it sends take screen priority, which means that they can't be bypassed or ignored – ensuring that everyone is able to see a message with immediate effect and act on it, if necessary.

Cost: From £100 for 75 licences and becoming cheaper, the more you buy

49 Soundbeam 6

EDTECH FOR MUSIC

This brilliant, award-winning piece of music technology for all people - regardless of ability or disability - uses ultrasonic sensors to detect movement and translate it into sound.

Cost: from £2495

50 Iiyama TE8668MIS-B1AG

This interactive 86 inch 4K UHD large format display feels right at home in every classroom. With its high resolution IPS panel, it's ready to inspire young minds with stunning graphics, content-rich presentations and detailed lesson materials that will be visible from anywhere in the classroom, even on bright sunny days.

Cost: £2999

EDVirtual

A virtual classroom to enhance learning for all

EDVirtual has been developed to enable your teachers, mentors and qualified support staff can work remotelywith your students in a safe and controlled environment.

Our virtual classroom helps excluded students and those students who require a short term alternative provision. Your staff have the capability to educate your students on specific timetabled pathways via live video stream. Your students will benefit from being taught through a unique pathway tailored to their personal needs and capabilities.

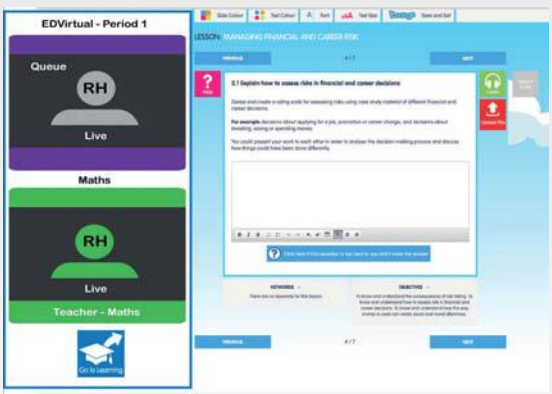
By using our virtual classroom your school can save time and money, benefit from seamless teacher and student lesson transition, and easily interact and support a group or individual while they are unable to attend school.

Our unique safeguarding tools have been designed to give educators the best opportunity to deliver lessons to off-site students whilst monitoring their attendance, behaviour and safety. All virtual lessons are recorded and automatically backed up and saved to ensure safeguarding all round.

This provision is a robust and comprehensive tool that not only allows your organisation to offer teaching and support, but also offers; tutoring, assessment, pre-assessment, verification, and expertise in any subject for any age group, for those doing core or academic courses.

"Since using EDLounge, Casey's attitude towards learning certainly changed. She struggled in mainstream school and found it very difficult to interact with people she didn't know. After a year of using EDLounge, she has now finished her exams and has been accepted onto an apprenticeship working in a private nursery"

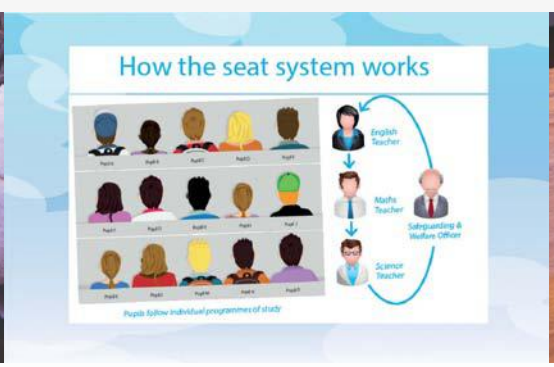
Mrs T - Guardian of Casey, 16, from Sheffield



The Virtual Classroom will allow you to:

- View students' learning live via a secure server stream
- Mentor students through a written chat, verbal chat or face to face video link
- Set structured and personalised pathways for individual students using school content or by using 7,500+ ready-made lessons provided
- Communicate face to face with students who are learning off-site
- Dramatically improve your students attendance and achievement

Request your FREE Demo at www.edlounge.com/demo



CONTACT US NOW to see how our Virtual Classroom and online support system could provide a great alternative provision for a range of your students, which adheres to **government safeguarding**, **well-being and supervision legislation**.

Contact: Paul Higgins
Email: paul@edlounge.com
WEB: www.edlounge.com

EDLounge

EDLounge Ltd, Unit 5, Aston House, Campbell Way, Dinnington, Sheffield, South Yorkshire, S25 3QD
Phone: 01909 568 338

CLASSROOM INSPIRATION

Fresh ideas to take teaching and learning to the next level

BREAKING THE BARRIERS TO INNOVATION

It's 13 years since I left school, yet I still remember my most inspiring teachers, lessons and experiences in the classroom. They shaped my education and childhood. Some of these involved technology: from moving a robot around a mat, to drawing a digital picture for the first time, to sending an email and exploring an internet search engine. These activities sound pretty rudimentary now, but at the time they were mind blowing.

Since then, technology has developed at an astonishing rate. We all have smartphones, 1.3 billion people use Facebook everyday and virtual reality is now an affordable experience. Unfortunately however, the digital revolution hasn't yet had the positive impact it could have on the education system and the use of technology in schools varies widely.

Facing a skills crisis

We at Nesta think this situation is due to the existence of several barriers that are in their turn severely limiting modern classroom inspiration.

As a result, many pupils are being poorly prepared for the world they're growing into. According to a report, "The Digital Skills Crisis," published in 2016 by the House of Commons Science and Technology Committee, 12.6 million adults in the UK lack basic digital skills, costing the UK economy £63 billion a year in lost GDP. Furthermore: 22 percent of IT equipment in schools is ineffective and the UK will need another 745,000 workers with digital skills by 2017.

Fundraising for the future

To help alleviate this, we created an online fundraising platform for schools (www.rocket.fund) to empower teachers to try the latest technology and gather reviews on what works. Designed to fuel imagination in the classroom, Rocket Fund enables schools to raise money from businesses and their community, in order to try new technology that's beyond the reach of their current budget. It also creates a mechanism for us to collect case studies and reviews from teachers, to help others choose and use technology more easily in the future.

It's fascinating to see what teachers buy when given the freedom of choice. This year, the most popular item by far is virtual reality headsets. Which is totally understandable considering the fantastic possibilities they offer – from exploring the oceans to walking around ancient Egypt. I'm excited to see what else teachers choose to fundraise for in the future and how these technologies develop when the suppliers start receiving direct feedback from the teachers via our platform.

Ben Gill, product manager, Innovation Lab, Nesta

Nesta is a registered charity in England and Wales 1144091 and Scotland SC042833.

36%

of secondary school educators think that teachers are the the most valuable source when it comes to measuring the effectiveness of edtech.

Source: BESA

ABOUT NESTA

Nesta is a global innovation foundation that backs new ideas to tackle the big challenges of our time, through its knowledge, networks, funding and skills. Nesta works in partnership with others, including governments, businesses and charities. It is a UK charity that works all over the world, supported by a financial endowment. To find out more visit www.nesta.org.uk

FROM SPREADSHEETS TO STORIES

If you focus on narrative rather than numbers, data analysis suddenly becomes more exciting – and effective, insists **Geoff Worth**

Like it or not, for many years, teachers have had to analyse data. There is increasing pressure to look at the numbers to see how students, teachers and the school are performing. In most schools, data analytics normally falls to one individual who has a passion for number crunching and an enthusiasm for creating spreadsheets.

In my school, Pate's Grammar School in Cheltenham, I am that individual. I love to play with data because it tells the truth. It means I can make decisions based on the most up to date information. However, I am very aware that not everyone shares my passion for detailed analysis.

"Not another spreadsheet!"

It used to be that a colleague would come to me with a request for analysis. Using one of my bespoke systems I would often present the findings in a spreadsheet. However, it was on one of these occasions that I received the following response, "Don't give me another spreadsheet Geoff; I don't do spreadsheets."

Spreadsheets are like Marmite – people love them or hate them – but I believe data is different. Rather than just being a string of numbers, data can tell a story; and who doesn't love a good story, especially if you get to control the ending? The power of data is that it can solve a mystery – it can even predict the future. So, once you transform numerical data into stories, suddenly it has much wider appeal.

By seeing the beginning of a story, we are in a much better position to ensure that it ends well – for example, if we know at the start of term that Charlie's attendance is affecting his grades, we can perhaps do something about that. Or maybe we can discover why the boys in year 8 are flying in geography but struggling in science. It might be that we notice that the introduction of a geography field trip has dramatically improved the grades of the current year 10s compared to last year's class. It's these little insights that will help us to decide on the best course of action to take.

I strongly believe that seeing these tales unfold with access to more and better data will be the answer to help schools to perform well on increasingly shrinking budgets.

Finding stories at the click of a button

When a teacher enters a classroom, they are met with a sea of individuals with different needs, backgrounds and interests.

Being able to keep a close eye on all of them is a daily challenge that all educators face – and I haven't met many who don't get excited about the prospect of seeing a student's past, present and predicted future, with just the click of a few buttons.

Teachers want to teach, so they are all looking for a speedy process that offers current information, to be able to get the best from their students. Providing tools which instantly reveal which individuals are struggling or excelling in specific areas enables us to create much better support strategies for our learners.

We found creating systems that show the data stories in a visual way – with Venn diagrams, bar charts, pie charts and line graphs – has been a powerful tool in enabling teachers to engage with complex pictures. We use SIMS Discover to do this automatically and it means that data analysis is now an action that doesn't get left on the to do list. Instead, our staff are keen to discover the stories that exist within our school, and have the means to do so, quickly and easily.

I meet with a lot of local schools to share ideas and best practices. Often when we talk about data analysis I am told 'we've developed our own system'. This usually means they have created something in Excel or Word that only a select few understand or want to look at. But no teacher has time to go through complicated analysis to be able to quickly access the information they need. They need to be able to see an overview of all their students to be able to make good decisions to help all learners achieve their full potential.

Getting ready for Progress 8

One of the biggest areas that seeing data as stories has helped us with is getting ready for Progress 8. Our student intake is constantly increasing, so we have to be able to look at the whole school at any point, review the available data, and quickly spot any changes in pupil and staff performance. The introduction of Progress 8 has meant that assessing the value that a school adds to each pupil is essential. We knew we needed to be able to ensure our pupils were reaching their potential. To do this effectively, all members of staff had to be able to quickly see if any pupils were not making the progress we hoped for them and then be able to provide the appropriate support mechanisms. It's obvious that if the analysis is being done by one person, and is not being presented in a way that makes sense to all members of staff, then the whole process is a waste of time and provides no value at all.

To survive on increasingly smaller budgets, we need to nurture a culture of storytellers within schools. It's important that we can see the stories as they develop and drive action where needed. By maximising the available data, we will be able to write many more happy endings!

6 WAYS TO GET THE MOST FROM YOUR DATA

1.
Don't leave data analysis to one person; the whole teaching staff needs to be on board.

2.
Collate your data and consolidate it into one place. It will save time and money in the long run.

3.
Inspire colleagues to look for the stories not the numbers.

4.
Look for ways for your staff to be able to view and interpret their findings in a visual way.

5.
Look for the trends and patterns both now, and also over the past few years.

6.
Share your success stories.

ABOUT THE AUTHOR

Geoff Worth is head of science at Pate's Grammar School in Cheltenham, (www.patesgs.org). For further information, visit www.capita-sims.co.uk/TeachSecondary

What if you had X-ray vision in the classroom?

Now you can.

With Vision for Chromebooks you can see all student activity in the Chromebook classroom.

- **Monitor student screens:** See all activity in one glance
- **Blank student screens:** Refocus attention
- **Block and filter web:** Keep students safe
- **Push URLs live:** Save time
- **See beyond the browser:** View activity undetected by other programs

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01926 813500 or sales@maitek.co.uk

A better way

If you're looking for an effective, affordable solution for managing student devices in the digital classroom, Netop Vision ticks all the boxes...

You have a lot to manage, and the list keeps growing. How do you make sure students are on-task and safe when using technology in the classroom?

With Netop Vision you see everything your students see by viewing all student screens from your computer. You can keep students safe by blocking websites and blanking screens. With Vision you can:

+ Capture students' attention and maintain focus.
+ Control potential distractions.
+ Supervise students' activity.
+ Help students remotely from your computer.

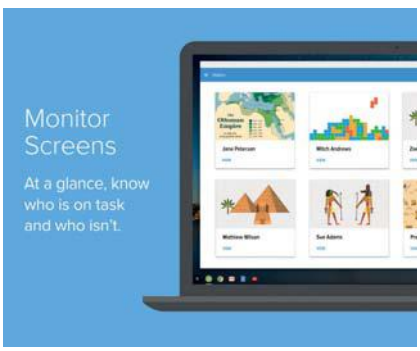
The right tools

At schools throughout the UK, educators are finding that teaching with technology is easier and more effective when they have the right classroom management tools. Take, for example, Stockwood Park Academy in Luton, which serves students from Year 7 through KS4 and sixth form. Offering a state-of-the-art building with cutting-edge facilities, teachers and students have used Netop's Vision Pro classroom management software since 2012 in their various ICT rooms.

"Vision Pro is a very powerful behaviour management tool," says Giselle Hobbs, assistant principal in charge of KS3 achievement and new technologies. "It is a great product that provides real solutions to improve teaching when using technology."

Vision Pro helps teachers better manage classroom technology with these core features:

+ View a screenshot of each computer or tablet in the classroom from the teacher display, following student's work in real time.
+ Communicate with students screen-to-screen. Teachers can chat, operate students' devices for them, or demonstrate directly on their screens – all from their own computers or tablets.
+ Turn internet access on or off entirely, or choose specific websites to block or allow.
+ Select the applications they want students to use while blocking others.



+ Distribute files, collect assignments and launch websites for the whole class in one click, saving lost transition time, letting teachers accomplish more during each class period.
+ Post lesson content online and conduct web-based assessments supporting blended learning and flipped classrooms.

Impressive results

At Stockwood Park, the results have been evident. According to Ms. Hobbs, Stockwood has experienced the following educational benefits from using Vision Pro: improved engagement within lessons; improved student behaviour; better understanding and progress on tasks during lessons; a greater opportunity for questions, feedback and reflection during lessons; and stronger relationships between teachers and students through one-to-one connectivity

Ms Hobbs also cites that using demos and pop-up questions have resulted in higher levels of teaching and engagement. She said the teachers' favourite feature is the sharing screens function because it keeps all students focused and enables teachers to share student best practices with others.

She noted that students "are still alarmed when someone takes control of their screens, but they enjoy the question pop-ups and benefit from the visual demonstrations during lessons."

Stockwood Park Academy chose Vision Pro in part because it was priced more attractively than other alternatives. She's been exceptionally pleased by Netop's excellent customer support and service.

EFFECTIVE TEACHING WITH TECHNOLOGY

Netop is a worldwide leader in classroom management software. The company's innovative line of classroom management products, including Vision Pro and Vision for Chromebooks, support traditional computer labs as well as one-to-one computing, blended learning, flipped classrooms, and more.

For further information, get in touch with Netop's UK Distributor on 01926 813500 or sales@maitek.co.uk or visit www.netop.com/edu for a free 30-day trial

PUT THE FUTURE IN THEIR HANDS

One memorable, interactive experience can inspire students to pursue STEM long after the school bell has rung, says **Dr Kevin P Stenson**

We all know of someone who was inspired to pursue a subject or their chosen career path because of one teacher, one class, or one moment during their school years; perhaps you might even be that person yourself. Nowhere are these moments more important than when teaching science, technology, engineering, and maths – subjects that often need a little help to jump off the page of a textbook and come alive for students. When it comes to getting students engaged in STEM, The Smallpeice Trust – of which I am Chief Executive – recognises that we need to help schools to keep serving up memorable, interactive experiences alongside the required curriculum – and let the students' curiosity do the rest.

We've worked closely with schools over the past 50 years to help them provide inspirational experiences that get students to dare to imagine the possibilities of using STEM. We offer in-school STEM Days, which are mostly free thanks to the support of sponsors, during which a Smallpeice educator will come to your school and hold an interactive workshop for up to 60 of your students.

Providing teachers with the tools

We can deliver Think Kits, which contain everything you need to start up a STEM Club for Year 8 and Year 9 students, including week-by-week lesson plans, presentations, student handouts, and project materials. As well as providing resources and sessions for schools, we also deliver residential and non-residential courses for students. Everything we offer complements the existing in-school curriculum, whilst simultaneously taking it that one step further.

We also work hard to link schools with some of the UK's top institutions, universities, and companies, to take students' learning outside of the classroom and get them excited about the possibilities of finding solutions to real world challenges using STEM. We have collaborated with everyone from The Stephen Hawking Foundation to the National Cyber Security Centre and our courses have seen students engineer Lego robots in Exeter, design boats in Strathclyde, and build hydro turbines in Newcastle.

The enthusiasm for offering unique STEM experiences for students is clear in the uptake we have seen from schools across the UK – in 2016, we held 600 STEM Days, reaching over 50,000 students.

With such an appetite amongst schools for providing inspiring, interactive experiences for students using STEM, the question is, do they work? Can one memorable experience make a tangible long-term difference in the perception, participation, and pursuit of STEM subjects by young people? Quite simply, yes – and we've been fortunate enough to see inspired students and their curiosity in action, following their experiences with The Smallpeice Trust.

Lighting the spark with STEM clubs

Last year, students from Clacton County High School in Essex attended an in-school STEM Day provided by The Smallpeice Trust and were inspired to set up their own STEM Club. The group used the school year to construct a Remotely Operated underwater Vehicle (ROV) from scratch, before testing it off the coast of Brighton.

The students' design incorporated lights and laser sensors that allowed them to overcome the lack of visibility and explore the murky waters of an offshore reef. As their ROV sped down to the depths, the team gathered around a screen to steer the craft using its live on-board camera, and view the images streamed back from the reef. The school's STEM Club inspired by The Smallpeice Trust continues this year, with the group aiming to improve their submersible with newly engineered features. One of the students has also gone on to receive a scholarship from the Trust's sister charity The Arkwright Scholarship Trust, to support her study of engineering at A Level.

To see these students enjoy their experience with The Smallpeice Trust and then feel inspired to tackle a challenge using STEM skills was fantastic. Their journey from feeling curious about a challenge, to identifying how it could be solved using STEM, through to engineering a solution and successfully launching it in the real world outside the classroom, is the essence of everything we strive to achieve.

Kick-starting STEM careers

We have also seen the beginnings of promising careers in STEM, following our work with students in schools.

When The Smallpeice Trust ran an in-school competition challenging students to build the paper boat that could be pushed the farthest along a desk by a fan, student Jonathan Wright came along to take on the challenge. His experience at this competition kick-started a journey that would see him attend courses with the trust in partnership with Corus and Jaguar Landrover, study Civil and Structural Engineering at The University of Bradford, and eventually secure a job as a Graduate Geotechnical Engineer with Van Elle Ltd.

Alice Thomas was in Year 8 when The Smallpeice Trust organised and ran a STEM Day at her school, challenging students to construct a floating device made entirely out of straws. Alice's team won, their prize being a place on the Trust's engineering course at The University of Nottingham, where representatives from engineering firms advised them on how to engineer their device using wood, nails and plastic. Inspired by her experience, Alice went on to study chemistry at the very same university where she first experienced STEM subjects in action with The Smallpeice Trust, and now works as an Assistant Chemist for EDF Energy.

Jonathan and Alice's experiences are just two examples of the countless stories we hear from the students and schools we've worked with. While Alice jumped at the opportunity to mingle with engineering professionals, saying, "I enjoyed talking to the representatives from the engineering companies and finding out what their careers involved," Jonathan said, "The Smallpeice Trust broadened my horizons and gave me a taste for the big picture of engineering." We're incredibly proud of stories like this, in which the beginning of professional careers in STEM can be traced back to an initial experience with the Trust.

Meeting challenges and making moments

We appreciate the challenges that teachers can face when leading STEM subjects. How do you find the time and the resources to run an exciting experiment? How do you explain complex theories while making them relevant to the real world experienced by students? And how do you do all of this while covering the required curriculum?

By offering a range of resources aligned with the curriculum and linking schools with innovative institutions and companies across the UK, The Smallpeice Trust helps schools to overcome these challenges. You can get in touch with us via email at info@smallpeicetrust.org.uk to discuss how we can help your school deliver STEM experiences over the next academic year that might just kick-start a career. As we've seen – sometimes one moment is all it takes.

ABOUT THE AUTHOR

Dr Kevin P Stenson is Chief Executive of national education charity, The Smallpeice Trust.

+KEY RESOURCE

Arckit is a freeform architectural model making system that introduces students to STEM learning through real-world architectural design. Arckit allows users to physically explore designs and bring projects to life. The modular system uses interconnecting components based on modern building techniques, making it possible to design and modify a diverse range of scaled structures. The multi-award winning Arckit system is used by schools and universities around the world as a classroom tool for teaching STEM concepts, developing fundamental design skills and offering the chance to explore hands-on creativity.

Find out more at www.arckit.com, or email education@arckit.com

ARCKIT®
IMAGINE IT BUILD IT

BRING STEM TO LIFE WITH ARCKIT

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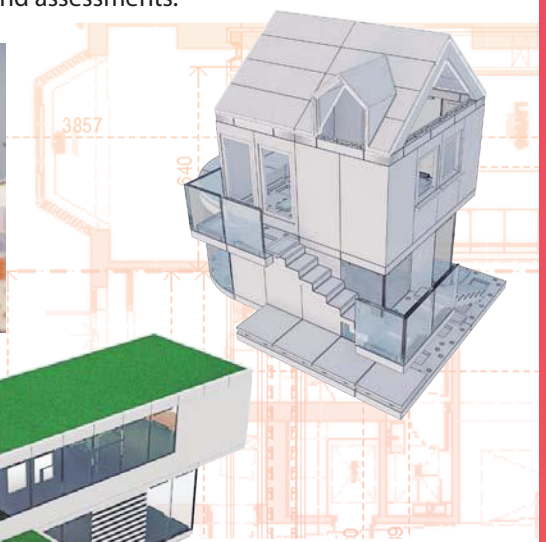
Introducing students to STEM learning through real-world architectural design.

Arckit is a freeform architectural model making system that allows you to physically explore designs and bring your projects to life. The modular system uses interconnecting components that are based on modern building techniques, making it possible to design and modify a diverse range of scaled structures. The multi-award winning Arckit system is used by schools and universities around the world as a classroom tool for teaching STEM concepts, developing fundamental design skills and exploring hands-on creativity.

Arckit also offers a complete learning resource for schools. The Arckit Education Programme teaches students how to think creatively, communicate their designs, practice problem solving skills, work collaboratively, engage with technology and develop a better understanding of architectural design through hands-on activities and assessments.



Arckit is compatible with 3D software such as SketchUp and Autodesk Revit. This allows users to seamlessly transition between mediums, bridging the gap between physical and digital design. This easy access to accurate models and experimentation means that physical model making can take a more active role in the design process.

These CAD skills can also be used for other STEM learning targets such as exploring spatial analysis, geometric equivalencies, ordering and composition.

Arckit allows users to build a vast range of structures, from models inspired by iconic buildings to your own freeform designs. Arckit uses no glue and is completely modular, so models can be endlessly modified to create different designs.

ARCKITEXTURE gives you access to a digital image library of surface textures and material patterns used by real building material companies. This allows you to add detailed and realistic finished to your structures such as wood flooring, terracotta tiles, stone walls and shingle aluminium. ARCKITEXTURE finishes can be downloaded and printed to the ARCKITEXTURE adhesive sheets found in your ARCKIT set.

YOUNGER STUDENT

· Design thinking to create ideas and then articulating them with physical models

· Introduction to geometry and scale and use these skills in design development

· The ability to assess, evaluate and modify designs

· Introduction to Engineering Process from concept design through prototype development

· Improved psychomotor dexterity by cutting, measuring and applying adhesives to finish models

OLDER STUDENTS

· Collaboration and team building in addition to a broad range of skills from research, final documentation to design presentation

· Develop proficiency with 3D printing technology to explore, design and integrate 3D printed components with the Arckit system

· Learning the principles of architecture, engineering and modern construction techniques

· Gain competence in CAD by designing and building the same structure in both real and digital environments

Email the Arckit Team for further information on learning resources and education discounts available for Arckit products.

education@arckit.com

Q&A: LONDON INTERNATIONAL SCIENCE FORUM

Richard Myhill, LIYSF director, explains what the forum means for participants

T&I What is LIYSF?

RM LIYSF is the London International Science Forum which takes place in July – August annually. It is a melting pot of ideas from international science students. In 2017 more than 480 students aged between 16 and 21 attended the 59th forum. Students attend lectures from top class scientists and researchers, visit the UK's most prestigious research centers and are given the opportunity to meet like-minded individuals from the world over. LIYSF is as much about cultural interaction as it is about science!

Who attends LIYSF?

Students aged 16 -21 are eligible to attend the forum. Participants come from all over the world, hailing all from different backgrounds. Some students win competitions to earn a place at the forum while others are chosen by their schools or colleges. As well as this, sponsors all over the world choose to send students to the forum as a way in promote science in their communities.

What do students get from LIYSF

A lot! Firstly, students leave LIYSF with new found information from world class researchers and scientists, often discovering new and exciting fields of science and career paths as a result of their time at the forum. They make like-minded friends from every corner of the world. From traditional musical performances, lectures, and visits to labs all over the UK, LIYSF is a truly inspiring experience. Students also get the opportunity to display a project they have been working on in their home country during our project bazaar, which gives them vital experience in presenting scientific work in a clear manner.

What makes LIYSF different?

LIYSF is different from many other science forums as it is non-competitive, which promotes a friendly atmosphere. Students also get the opportunity to engage face to face with top class scientists and researchers. It's rare to find an event as culturally rich as LIYSF. It offers a unique opportunity for our young participants to meet people from completely different backgrounds. It is often said that participants at LIYSF learn as much about culture as they do about science.

www.liysf.org.uk Call: 020 8295 8295 Email: info@liysf.org.uk

Q&A: ACTIVE ROBOTS

Becky Yelling, of Active Robots, talks about the LEGO® Education robotics range

T&I What can the study of robotics teach students?

RM LEGO® MINDSTORMS® Education EV3 brings project-based learning to the world of computer science and STEM, enabling secondary pupils to improve critical-thinking, problem-solving and collaboration skills. As inspiring as it is engaging and creative, you can use the EV3 robotics technology straight out of the box and download the software, curriculum material and e-learning modules for free. The solution enables pupils to understand and interpret two-dimensional drawings to create three-dimensional models; build, test, troubleshoot and revise designs to improve robot performance; and gain practical, hands-on experience using mathematical concepts such as estimating and measuring distance, time and speed.

What's special about the LEGO® Education robotics range?

The range of LEGO® Education products has everything a teacher needs to engage pupils in an exciting computing, technology, engineering and maths lesson. With all LEGO® Education software, curriculum material and teaching support now available to download for free, there is a wealth of inspiring content and support across a range of subjects, including computing and STEM, at your fingertips. The software contains step-by-step lesson plans which makes teaching ICT more fun than ever!

How easy are the sets to put together?

Pupils design and build programmable robots using high quality motors, sensors, gears, wheels, axles and other technical components. The sets are very easy to build and build guides are available, however LEGO® MINDSTORMS® Education EV3 encourages creative building.

Are you able to guide schools towards choosing the robotics resources that best fit their needs?

Active Robots Ltd has been in business for over 15 years supplying the education sector with all its robotics requirements. We supply primary schools through to universities with relevant robotics for their stage of learning, from LEGO® Education WeDo2 right through to high end collaborative robots. We have a specialist team who can give completely neutral advice on what system will best fit each individual schools requirements and budget.

Visit: www.active-robots.com Call: 01761 234328 Email: sales@active-robots.com

Q&A: GoCalm

Dawn Baker, Head of Innovation at NCFE explains how tech can help reduce exam-related stress

T&I Why is NCFE so concerned about exam pressure?

DB Mental health issues have been a focus in the media lately. These challenges can start in childhood and if dealt with on time, there are slimmer chances for them to escalate into bigger mental health problems. At NCFE, we are committed to developing solutions with our learners in mind and as an educational organisation with a charitable status, exams are an area that fits naturally within our scope.

Why has the charity partnered with MyndPlay to develop GoCalm?

The BrainWave technology used by MyndPlay is able to read the mind's electrical discharges and feed it back to the screen for visible focus and relaxation levels. This technology is simple to use; it's wearable tech that doesn't require an expert to be on hand to set it up. When we were introduced to the technology that MyndPlay uses, we understood that this will help us in our mission to support learners in their journey with us.

How does GoCalm work? What's the science behind it?

Learners are provided with a simple headset that is linked to an interactive desktop based app; they are then guided to follow various calming techniques. They can train themselves to improve over time and then use in a matter of minutes whenever they feel anxious. MyndPlay is the first mind controlled media player and platform which painlessly connects a user's' computer to their mind with dry sensor EEG BrainWave technology.

Every interaction between neurons creates a miniscule electrical discharge, measurable by EEG machines. The technology headset is there to pick the electrical discharge up, interpret it and transmit it.

Can teachers get a taste of what GoCalm could do, before committing to an investment?

Teachers, learners and users can try the first module of the solution which is distributed for free to everyone and consists of two short videos on TFT - Thought Field Therapy (tinyurl.com/tryTFT) and mindfulness (tinyurl.com/trymindfulness). For them to understand how the headset works, they will need to purchase it. However, we will be running demos at various trade shows over the coming months. We are also filming real case studies so that they can see how it's been used elsewhere before they commit to buy – we will be posting these on **ncfe.org.uk/gocalm.**

Visit: ncfe.org.uk/gocalm Call: 0191 239 8037 Email: dawnbaker@ncfe.org.uk

Choose your REALITY

Robots aren't going to replace teachers, says **Terry Freedman** – but the rise of artificial intelligence could make educators' lives a good deal easier...

The science fiction writer Isaac Asimov wrote a story set in the year 2157, in which a boy discovers a 'real' book. In it, he learns that in the 20th century, kids weren't taught by a robot but by a real person in a place called 'school'. He and his friend muse on the fun those long ago children must have had. So, how far off was Asimov in his prediction – and should we take heart from the observation by Arthur C. Clarke, that any teacher who could be replaced by a machine probably should be?

An insight from a recent McKinsey report is useful. In '*Harnessing automation for a future that works*' (see http://bit.ly/TSMcReport), the blog post about the report makes the point that: "The effects of automation might be slow at a macro level, within entire sectors or economies, for example, but they could be quite fast at a micro level, for individual workers whose activities are automated or for companies whose industries are disrupted by competitors using automation."

That's a profound statement. It is highly unlikely that when you return to school from the summer brto eak you'll be handed your P45 on the grounds that a robot has taken your place. But what we are likely to find is that some of the jobs teachers do are taken out of their hands, either completely or partially. Let's consider a few possibilities.

Automatic marking

To reduce the workload arising from marking, many teachers set tests that mark themselves. There is nothing artificially intelligent about this usually, but it's worth considering two things. First, by using self-marking tests you are showing your willingness to hand over decisions to a computer. True, you're the one who set the test and told the software what the correct answers are, but as a matter of principle you have taken that first step.

Secondly, experts in this field are confident that computers can be taught to mark essays and creative writing. To do so someone would have to 'show' the computer hundreds of essays marked by teachers. It will then be able to work out for itself what to look for, and could then mark essays unaided (to investigate further, see http://bit.ly/TSmarking).

Assessment: the bigger picture

One of the challenges teachers face when trying to work out whether a pupil knows something is balancing the requirement for lots of evidence with the need to reduce workload. Detectives have a similar conundrum when faced with a crime scene: which aspects of it are significant? Are there similarities between this crime scene and others that have been recorded? Enter an AI project called VALCRI, in which the computer can carry out the equivalent of 73 searches through the evidence in one click of the mouse, and even knows that words such as 'scruffy' and 'dishevelled' mean pretty much the same thing.

Perhaps in the future similar systems will be available in education. Imagine being able to present the computer with a pupil's e-portfolio, essays, project notes and annotated programs, and be rewarded with an instant analysis of her 'computing capability'. At the very least, AI could be used to suggest the student's weak and strong points - of course, how to convey that to the student and scaffold appropriate learning activities would still be up to you, the teacher.

On hand to help

At Georgia Tech – a public research university in Atlanta, Georgia – one of the teaching assistants the students find very helpful is Jill Watson. She is always in the online forums, and answers students' questions quickly and accurately. What the students are not told during their course, however, is that Jill Watson is a 'bot': a piece of AI software. Imagine having your own Jill Watson in school, to answer parents' and students' 'low level' questions, freeing up the admin staff to deal with more serious matters. (See http://bit.ly/TSWatson).

Another interesting area of research was reported in article in the Guardian newspaper in May 2017, which described the development of a 'bot' that could respond to statements in different modes, such as liking or disgust. Could such a piece of software eventually find its way into support lines, to give initial advice, at least, to help a child in distress? (Find out more at http://bit.ly/TSGuard).

A mixed reality?

There are apps that can bring to life subjects like astronomy and chemistry (Augmented Reality), while Virtual Reality can put a student right in the centre of a different experience. Is one better than the other, and more likely to gain traction in education? Well, perhaps the most intriguing development, and the most likely, will be the merging of these different approaches.

Work is already under way here. For example, a Holocaust survivor has been filmed in '3D video' answering 1800 questions. Imbued with AI, the resulting 'hologram' can answer questions from students appropriately, by working out what it has been asked (see for yourself at http://bit.ly/TS3dvid).

Meanwhile, Pearson is developing a holographic nurse that will be both artificially and emotionally intelligent, to be viewed through Microsoft's Hololens (this is a headset that projects 3D images to a space in the room you're in, meaning that you can walk around them). The idea is that the Pearson nurse will be able to respond to questions just like a real one.

It's all very exciting; but it's worth considering whether the biggest challenge facing educationalists might now be how to ensure that the technology works for us, and with our full knowledge. What we probably need is an education ethics committee.

THINKING MACHINES

Artificial intelligence continues to develop by leaps and bounds. What makes it very different from – and much more exciting than – early attempts at creating computers that think is what has come to be known as 'deep learning'. Whereas before, programmers would have to load the computer with every possible scenario they could think of, software developments have led to computers learning on their own. In a very small nutshell, simply by exposing it to a situation, such as driving along a road or playing a game, the computer can figure out the rules by itself. And what this means is that it can handle a situation that wasn't foreseen, and therefore not included in the program.

ABOUT THE AUTHOR

Terry Freedman is a freelance writer, speaker and trainer, and publishes the ICT & Computing in Education website at www.ictineducation.org.

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Peter Manns, Head of Maths and Assistant Head Teacher

I would recommend Mathletics. **We use it to augment, support and reinforce classroom learning**. And because there's that "we want to do this...", they don't notice that they are still reinforcing their learning and still practising. **For the engagement with the students, it's been fantastic**."

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REVIEW: ONLINE MATHS RESOURCES

MATHLETICS

www.mathletics.co.uk **Reviewed by John Dabell**

Mathletics – the multi-award winning online maths resource for students aged 5-18 – is currently used by more than 5,000 schools across the UK and millions of students worldwide. Its aim is to develop mathematical fluency, problem solving and reasoning skills and it does this by offering subscribers a wealth of digital delights. I first started using Mathletics in 2010 and since then it has super-evolved to include a whole pile of improvements and updates. For example, it is now fully hosted in the cloud and there are considerably more curriculum activities to access. Real world videos help students understand the maths beyond the classroom; there is a ground-breaking new interactive graphing calculator available; there are new student background themes; and a new Reports area has been launched.

Teachers' view

The new-look site is divided into two main areas: for Teachers and Learners, each of which can be accessed via specific logins. Logging in as a teacher opens up a neat and tidy workspace where you will find areas devoted to classes, courses, results, reports, lessons, eBooks, demonstrations, a toolkit and assessments. Easy to access and even easier to use, each area is a vast improvement on what was available before. Everything is geared towards getting the most out of the resource without creating any extra work and you'll find a wide variety of tools which can be used to control the access of classes, whole cohorts and individual learners to particular areas.

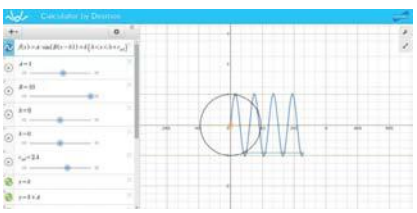
Mathletics claims seven key elements to its approach: engage, target, diagnose, assess, report, fluency and mobile. Well, it certainly engages because the design of the site is fresh, clear, fun and friendly. The use of rewards and certificates and the mathematical gaming element mean students are kept on track, entertained, educated and motivated. In terms of targeting, there are plenty of adaptive activities to access as you can choose from 1300 of them, each with pre and post testing. You can easily assign an assessment to a student and look at a full diagnostic analysis in the teacher console, which allows you to see where a student is in terms of progress and how you can help them improve – including a recommended work plan and activities for students to try targeting specific curriculum outcomes. This makes it easy to benchmark or track improvement and create individual learning pathways. Reports on Mathletics are given in real time and are highly detailed too so you can see exactly what was done and where more help is needed.

I think a major appeal of Mathletics is its flexibility and meticulous approach to differentiated learning. As a teacher you retain a lot of control and have the capacity to modify work to suit individual needs by 'secret setting'. This allows you to give lower ability pupils work from an area below their peers without the student being aware of it, which obviously removes any confidence denting. What is also great about the teacher logins is that you can see on-screen if students finish their work and then re-set tasks accordingly.

Challenge and explore

The Learners' area of Mathletics contains an extensive range of different sections that are designed to support the teaching and learning of mathematical tasks, including live Maths challenges against other learners from other parts of the world, targeted curriculum problems, support material, demonstrations and games. The general gist of Mathletics is to motivate learners to take part in challenges and curriculum learning to gain credits which can be turned into certificates, awards and the ability to spend credits to update their 'avatar'. The My Study section of this area mirrors what you will find in the Teachers' section in terms of activities, eBooks, interactives and videos with the aim of earning medals along the way. Rather brilliantly, students can now use a free mobile app to take their account settings with them, including homework.

As with all systems there are pros and cons. On the plus side, the interactive format combined with the competitive points system can engage and motivate students. The program is in line with the National Curriculum, teachers have full control over what challenges students complete, and it supports assessment wonderfully. It's great that you are able to repeat lessons until students have mastered a concept and earned a score of 100% along with the corresponding reward.



Young people generally enjoy the games and the built-in motivation works a treat. The range of activities and challenges is enormous and will undoubtedly help to improve fluency in core competencies.

In terms of room for even further improvement, I would suggest (as a fan) that some activities lack appropriate demonstrations about what to do and this can lead to confusion – for example, some of the worksheets could do with more explanation, and more videos for each lesson would be welcome. The videos are spoken in Australian English and occasionally I have had students complain of not being able to 'tune into' the way certain words are pronounced.

Overall though, the positives outweigh the gripes and when used creatively and strategically Mathletics is a tested, verified and proven resource that can have a significant impact on the results of schools; indeed, my experience has shown that students get the most benefit out of engaging with Mathletics when used over a number of years.

VERDICT

+ It all adds up

Mathletics is an intuitive and engaging resource, bound to improve learners' skills, knowledge and ability in maths, especially in numerical skills and speed.

A DIFFERENT PLATFORM

When it comes to education apps, it's essential that teachers are able to separate the wheat from the chaff, says **Charles Wiles**

Education technology isn't just about making learning more fun and more efficient. It's employing new developments in order to radically optimise the time and efficiency of a teacher. There are about 200,000 e-learning apps on the market; isolating the best ones for classroom gameplay is a minefield to the time-pressed educator. And despite the sheer vastness of choice, a core failing of the majority of these apps is that they don't contain enough relevant curriculum content. Plus, they often do not collect data on student performance or provide meaningful, actionable insights in order to optimise learning.

Money matters

Budgetary constraints have obviously been a blocker to progression. Primary and secondary schools in the US alone spend $11bn on educational technology annually which, while growing at 20% year-on-year, is still only a tiny fraction (1.4%) of the $800bn spent on schools. Plus a school may blow its entire designated annual budget (usually £500) on a single edtech app, restricting variety and – once embedded in the teaching programme – discouraging replacement.

All the while the current quality of software used by schools remains extremely poor compared to what it could be. For example, there are ten year old products out there – some of which have had little to no investment over that time – that schools are still widely using, simply because identifying, learning and embedding a suitable replacement app into teaching is both cumbersome and time-consuming.

A 'Spotify for education'

So what do teachers really need to know in order to understand and select the best apps for teaching and learning?

What schools could especially benefit from – in order to access and incorporate the best of edtech into teaching cost effectively, while separating the wheat from the chaff – is a platform whereby they would be able to buy one annual subscription to use many different apps: a 'Spotify for education', if you will. This would allow the use of many niche edtech apps in classrooms that specialise in teaching one specific aspect of a subject, such as Touch Long Division. These apps would be mapped to the curriculum, come with data on their efficacy, and be instantly classroom-ready. Crucially, this simplifies the purchasing decisions made within the existing rigid framework. It's exactly this kind of technology that we're pioneering here with our own 'teacher dashboards'.

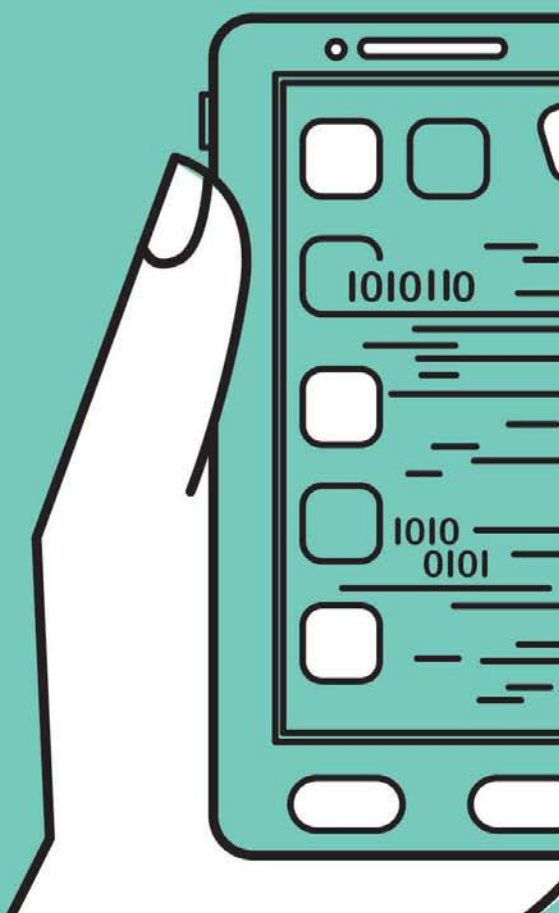
Serious games

Teachers could also benefit from choosing the best apps that give them access to valuable real-time data and insight into the classroom. In the past, teachers would test their students at the end of a term or topic and only at that point would they discover what students really knew – by which time it was too late to do anything about any learning gaps students might have. Now teachers are able to get this insight instantly in every class and change their teaching immediately to address any issues and ensure pupils achieve mastery of curriculum-mapped learning objectives.

For example, three science teachers at Chisholm Trail Middle School in Texas have been using formative assessment tools like Quizalize for the last six months to help prepare students for the District Common Assessments (DCA). The results reported have been quite outstanding, with students scoring an average of 8 – 10% more in tests compared to last year, where edtech formative assessment apps were not used in teaching, nor were they deployed as part of homework.

Data and algorithms have the power to really transform learning; the job of such technology is not to replace teachers, but instead, in a sense, to provide them with their very own virtual teaching assistant. Such an assistant can help the teacher know each student intimately, make recommendations for them, and personalise their teaching individually.

Adaptive algorithms in their own right are an exciting area of progress here. Algorithms based on a technique called 'spaced repetition' aim to select the optimal time to retest students so that they memorise and retain knowledge as quickly as possible. Lingvist, for example, which focuses on helping students learn vocabulary for foreign languages, claims



that students can learn a language ten times faster using their software when compared to traditional methods.

Choosing apps that incorporate gamification into innovation is also important. Gamification is not fundamentally about turning learning into games, but rather, applying the science of motivation to help students stay focused and motivated. In fact today's leading games, whether it's Candy Crush or Clash of Clans, use the science of motivation to keep players playing for longer. Setting and achieving small achievable and measurable goals and using social levers such as competition and collaboration are known to be key drivers to motivation. These drivers can be hard to apply in a normal school setting, but, when it comes to software, they become simple and natural features that drive usage, engagement and improvement.

Personal tuition

Nothing, of course, can replace one-to-one learning. Numerous studies in the public domain show how it can dramatically improve student performance. But while that intense level of teaching is generally neither practical nor viable due to lack of funding and resources, edtech can simulate this dynamic to give every child their own personal virtual tutor, using big data and adaptive algorithms to deliver an optimal teaching and learning experience. Plus a virtual tutor will never lose patience, will never tire and can always be there, 24/7. And it can work out exactly the right thing to motivate each and every student.

Ultimately, this is what makes edtech apps so exciting. The potential for such technology to democratise quality education and transcend the socio-economic barriers to progress is incredibly promising.

Choosing the right app needn't be a minefield so long as the basis for purchasing decisions lies on these core functions: it's truly engaging to use; it provides real time data on performance and spots learning gaps; it radically saves time on assessment and lesson preparation; it's intuitive and drives mastery on a bespoke and individual level. Peer endorsed apps will naturally hold sway and appeal, so visit renowned edtech platforms with market places where teachers may rate or slate with no biases.

ABOUT THE AUTHOR

Charles Wiles is CEO of edtech venture Zzish (www.zzish.com), a software company that specialises in transforming all e-learning apps into classroom-ready tools and gives real time analytical insight on student and class performance.

Quizalize & zzish

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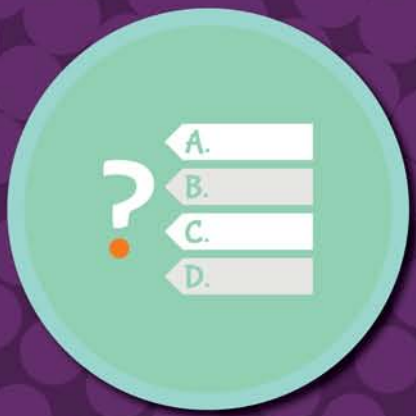

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Q&A: APPS FOR EDUCATION

Zzish

Charles Wiles, CEO, explains how Zzish can help teachers get the most out of e-learning apps – and more...

T&I How can 'gamification' of learning improve students' overall outcomes?

CW Choosing educational technology which combines gamification and innovation is important. Gamification is not fundamentally about turning learning into games, but **applies the science of motivation to help students engage** in learning activities. Today's leading games, including Candy Crush or Clash of Clans, use the science of motivation to retain players' attention for longer. Setting and **achieving small goals** alongside social levers, such as **competition and collaboration, increase motivation**. It is hard to apply this concept within a school setting but educational technology can make it simpler, and drive engagement as well as improvement.

What does Zzish contribute to the process?

The best of edtech fundamentally **speaks in the language that children understand**: gameplay, colour, interactivity and friendly competition. Zzish is best known for its **gamified formative assessment tools and real-time 'teacher dashboards'**. Teachers set quiz assignments in class either by creating their own quizzes or selecting one of over 150 **curriculum-mapped quizzes** available on the Zzish marketplace. An interactive basketball game called HOOPS is integrated into the platform, so class teams or individuals can play against the computer. HOOPS complements Zzish's existing range of features by driving engagement, increasing student **motivation**, optimising **memorisation** and **developing mastery**.

How do you quality control the apps that you share with teachers?

Accessing and incorporating the best edtech into classroom teaching so it enhances student knowledge and is cost effective can be challenging for schools. However, the Zzish 'teacher dahboards' offers schools a unique 'Spotify for educational apps' where teachers can pay an annual subscription to access various high-quality academic apps.

Each app is designed to target specific subject content, for example long division, and is **mapped to the curriculum so it is instantly classroom-ready**. Moreover, the **efficacy of each app** is also displayed, to **simplify the process of searching for good quality apps** which coincide with rigid educational frameworks.

> "Zzish has significantly contributed to improving standards of teaching and learning at KS3"

How can your teacher dashboards improve learners' progress?

Zzish has **significantly contributed to improving standards** of teaching and learning at KS3 through its real-time teacher dashboards. Zzish offers teachers **instant insight into student learning gaps**, to encourage increasingly **personalised and student-centered** learning opportunities. Laptops, tablets and even smartphones in the classroom enable teachers to actively engage with students and highlight specific areas for improvement which can be actioned immediately. Teachers can identify certain subject individual students are struggling with as well as misunderstanding among the whole class. The Zzish teacher dashboards are a **breakthrough technology which turns simple apps into valuable classroom tools**.

Tell us about Quizalize...

Quizalize is Zzish's own showcase app - which turns dull assessments into fun whole class quiz games. Quizalize

improves student motivation in KS3 classrooms, and augments a **positive classroom learning environment**. Additionally, the Quizalize marketplace is the world's first online store for teachers, which offers **interactive educational content** and **curriculum-based assessments** for KS2, KS3 and KS4 which can be individually created, shared, and bought.

How do you see Zzish developing over the next few years?

Zzish is currently used by **80,000 teachers from 110 countries** and over a million students. Zzish was also a finalist in the Teach Secondary's Technology & Innovation Awards 2016 for its role in **improving standards of teaching and learning** at Key Stages 3 and 4. In a profession where marking significantly contributes to a teacher's unsustainable workload, Zzish provides a **'virtual teaching assistant'** which **radically reduces marking requirements** and encourages personalised classroom teaching. Zzish allows children to **engage in unique digital learning experiences** and has the potential to endorse equality in education and **transcend socio-economic barriers**. The technology uses **analytics and intelligent algorithms** to make **teaching more informed and effective**.

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The engine of innovation

Andrew Cluney discusses how 3D printing is bringing learning to life in schools around the globe...

If a traditional printer is a 'tool' in the same way a hammer is a tool, then a 3D printer is something else entirely. It's more like an engine - a driving force that allows students to break down the boundaries of their own imagination and put their insights to use in real-world applications.

Teachers have known for generations that students learn best by doing something, whether it is hands-on problem solving or a science lab exercise. The experience itself helps to make knowledge stick. We retain only 5% of what we hear, but 75% of what we do, which means experiential learning is a more effective way to gain understanding of materials than lecture-based discussions.

The world of 3D is bringing concepts to life in manufacturing and retail, and educators are taking notice. In forward thinking schools around the globe, administrators are employing 3D printers to make abstract concepts from physics, algebra and chemistry.

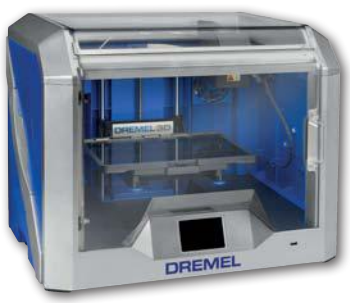
Bringing concepts to life

In past generations, STEM fields might not have been able to engage students as much as, say, football. The 'x's and 'o's on the coach's blackboard came to life on the field every week, while the algebra on the paper in class just sat there.

Today, 3D printing is inspiring the same sort of wonder in STEM fields as some have for the field of athletics. Students are printing designs for cooking tools, inhabiting planets and even inventing new animals.

The prototype

When algebra and chemistry are on paper, many educators think that students close their minds to them because of the fear of failure. A wrong answer means red marks all over the page and lower grades. With the new generation of 3D printing and computer modelling, the ability to create physical prototypes brings equations to life. Students can see first-hand the anomalies that incorrect equations cause, and they can fix them by a trial and error process that is much more fun than the right/wrong dichotomy of the page.



Gamification of learning

Schoolchildren eat up 3D technology for one reason: they have already been introduced to the technology at home. One of the most popular types of games, the first-person shooter, is basically a 3D rendering of an environment. In the latest generation of gaming consoles, kids get to engage these worlds even more closely through virtual reality, making the 3D world even more immediate. This 'training' creates a natural camaraderie between the modern student and 3D technology. When 3D printing was introduced to elementary and junior high school students, they were quickly printing out prototypes and creating new versions of examples – they had been doing this for years on the insanely popular building game Minecraft.

Starting early

Administrators in many schools note that students who see the results of their equations and work in 3D physical form tend to take a much more serious view of STEM fields. They want to learn the ancillary skills to make their prototypes, so they take to algebra and other mathematical disciplines much more readily.

3D printing as an enabler

With the advent of 3D printing, experiential learning can be extended to other fields. We can all picture models of the atom or skeletons hanging in the science lab, but imagine if we could make any shape quickly in the classroom.

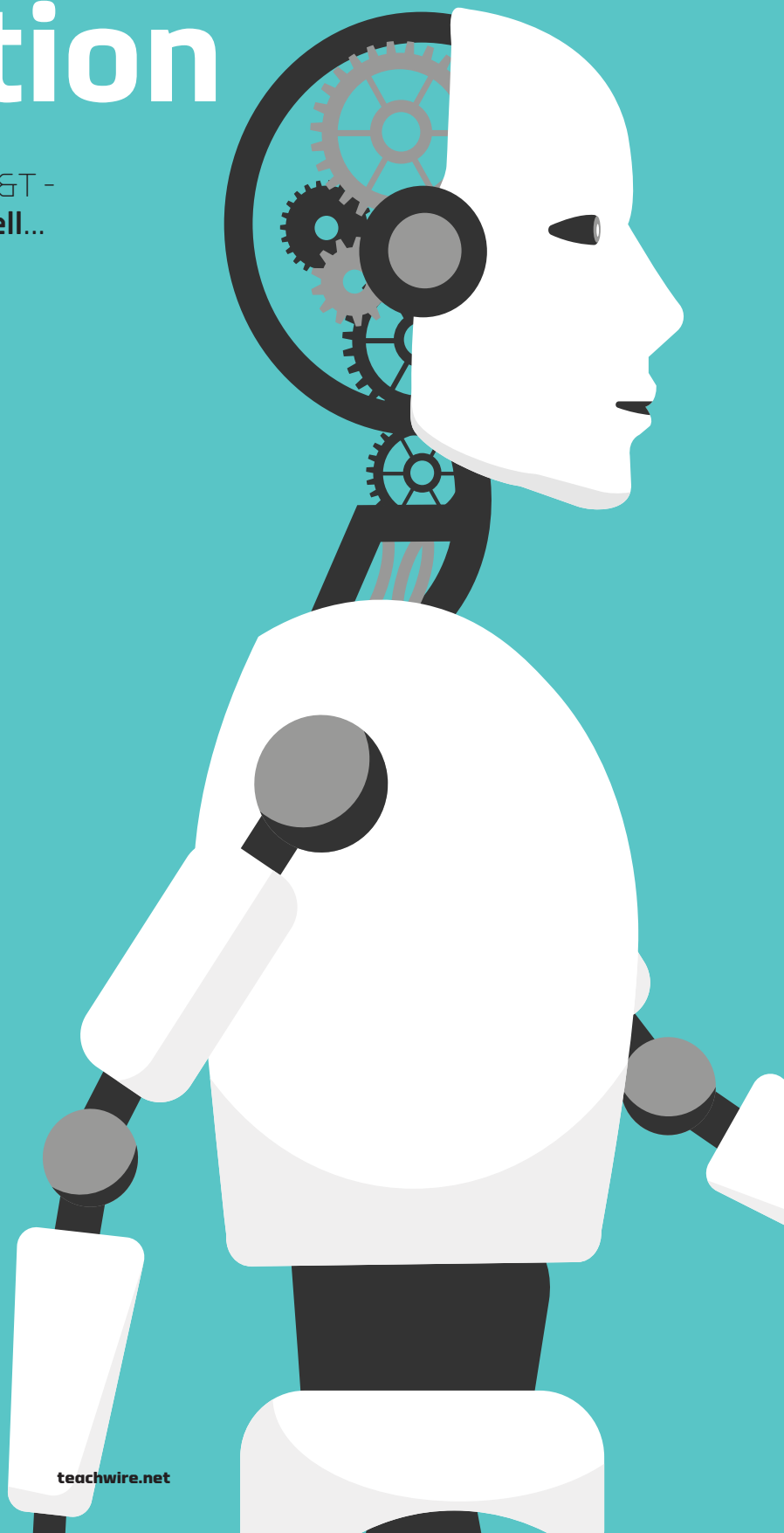
Instead of just looking at a plastic skull, we could make alternate versions to handle, rotate, measure and test to better understand why our heads are shaped the way they are. Instead of just working with the equations that calculate the strength of different shaped beams in a bridge, we can make them to any specification that we want and measure how strong or flexible they are.

ABOUT THE AUTHOR

Andrew Cluney is regional brand manager at Dremel UK For more information about 3D printing in the classroom, see Dremel's videos on YouTube.

The Robot Revolution

Not only *can* we do robotics in D&T - we *have* to, argues **Andy Mitchell**...



Designing and making robots in design and technology schools is nothing new. In fact, the inclusion of associated technologies – electronics, structures and mechanics – dates back to the 1960s. This, of course, was before the personal computer revolution and the ubiquitous use of microprocessor control that now permeates our lives. Robotics is all about building control and a degree of autonomy (intelligence) into useful devices. Devices that can react predictably to changes as they occur. Back then and still now, products typically included models of fairground rides and level crossings. Who would have thought, with the introduction of the English National Curriculum design and technology programmes of study back in 1999, that within a few more years, the updated content would require all young people by the age of 14 to: *apply computing and use electronics to embed intelligence in products that respond to inputs [for example, sensors] and control outputs [for example, actuators] using programmable components [for example, microcontrollers]?* The National Curriculum in England: design and technology programmes of study (2013)

Moreover, this needs to be taught when designing and making. If we are honest, it is this aspect of D&T in most schools that remains least developed and most under resourced. Unless schools and their D&T departments embrace the digital revolution and what that means beyond using computer aided design and computer aided manufacture, then they are failing to provide fundamental aspects of a technological education for all young people. The world that they will occupy will become increasingly dependent on robotics. With artificial intelligence pervading if not replacing more and more current jobs – and that includes the

professions such as law and medicine – it is incumbent on us to make sure that the technological education we provide reflects this. As a nation, we will however still need human beings to undertake the intellectual and fulfil the practical and technological roles associated with constantly improving it and keeping the technology running. That is why providing through D&T activity, an insight into the emerging career opportunities is so important.

Getting started in schools

So if you are in a school that currently does little in this area, what should you be doing? Well the first thing your department needs to be doing is developing a vision for what robotics and control could look like in your school. Importantly, in order to fulfil that vision, you should consider what needs to be done, who needs to be convinced, what investments need to be made, what CPD will be necessary and how you might attract and secure the resource to enable it. It will need to happen in a gradual, sustained way – but you can't hang about! So, where is the expertise in your school already? Can your IT colleagues help? What do you know about systems out there that could be used to get you started – their ease of use, accompanying support and of course, price? Could you prioritise this as an area for departmental professional development? Have you engaged with the Design and Technology Association and taken advantage of the advice and support it provides to members? Recently I have attended two school robotics events. The first was the FIRST LEGO league international finals held at Bath University. It was attended by a staggering 1000 young people, some from as far away as Brazil. There were UK teams too, and it all served to prove how animated, creative and involved young people can get when provided with challenges and robotics equipment to explore. Should you wish to explore the LEGO route, free support and advice can be accessed through www.education.lego.com.

Secondly I attended an event at Finham Park School, in Coventry. The D&T Association has been working to support the development of D&T in schools in Shanghai and this has included the use of control technology. The same animatronics project (available from the D&T Association) was undertaken by schools in both countries and they met up at Finham Park to present what they had done. The schools had been given training in how to use the very accessible Crumble micro controllers available from www.mindsets.co.uk and peripherals used in robotics such as servomotors, switches and LEDs. Some of the outcomes also used the flexible robotics system available from www.vexrobotics.com. The results were outstanding and the event provided rich opportunities for cultural exchange. One can't help thinking that if the Chinese are developing D&T education in their schools, taking as their starting point the use of high tech resources, then maybe we should sit up and listen. Further work will follow, that involves online collaboration between schools through the use of video conferencing and social media.

Reusable resources

Of course you can't do this type of activity without the kit, and lack of resources is often the reason put forward for not adopting developments. But this can be a lame excuse and often hides other issues; most notably, confidence and experience. But ignoring the need for this kind of education is not an option, and teachers should be aware that there is support out there. D&T has to move on if it is to have a future in the UK, and not be overtaken by innovative work in other countries. Perhaps for too long, we have tended to define the subject as being concerned predominantly with making things that result in artefacts to take home. I suggest that we can no longer afford to do this all the time. Whereas I fully agree that part of a pupil's experience should be about manufacturing high quality crafted designs, some of which may go home, this is restricting practice. The £250 investment in microcontrollers etc made to enable each school to undertake the animatronics challenge was capital not consumable investment. Most component parts other than those laser cut from plywood and acrylic or 3D printed are reusable by the next class. We need to rethink the nature of some of the activity we include and rethink how we spend the shrinking financial resources we are allocated.

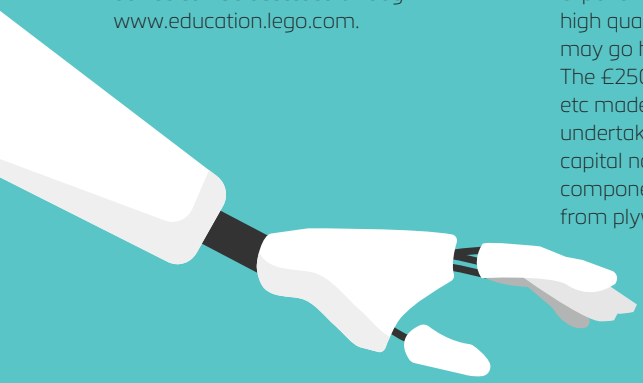
The new simple to use and low cost programmable resources now available are opening up a world that in the past has been the prerogative of 'techies'. Now everyone can engage, and it's vital that in schools we provide that opportunity.

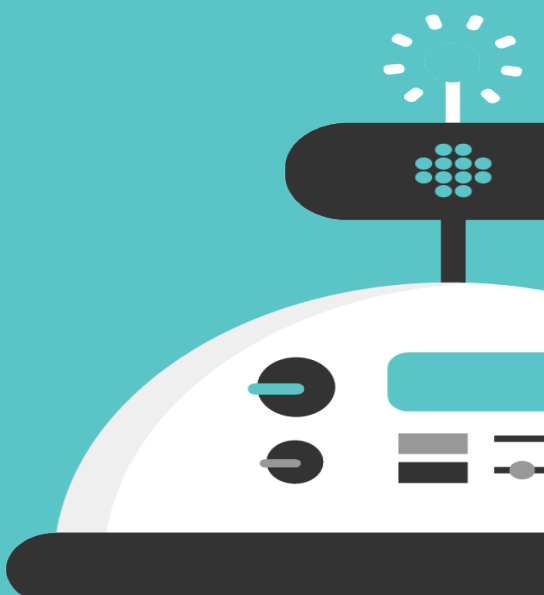
WHAT YOU SHOULD BE CONSIDERING IN YOUR SCHOOL:

1. Look to build in at least one systems and control based project in each year at KS3.
2. With advice, investigate which micro controller system to invest in.
3. Develop a short, medium and longer term plan for building robotics and control into your schemes of work.
4. Look at the requirements in the new single title D&T GCSE relating to programmable control and use these to inform your KS3 planning.

ABOUT THE AUTHOR

Andy Mitchell is the deputy chief executive at the Design and Technology Association www.data.org.uk





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Knife Cutter

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School Play Merchandise

Laser Cutter

Items to Sell at the School Fair

Curriculum Resources

Design and Technology

CAD/CAM is used in the teaching of Design and Technology from Key Stage 2 to A Level:

National Curriculum Key Stage 3

*"develop and communicate design ideas using ... **computer-based tools**"*

*"select from and use specialist tools, techniques, processes, equipment and machinery precisely, including **computer-aided manufacture**"*

GCSE (OCR) to start September 2017:

***"Digital design and manufacture must** be used either throughout the development of the final design solution or when making the final prototype(s)"*

AQA A Level September 2017:

"Development of design proposals: The use of CAD is encouraged"

"Development of design prototypes: The use of CAM is encouraged"

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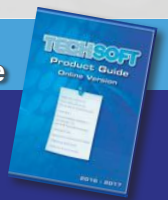

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New D&T Curriculum

Integrating Textiles

Sewing

The Brother Innov-is range of sewing machines are affordable, user friendly and come with a 3 year warranty. We generally recommend the Innov-is 35 as the best all-rounder for schools, but the full range of Brother models are available.

Sewing Machines	ex VAT
Innov-is 15	£177
Innov-is 35	£283
Innov-is 55FE	£319

Embroidery

Embroidered designs can be added to a variety of fabrics including those with a pile such as fleece or towelling. Lace effects look stunning when stitched out on dissolvable stabiliser fabric. Develop ideas in 2D Design and export them into the PE Design Next software for stitch conversion.

Embroidery Machines	ex VAT
Innov-is F440E	£637
Innov-is 800E	£921
PR-655	£4,250

Knife Cutting

Knife cutters are perfect for combining sublimation printing with cutting, for example when cutting nets to make up textile containers or lanterns. They can also be used to cut out heat applied media such as vinyl.

Knife Cutters	ex VAT
CAMM 1 GS-24E	£1,195

Sublimation

Sublimation is the ideal system for creating original printed textiles and for applying digital images onto existing textile products including bags, clothing and accessories. A great way to customise ready-made garments.

Sublimation	ex VAT
Textiles Starter Pack A4	£1,120

Laser Cutting

Laser cutters can be used to good effect to cut and engrave many materials used in Textiles. Custom plywood buttons, too, can add that little extra. Simple designs can have a dramatic effect on the finished garment as shown below.

Laser Cutters	ex VAT
LaserCAM A2+	£13,995

Software

For colourful textile print or embroidery designs, technical drawings of textile products or graphical presentations, 2D Design V2 has been developed to give you all the tools you need and in one place. For embroidery use PE Design Next for stitch conversion.

2D Design

PE Design Next

Software	ex VAT
2D Design V2 site licence	£695
PE Design Next Set of 3	£250

For more information see www.techsoft.co.uk/products/textiles
Telephone 01746 535007 or email sales@techsoft.co.uk to request a Product Guide

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4 Cambridge Technicals Level 3 IT

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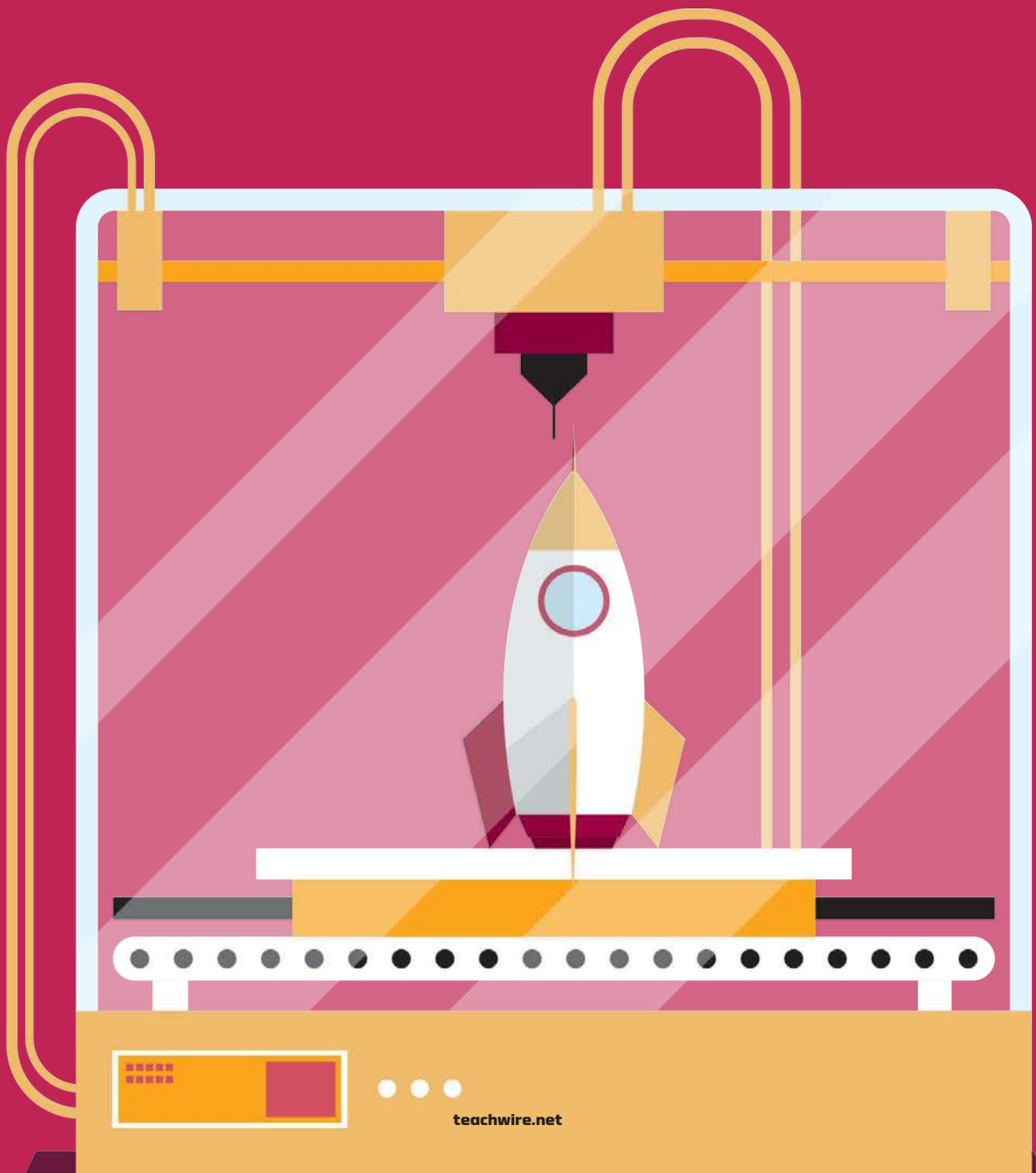
Let's make it HAPPEN!

Yes, there are barriers to innovating with 3D printing technology in schools, says **Paul Croft** – but there are ways to break them down, too...



When I asked my parents why they wanted to be teachers they didn't refer to attainment targets or league tables. Instead they talked about seeing the pupils' eyes light up and getting a sense of satisfaction from students learning new things. There has never been a time when teachers have had so much technology at the fingertips to achieve these aims, yet classrooms across the country are only just embracing the learning benefits on offer. Whilst most people assume budget is the main barrier, others are staff confidence, and time.

Teacher time has been squeezed to the limit in recent years, which equates to a lot of talented and dedicated teachers simply not having the capacity to incorporate new technology into the classroom as much as they would like. When the time *can* be found and the passion is there, utilising technology still requires new skills and confidence in the outcome. Thus, even where schools have invested in new technology, it is often not embraced and utilised to its full potential.

Search for support

The support and professional development teachers require can be lacking due to budget pressures and with some new technologies, lack of opportunities. Take 3D printing for example; currently there is very little face-to-face professional development available that allows teachers and technicians to get hands-on with the technology in order to develop their skills. With 3D printing technology, technical expertise in the hardware and software is required – but teachers also need to understand the design aspects of 3D printing, CAD software, the 3D printing process and how to manage 3D printing workflow in the classroom. In order to truly maximise the benefits of the technology investment, teachers also need to understand how 3D printing can be used right across the curriculum.

How can these barriers be addressed? The internet provides opportunities for addressing some of them, by providing free professional development and support, accessible at the point of need. For example, YouTube provides video tutorials in the use of the technology and file sharing platforms allow access to 3D models that can be downloaded to print or remixed and adapted by students for project work. Many open-source CAD software programs are available for 3D design and these also provide tutorials, example files and help to enable teachers and students to learn the software.

The A of 'arts' should be added to STEM

The open-source CREATE Education Project has built a platform to give people access to a 3D printing community, enable peer to peer learning, share best practice and provide resources including practical classroom resources, professional development and technical support.

The skills they'll need

Many of our industry users are now sharing case studies that provide the social proof of these technologies being incorporated into the workplace, placing further emphasis on how relevant 3D printing is in the 21st century and how significant it will be in years to come.

Whilst the addition of the requirement for students to understand new manufacturing technologies in the new Design and Technology GCSE is welcome, it is equally disappointing that more emphasis has not been placed on developing the required skills for additive manufacturing. Industry has an increasing requirement for 3D CAD and 3D printing skills to fill present and future jobs. Schools that put more emphasis on developing these vital skills will be preparing their students for the wealth of opportunities available to them in additive manufacturing across many different sectors including engineering, architecture, medicine, biotechnologies and so on.

Working with Design and Technology teachers across the UK, the CREATE education project has produced a 3D printing in GCSE Design Technology Guide to help teachers to maximise the opportunities for developing 3D design and production skills within their GCSE courses, along with publishing a wide variety of practical project resources, free for everyone to download.

STEAMing ahead

Many of our more forward thinking educational institutions are already incorporating 3D printing into most subjects. 3D printing can be a catalyst for so many amazing STEM projects. Students are combining code and CAD to make product prototypes; robotics and computer programming are now participatory activities rather than theory lessons. Moreover, some people contest that the A of 'arts' should be added to STEM, making the importance of creativity as part of discovery and innovation explicit. Education is always a hot topic, and as other countries have clear skills strategies the challenging political environment endangers the UK in international terms. Uncertainty and a lack of stability are a distraction from the primary purpose of education: to share knowledge and inspire lifelong learning. Whilst policies may change, the technological shift that society is undergoing is inevitable and our students must be given access and support as soon as possible.

Happily, lots of people have already begun to see their students' eyes light up and are getting that sense of satisfaction from young people learning new things by using 3D printing to enable STEM skills to be developed. Maybe my parents retired too soon....

5 WAYS TO MAXIMISE YOUR 3D PRINTER INVESTMENT

1.
Enhance your extra-curricular STEM provision and engagement by incorporating 3D printing into STEM projects or set up a makerspace for students and/or the wider community to experience craft based technology.

2.
Print your own classroom resources to save money e.g. maths manipulatives, science models.

3.
Bring history to life by 3D printing real artifacts from museum scans.

4.
Run a business enterprise project where students design, manufacture and sell 3D printed products, raising money for the school in the process.

5.
Attract new students by using the WOW factor of a 3D printer at school open evenings.

ABOUT THE AUTHOR

Paul Croft is the founder of The CREATE Education Project (createeducation.com)

CREATE
Education

Thinking of investing in 3D printing technology? Or just want to learn more about it?

Visit the open source CREATE Education Project to learn more. Access **FREE** classroom & professional development resources plus case studies & projects.

"I have been both a fan and collaborator of CREATE Education since I came across them in 2014. What impresses me is their selfless dedication to the objective of incorporating their technology into education. The CREATE Education team have been and are instrumental in make 3D printing accessible to schools and students. They have not just gone into the market with a flashy brochure. They have gone into schools and rolled up their sleeves, learned at the chalk face and given back in terms of their education interface, product and software development. CREATE Education provide much more than just a 3D printer."

David Holloway OBE – The Ideas College

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The CREATE Education Project

Thanks to this brilliant, open source community platform, every school can join the 3D printing revolution...

The CREATE Education Project is an open source community platform providing inspiration and support to schools who wish to benefit from 3D printing technology. The website contains a wealth of ideas and resources for embedding 3D printing across the curriculum at all levels as well as providing case studies, professional development materials and a platform for connecting and sharing.

What does the community offer?

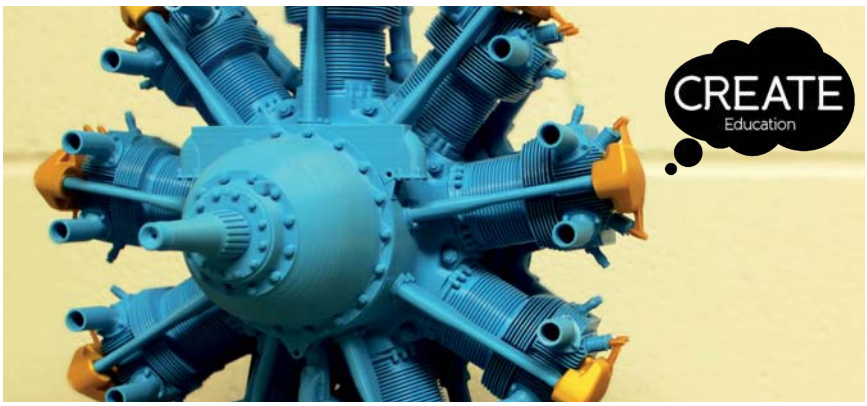
The CREATE Education community consists of a network of industry partners, experienced hub schools, inspirational education ambassadors, creative organisations and teachers who are passionate about 3D printing, all sharing their ideas and experiences to benefit the wider community. Any teacher can become a member of the community by registering on the website, joining the community allows you instant access to all the downloadable resources on the website.

What is available on the website?

The website contains a variety of FREE resources to help educators across all sectors and subject areas to understand 3D printing technology and use it as a tool to increase pupil engagement and attainment - resources include:

+ 3D Printing Projects – including planning documents, teacher guides, classroom presentations, tutorials and student worksheets.
+ Professional Development Resources – including tutorials, videos, tips and tricks and curriculum guides.
+ Getting Started and Troubleshooting Guides.
+ 3D Printer Funding - ideas and information about available grants.
+ Case studies, ideas and inspiration in the blog.

You can also access face-to-face professional development workshops and technical training; locate your nearest



CREATE Education Hub and access the free 3D printer loan scheme.

What's new and coming up in the Autumn term?

September will see the launch of a new guide - 3D Printing in the new GCSE Design Technology Curriculum. This will provide details of how 3D printing technology maps to the various new GCSE Exam Board Specifications along with lots of project and activity ideas contributed by D&T teachers across the UK. Many of the projects referenced in the guide will also be available on the website along with downloadable project resources.

In October the next curriculum guide in the series will be published - 3D Printing in the Computing Curriculum, produced in collaboration with a number of regional CAS ambassadors and hub leaders.

Further curriculum guides will follow throughout this academic year including guides for CAD software, STEM, science, mathematics, humanities and the arts. In addition, the website is regularly updated with new projects, activities and ideas.

How does the 3D printer loan scheme work?

If you do not have access to a 3D printer or you want to try one out before committing to investing in one, you can borrow a 3D printer for a period of up to four weeks in order to run a specific project. The loan scheme is free of charge, all that's required is that you register on the CREATE education website, and at the end of the loan period, you share the details of your project and experiences with the community. You can choose to either share your project resources (lesson plans etc) or you can write a case study for the blog. This way the whole community will benefit from your experience. Of course anything you share will be credited to yourself and your school.

What does it cost?

Everything on the website is free to access and download. There is a charge for face-to-face professional development workshops and technical training. A range of 3D printers, filament and accessories are also available to purchase; current prices are listed in the products section of the website. Free technical support is also available to all customers.

Visit www.createeducation.com Email: enquiries@createeducation.com
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21ST CENTURY MUSICIANS

Nik Preston considers how to ensure music provision is meeting the needs of today's students – whether inclined to the classical or the contemporary...

All too often, I come across classically trained educators who are seeing diminishing returns in student enrolment, engagement and retention from classical music provision and are looking at diversifying into the obvious growth areas: contemporary music and music production.

Marking a clear delineation between where one genre starts and another begins can be an almost impossible and often fruitless task in the main and as you have heard in various political rhetoric in recent times, "there is more that unites us than that which divides us." The same is true for musicians.

The vast majority of music's fundamentals transcend genre, but at certain areas there is a natural divergence necessary, which is based on particular idiomatic requirements.

Composition and assimilation

When I ask students and even teachers to articulate the differences in role between a 'classical' and a 'contemporary' musician, you'll often hear responses which include: "Contemporary musicians improvise, classical musicians don't." "Classical musicians sight read, not all contemporary musicians do." "Contemporary musicians have better ears." And so on...

In individual instances, there may be truth to these assertions, but the roles fundamentally distinguish themselves in as much as a contemporary musician is predominantly responsible for creating her

own instrument or vocal parts, whereas her classical counterpart is responsible for performing parts composed by others. In order for the contemporary musician to accomplish this feat, it is necessary to imitate, assimilate and analyse the performances of their chosen exemplars.

Different requirements

If we use the role of a professional musician to inform the pedagogy that precedes the attainment of such advanced levels it becomes clear that the contemporary musician must have a stylistic awareness which transcends that of her own discipline in order to create and perform idiomatically appropriate parts. Stylistic awareness is the sum total of our harmonic, rhythmic and melodic understanding, in addition to our understanding of appropriate production values. (A modern bass player needs to have an innate awareness of the role of the drummer in order to augment the ensemble suitably, in addition to understanding the role of the harmony instruments and the harmonic, melodic and rhythmic nuance inherent in the composition. All of this whilst also having a fundamental understanding of suitable equipment choices and production values).

The classical musician, however, may well need an in-depth knowledge of the physical performance aspects of particular repertoire and the notational understanding which allows for the accurate recreation of the parts without the need for transcription.

Performance first

The role of music education is ultimately to endow students with the skills, knowledge and understanding necessary to create and perform at the highest level possible – based on the student's ambition. In the contemporary world this requires a more comprehensive and relevant understanding of contemporary theory and harmony than that currently purveying the classrooms of many school music teachers.

With that said, we learn to speak our native language first and then learn to comprehend the written aspects of said language afterwards. There is a great deal to be said for employing similar approaches to contemporary music pedagogy i.e. learn to perform first and then subsequently become acquainted with the stave. This is a tradition that you often see employed in many of the vast genres which form the 'world music' idiom and can lead musicians to be able to express themselves musically earlier than those who were introduced to the stave as the primary stimulus for playing one's instrument. But, to adopt only one approach, at the exclusion of others, is folly and potentially places the student's development at a disadvantage. To my mind, this is a huge factor in why so many children choose to cease learning instruments and indeed sometimes don't manage to achieve their potential in academic subjects: not having been introduced to enough approaches to learning and development.

Intervals and chord types

We at RSL believe strongly that all skills necessary to perform music, of any genre, are crucial to ensure engagement and retention of 21st century musicians, this includes: technique, analysis & stylistic awareness, aural development, sight reading, composition, arrangement, theory, harmony, improvisation and music production.

Whilst it is beyond the scope of this article to investigate teaching methods for each of these I can highlight a fundamental often found missing (understandably) from classical music pedagogy in the UK for school age children and is vital for the attainment of the aspiring contemporary musician - the knowledge of intervals relative to chord types. This is a fundamental that will inform and support the development of each of the other areas listed above, but is sadly lacking in the UK.

The ability to hear, play and articulate intervals relative to chords is vital if a contemporary musician is to amass a working vocabulary and in a relatively small time any musician can gain a comprehensive knowledge of all intervals and chord types, in all keys. I truly believe, were more musicians subjected to this essential concept at an earlier age, retention and attainment would improve at an astonishing rate and the student's ultimate ability to create music (one of the strongest selling propositions of their contemporary music exemplars), could continue uninhibited.

ABOUT THE AUTHOR

Nik Preston is a renowned educator having tutored members of: Lawson, Ed Sheeran, Jeff Beck's band, Jess Glynn's band, The Pet Shop Boys, The National Youth Jazz Orchestra and Camilla Kerslake.

He is currently director of Academic and Publishing at RSL.

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A mission to inspire

Discover how pi-top is changing classrooms through the introduction of STEAM technology...

Launched in 2014, pi-top's mission is to change the face of science, technology, engineering, arts and mathematics (STEAM) education. They are formally endorsed by OCR (Oxford Cambridge and RSA) for teaching computer science, and winner of the BETT 2017 EdTech Startup Company Award. pi-top makes it possible for any school to deliver computer science and STEAM curricula in a simple and engaging manner. pi-top provides an affordable, education-focused platform for students to learn how to code and how to engage with physical computing projects. With pi-top's broad hardware and software applications, the ecosystem takes the best of the fun and engaging aspects of the 'maker world' and applies them to school learning in a way that no other STEAM product has done before.

"pi-top seems to be the only thing the children have been talking about since they got their hands on building them."

Kevin Chung, teacher (House Schools Group)

pi-top

Since 2014, pi-top now delivers to education customers in over 80 countries worldwide. They have built a strong community of teachers and makers who help shape the products and services - making pi-top a world leading teacher learning platform. Part of that, is creating affordable, quality hardware. There are two staple hardware products: the pi-top, build it yourself laptop; and pi-topCEED, the modular desktop, both powered by the Raspberry Pi. Accessories such as the pi-topSPEAKER and pi-topPROTO allow for more classroom activities. The pi-topPULSE was launched recently as an accessory to help you build projects with lights, music and is even integrated with Alexa Amazon! Furthermore, pi-top provides access to world-class educational resources for the new computer science and STEAM curricula, designed with effective learning in mind.

Teach computing with ease

pi-top focuses on teaching individuals computing through project-based learning goals supported by industry leading software, pi-topOS. The pi-topOS software suite makes it possible for any teacher, regardless of their computer literacy, to deliver fun and engaging lessons. The operating system boots into the pi-top DASHBOARD, which includes pi-topCODER and pi-topCLASSROOM. pi-topCODER is the innovative interface that allows you to access worksheets and pre-built lesson plans. It's the easiest way to deliver lessons providing step-by-step guides for computer science and STEAM worksheets. You can then track and monitor your students' progress through all pi-topCODER worksheets with pi-topCLASSROOM.

An integrated environment

Together, all this creates an all-in-one development and lesson plan environment, which teaches students how to code and allows educators to build customised lesson plans for their classroom. Pi-topCODER has hundreds of hours of lesson plans to support delivery in the classroom. You can also use pi-topOS for standard tasks such as: to browse the web, check emails, create and edit text documents or playing games. Furthermore, pi-top has developed an educational game, CEEDUniverse, which teaches coding in a world of fantasy grounded in computing reality by taking science fiction and transforming it to science.

Using pi-top in your classroom opens a world of engaging maker and game-based technology to use in your school. Based in London, pi-top is designed and built by a passionate team of engineers and creatives. As pi-top's co-founder Jesse Lozano says, "We want people to have fun when learning and use pi-top as an empowering tool to inspire the next generation in this new digital age."

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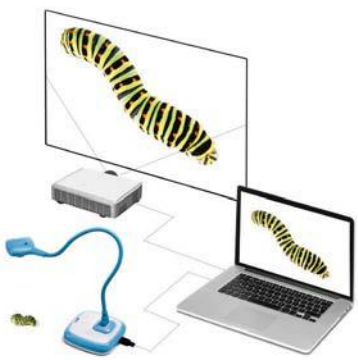

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SCHOOL SOLUTIONS

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ASK THE RIGHT QUESTIONS

Digital technology is redefining almost every aspect of our lives, from financial businesses to hailing a taxi, from managing a long-term health condition to scientific discoveries, to helping us socialise or entertaining us. Schools have not been isolated from this change and digital technology has begun to make its way into classrooms across the UK. There is, however, scope to make this more effective as we build up evidence of what works and what doesn't.

To ensure schools benefit and can take advantage of new technologies and products, it's helpful to understand how technologies can support schools, their teachers and students. We think about this in three ways: school management and infrastructure; subject specialism – such as computing; and learning technologies.

Variable impact

There is no doubt that digital technologies have had a profound impact on school management from electronic registers, cashless catering, student monitoring and school data. There have been huge changes in the curriculum with the introduction of computing and new products and initiatives such as Scratch, Bee-bot, Code Club, Apps for Good and Technology Will Save Us. Yet, whilst studies consistently find that digital technology is associated with moderate learning gains – on average four months – there is considerable variation in impact, as shown by the Education Endowment Foundation Toolkit. It is this variation in impact which causes concern among educationalists.

What we know is that technology is not a panacea for schools, neither is it a solution in its own right. It is about how it is used, by whom and for what purpose. If all this has been considered, it can be highly effective.

Critical consumers

Schools are places of educational expertise and this needs to be at the forefront of choices about digital technologies, whether that is in the classroom, engaging with parents or managing reporting. Teaching and learning goals should drive the effective use of technology. What doesn't work is simply buying a bunch of laptops and expecting an increase in student attainment. Neither does expecting teachers to just use digital technologies without any support or training about how it could be used to support learning or reduce teachers' time.

Tech companies have strong expertise in sales and marketing but teachers and students are critical consumers. Increasingly, they are demanding to know what impact this product has and what evidence there is to support these claims beyond a simple quote from another school. Schools are talking more about learning rather than it being about the tech – and that's a good thing.

Amy Solder, project lead, education, Nesta

43%

of parents are concerned their child won't be prepared for the future workforce

Source: Tech Will Save Us

T&I RECOMMENDS

Thrive: Schools reinvented for the real challenges we face is a new book by Valerie Hannon, co-founder of the not-for-profit social enterprise Innovation Unit. It takes a deep look at the nature of the change around us – particularly within environment, technology, and human evolution – and presents new ideas about what young people need to learn if they are to flourish in this emerging world, sharing examples of schools from around the world who are using innovative approaches that help children to thrive. It makes for fascinating, and inspiring, reading.

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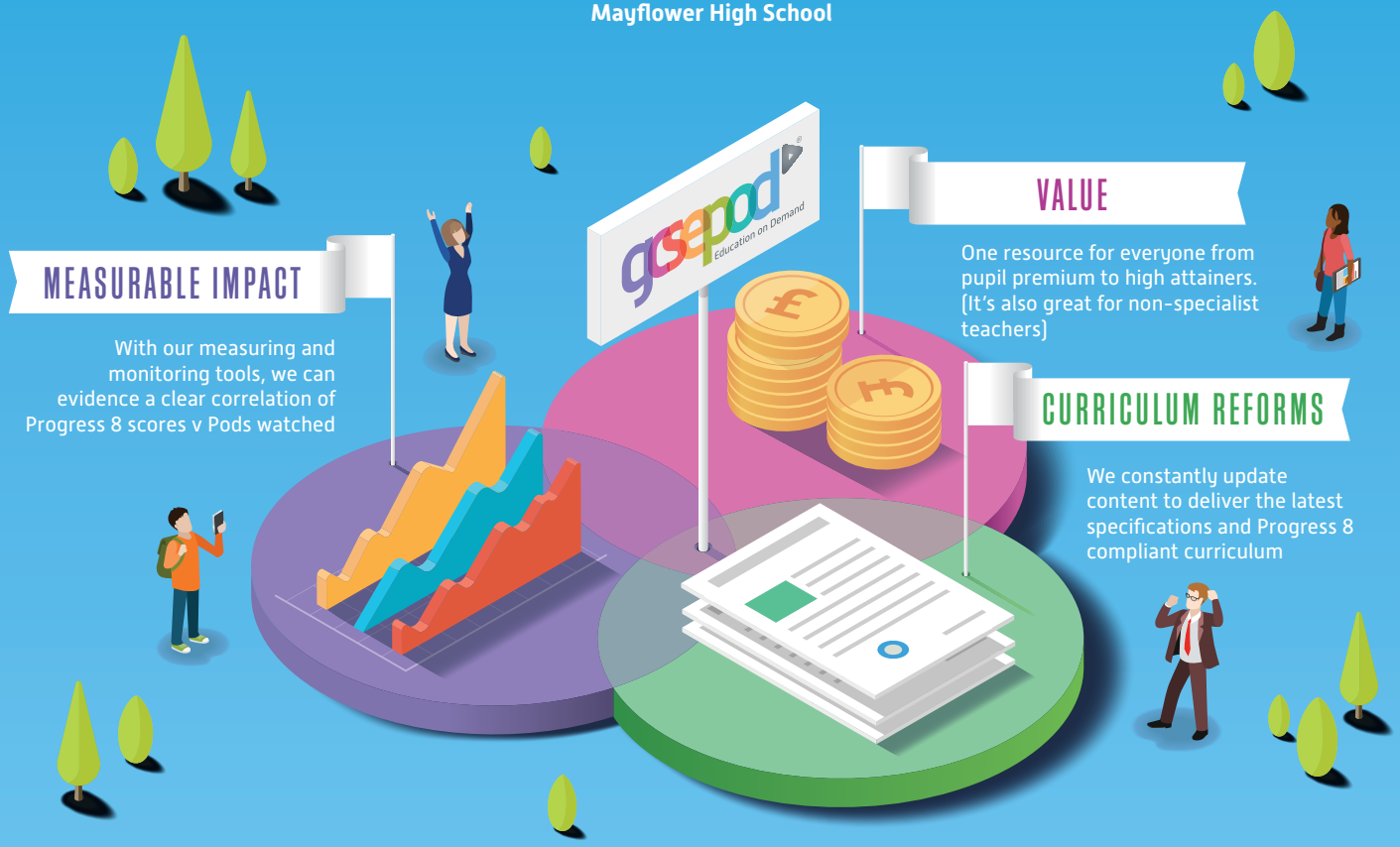
Jonathan Rowlands, Assistant Headteacher
Mayflower High School



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What Students Want: teaching the YouTube generation

Once upon a time, study guides and textbooks were as linear as terrestrial TV programming – but for Generation Z, learning aids must be as flexible as their favourite streaming services

Engaging digital natives is harder than ever. From Facebook and Instagram to YouTube and Netflix, the age group known as Generation Z expects immediate access to content of choice across an array of technical devices.

The sheer volume and convenience of content at a student's disposal today means that educational resources must work harder than ever to meet their incredibly high expectations. Publishers must change the way they think or, as some have already, see their market share fall dramatically... It is no longer acceptable to control how content is drip-fed to audiences; instead, the audience want complete autonomy to watch, read and listen as they choose.

Impressive uptake

For companies taking the trouble to understand how students are using digital tools, the rewards for both them and their clients are plain to see. GCSEPod, a digital education publisher, has seen usage amongst subscribing schools rocket in the past twelve months. It publishes content in a unique 'Pod' video format that breaks learning down into 3-5-minute accessible chunks.They can be viewed on any platform, on or offline. **In 2016/17, nearly 7.5m Pods were viewed by students in subscribing schools – that's a 50% uplift from already impressive usage the year before!**

Behind GCSEPod sits a reporting system which gives the team unprecedented access to big data about student learning habits. This informs ongoing product development. The same data is accessible to senior leaders and teachers for their own schools or MATs, enabling them to analyse learning behaviours on a detailed level, identify knowledge gaps, and provide the very best support to specific learning groups and individuals.

As Geoff Barton, General Secretary of ASCL says: "GCSEPod could be a very significant step in helping to declutter the working lives of teachers, to reduce their workload and make them more effective in monitoring their students and then in providing more customised feedback. I'm really impressed."

An all-year resource

It is fascinating to see how GCSEPod usage has grown and shifted since it was first introduced as a revision resource seven years ago.

GCSEPod is now used year-round as a classroom and independent learning resource, helping to consolidate knowledge and provide students with a deeper understanding of topics they have covered in class.

However, it is still used particularly heavily during exam periods as a way of plugging knowledge gaps and for accessing bursts of high-quality revision content. During the summer exam period alone, more than 2.7 million 'Pods' were streamed nationwide. The company recorded its highest ever usage directly before the summer's closed textbook English Literature exam – with a staggering 170,916 downloads in a single day, nearly double that of the previous year.

Meeting new challenges

This next academic year will be a particularly challenging one for Year 11s and their teachers. They're the first cohort to face new exams and a brand-new grading system across so many new GCSE subject specifications. GCSEPod's digital approach means that for the price of a typical set of traditional textbooks, subscribing schools get access to coverage of new specs across all exam boards for 20 subjects. Traditional publishers simply can't match that.

With such compelling evidence that GCSEPod meets the needs of our 'YouTube generation', is now the time for your school to make the move?

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"A VIRTUAL DUCK HELPED MAKE US BETTER TEACHERS"

Gurpal Thiara explains how a trial with AI technology has completely changed D&T teaching and learning at Seven Kings School, Ilford

Design and Technology by nature is a subject that needs a reflective approach. It requires opportunities to broaden thinking by analysing what you have done well and how to improve. It consistently evolves. We have always been interested in cutting-edge technology and new strategies that will enhance and improve the learning experience for our D&T students.

So, when we were approached about a Government-backed trial to realise the benefits of Artificial Intelligence in the classroom, we were keen to take part. The technology, FormativeAssess, is a web application that uses machine learning to provide live feedback to students, in the form of an avatar. In our case, the avatar was a duck.

It began with a meeting with tech company Digital Assess, Goldsmiths, University of London, and the academics behind the technology. We discussed the questions that the technology would ask the pupils, and how we would implement it. FormativeAssess was then set up on our existing computer hardware, and from there it was straightforward to access over the internet.

Immediate positive response

It had an immediate positive response from the students across different year groups. They are so tech-savvy that it was instinctive for them to understand and take to it immediately. The open questions it asked them as they engaged with it made them think of the brief in a broader context. By challenging their perception of what the problem was, they thought harder about the solutions.

Another observation was that it helped the students become more independent, as they realised that they held the answers themselves. The technology helped to shake up their thought processes, but the ideas actually came from them. The psychology behind the questions meant that students were focused, rather than just opting to stay in their comfort zone – they started to become more adventurous and trusted themselves to come up with the right answer.

This type of independence is so important because of the way that the current education system focuses on academia – seeming only to care about the outcome, not the journey. It stifles creativity rather than empowering it. Most "education technology" that we've seen over the years only enables to regurgitate knowledge.

Teachers need to become a beacon for the empowerment of students by taking up these tools and pushing for change.

More time to teach

Time is so precious in the classroom, but teachers need to have discussions to inspire and challenge. This is especially true at the start of an open-briefed project, where the kind of questions asked are designed to give a much broader perspective. However, it can also be just as important in the middle or end, and one of the things the avatar asked was "where are you in the project?" It then differentiated the follow-up questions based on the answers it received. From a teacher's perspective, the technology gave me more time to spend with pupils that really needed it.

We hear a lot of talk about robots replacing jobs, but this example of AI in the classroom achieves the opposite. It's a tool to help teachers scale good practice, and if used correctly will make the teacher a better practitioner. We should be embracing technology that aids us to enhance the learning process, rather than fearing it.

The overall outcome was that the AI changed the thinking of the students. Most of those taking part produced work that was more creative, explorative and experimental. The students were empowered through FormativeAssess and the focus on the process, rather than a grade at the end. Attitudes changed, and they believed that they could succeed. Breaking through that psychological barrier really opened up the learning.

In summary: 5 things our experience taught us about AI

1. It encourages independence

In a subject like design and technology, which places huge importance on continuous improvement, it's key that students are encouraged to think imaginatively and autonomously. The technology doesn't give them the answers, but helps them develop a solution themselves.

2. Creative questioning is key

The key to success lies in the open questioning the machine learning uses. My suggestion would be to make the "what stage are you at in your project?" question more focused, to challenge pupils right at the start so they can begin to think more creatively. For example, the question that asks pupils to "imagine your product was made out of custard", empowers them to think completely differently – more laterally – throughout the task.

3. There's nothing to fear

Teachers don't need to be afraid of the onset of this new technology. It cannot replace teaching, but if used properly it can be a useful resource. The students are already so technologically savvy that they can pick it up and run with it, and we should be embracing the benefits rather than avoiding it.

4. It's not complicated

This technology is easy to implement provided the school already has the IT infrastructure. At Seven Kings School, we have laptop trolleys and internet access, so it was very straightforward for the pupils to log on and access the programme online. Apart from a few minor issues at the start of turning on the machine learning, which were quickly resolved by the company, the trial ran smoothly.

5. It frees teachers to teach

Artificial intelligence can lead to a valuable increase in differentiation time for teachers. Whilst the technology gives each student a form of tutoring, helping them to generate solutions to the tasks given them, teachers can focus on the pupils that are struggling or need extra assistance face-to-face.

If this type of AI technology could be integrated into classrooms on a wider scale, I believe it would have a massive impact. Students and schools would really benefit, especially for project-based tasks. Ultimately, if it adds to the whole student learning experience, then why not?

ABOUT THE AUTHOR

Gurpal Thiara is learning leader of design technology at Seven Kings School.

Take two minutes to explore brilliant resources from Mindsets

Elevator PITCH

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The SEP Energymeter was designed to meet the needs of the science curriculum, aiding progression through the concepts of power, energy, voltage and current. This latest version also has the ability to log measurements, which can be read over USB using Mindsets' free datalogger software.

2 The Crumble Controller

The Crumble Controller is quietly revolutionising accessibility to physical computing and electronics. We have seen the Crumble used effectively at KS1 and up, in Computing, DT and performance arts. For project ideas, tutorials and more information see: www.crumble.tech

3 Smart Materials

Mindsets have built-up an extensive range of interesting Smart Materials. Our reactive materials can be used to add "smarts" to your projects, for example, make a thermally reactive cup (pictured).

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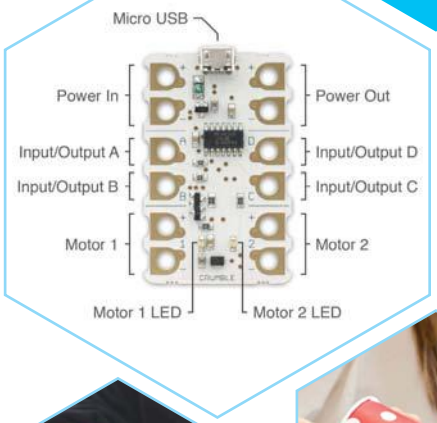
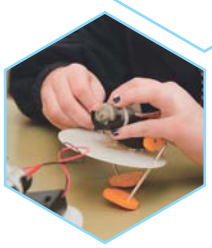
We believe that providing a hands-on experience is essential part of a good education. At Mindsets, we strive to provide kits that are exceptional value for money, enabling the maximum number of students to build and keep something that actually works!





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Q&A: METRO SECURITY

Trevor Wallace, Metro Security's MD, discusses education risk management

T&I What types of risk are typically posed to educational facilities?

TW Pupils, students and staff potentially face a wide range of personal safety threats from site intruders, for example, while the on-site facilities they use are also vulnerable to a variety of risks including criminal damage, thefts and arson. Specific localised issues must also be considered – to ensure eg that a school can be locked down in the event of an incident – and that fire and security safeguarding measures are both custom designed and appropriate to each setting.

What makes Metro Security stand out from the crowd?

Our 40-year operational track record provides education managers with experience, reliability and flexibility in designing, specifying, installing and maintaining cost-effective fire, security and other building management solutions. As a NSI Gold-certificated supplier, complying with all relevant standards, we can also monitor education sites out-of-hours from our in-house centre. As a two-time Havering Business Awards winner, we're also a runner-up in Teach Secondary magazine's Technology & Innovation Awards.

How exactly can education sites be protected?

Starting at the site boundary, layered physical protection including perimeter fencing and detector-activated lighting can be complemented by electronic security measures such as access control and visitor management systems, CCTV surveillance cameras, remote visual verification and automated number plate vehicle recognition alerts. Meanwhile, fire monitoring, detection and extinguishing systems provide additional reassuring safety back-up against flammable and smoke-related risks.

What additional benefits does new technology offer?

Advancing technological capabilities, increasing cost-effectiveness and integration potential means, for example, that IP-addressable surveillance cameras can be redeployed around a site quickly, easily and inexpensively to suit changing requirements, site configuration changes and evolving security threats. IP-enabled CCTV systems can also incorporate older, analogue cameras and other digital units, meaning equipment that remains operationally effective can continue playing a meaningful role.

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GET THEM INVOLVED

What is experiential learning – and how can it benefit your STEM classroom? **Christo Dreyer** digs deeper...

Over a hundred years ago the 'learning curve', which describes the relationship between memory and time was formulated by a man called Hermann Ebbinghaus. In short, it states that, during a lecture, assuming your information absorption rate is at 100% on day one, there will be between a 50-80% loss of learning from the second day onwards, which steadily reduces even further to a retention rate of a mere 2-3% at the end of 30 days.

This theory is even more relevant in today's world where attention spans are under constant threat from social media and our children are bombarded with more information in a week than our parents were exposed to in a year whilst they were growing up.

Our children are growing up in a vastly different world from the one we or our parents experienced. True as that may be, however, human beings have actually been learning the same way for centuries. We learn better by doing and by getting involved, than by merely listening, reading or watching.

As the ancient Chinese proverb puts it: "Tell me and I forget, teach me and I may remember, involve me and I learn".

What is experiential learning?

Experiential learning is in essence learning by doing. Wikipedia defines it as: "the process of learning through experience" and, more specifically, "learning through reflection on doing".

The general concept of learning through experience is ancient though. Around 350 BC, Aristotle wrote in the Nichomachean Ethics, "for the things we have to learn before we can do them, we learn by doing them".

The process of experiential learning involves both self-initiative and self-assessment, as well as hands-on activity. So, what are its specific benefits in the STEM classroom?

It accelerates and enhances learning

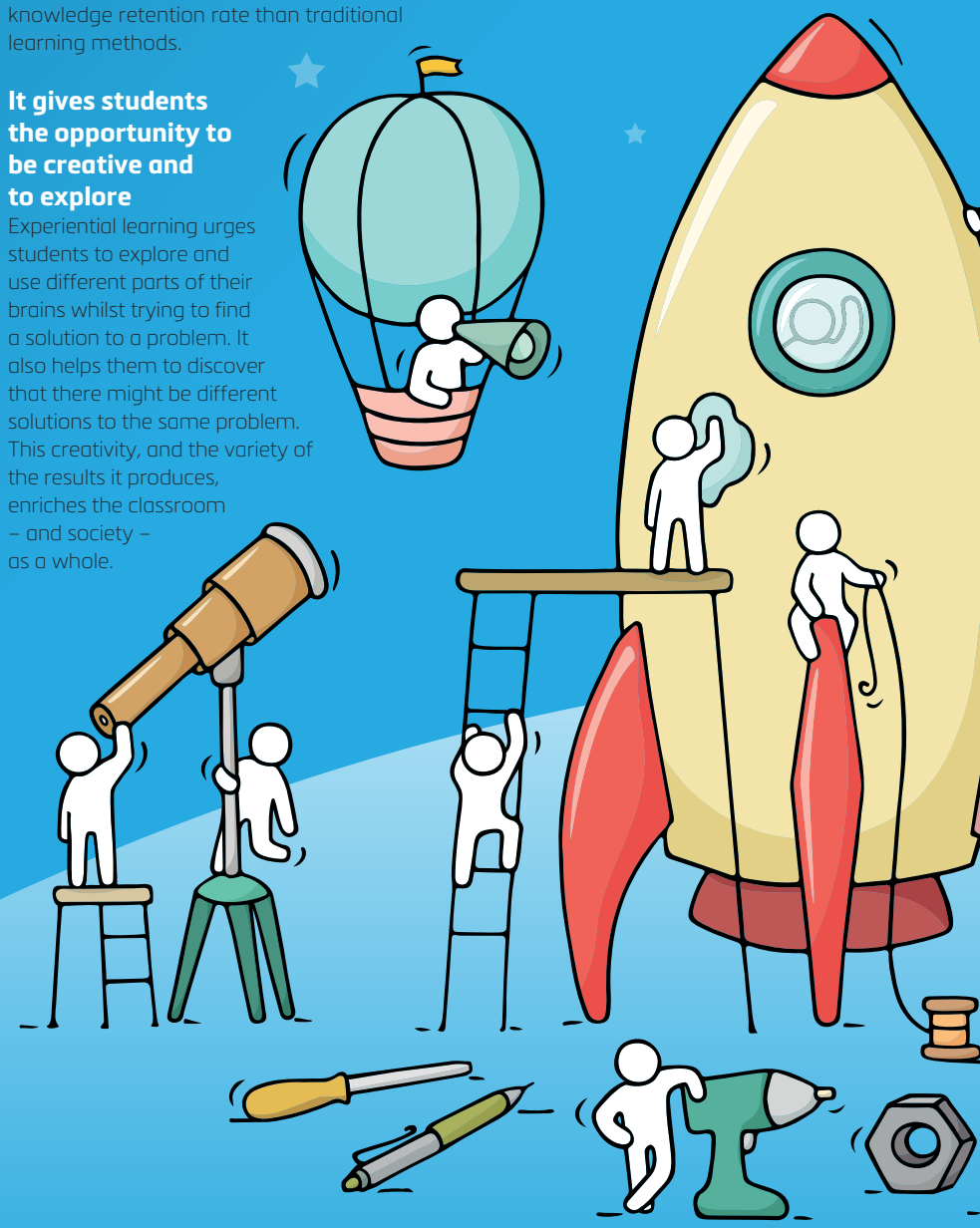
Repetitive learning or 'staring at a textbook' is rapidly being replaced by 'learning by doing'. Experiential learning uses critical thinking, problem solving and decision making to deliver information in a 'real life' way. It also has a much better knowledge retention rate than traditional learning methods.

It gives students the opportunity to be creative and to explore

Experiential learning urges students to explore and use different parts of their brains whilst trying to find a solution to a problem. It also helps them to discover that there might be different solutions to the same problem. This creativity, and the variety of the results it produces, enriches the classroom – and society – as a whole.

It stimulates curiosity and helps develop critical thinking

Children are curious by nature. Stimulating their curiosity by involving them and by encouraging them to ask questions and then allowing them to explore the different outcomes helps them to develop new and different thought processes.

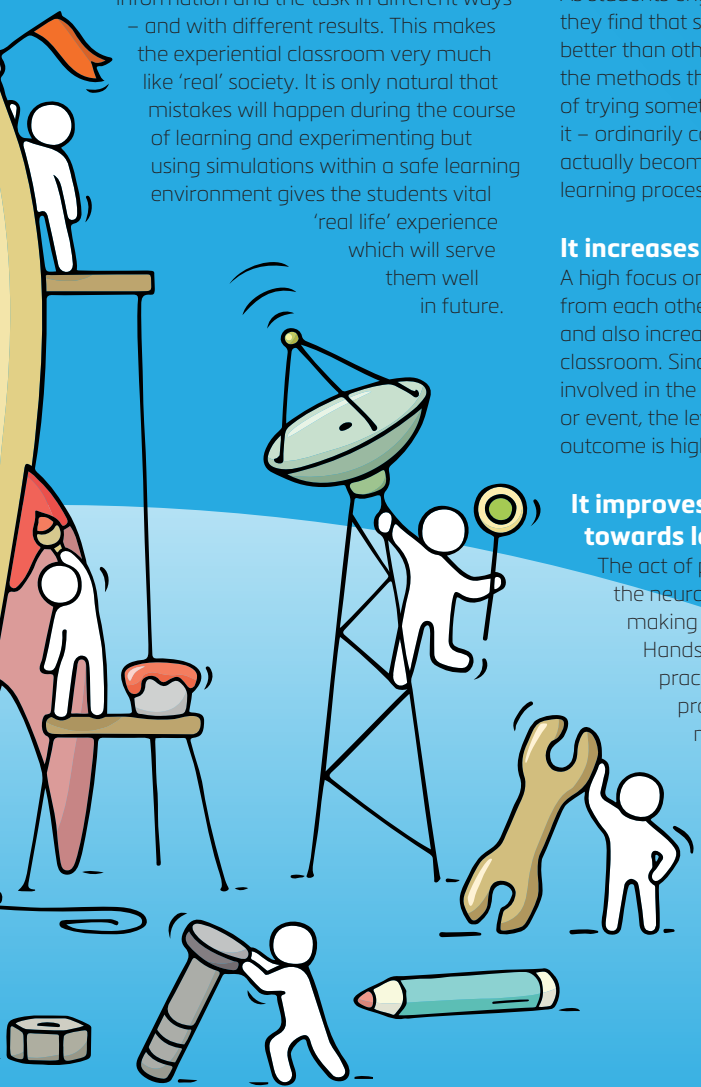


It bridges the gap between theory and practice

Moving beyond theory to the realm of 'learning by doing', gives the student first hand experience of practising what has been taught. This plays a crucial role in retaining knowledge of concepts and ideas.

It gives students a 'real world' experience within a totally safe environment

Experiential learning uses data and abstract concepts and makes them 'real' for students by applying it to hands-on tasks, with real results. Each student's learning experience will be different from the next and guided by their own unique past experiences, each will interact with the information and the task in different ways – and with different results. This makes the experiential classroom very much like 'real' society. It is only natural that mistakes will happen during the course of learning and experimenting but using simulations within a safe learning environment gives the students vital 'real life' experience which will serve them well in future.



It creates an opportunity for reflection on outcomes

Reflection is an integral part of the experiential learning process. By combining concrete experiences with abstract concepts and then reflecting on the outcome, students engage more regions of their brain and make true, personal connections with the material. They can then analyse how their actions affected the outcome and how their own outcome may have varied from other students'. This analysis helps them better understand how the concepts learned can be applied to other varied circumstances.

Mistakes become valuable learning tools

As students engage in hands-on tasks, they find that some approaches work better than others. They learn to discard the methods that don't work. The mere act of trying something and then abandoning it – ordinarily considered a 'mistake' – actually becomes a valuable part of the learning process.

It increases engagement levels

A high focus on collaboration and learning from each other benefits every student and also increases engagement in the classroom. Since the student is immediately involved in the problem solving activity or event, the level of ownership of the outcome is high.

It improves attitudes towards learning

The act of practising a skill strengthens the neural connections in our brain, making us, in effect 'smarter'. Hands-on activities require practice and therefore develop problem-solving and decision-making abilities. As student engagement increases through these processes, learning accelerates and knowledge retention rates improve. The personal nature of experiential learning engages the students' emotions as well as enhances their knowledge and skills. When students see the concrete fruits of their labour, they experience greater gratification and pride, thus enhancing their enthusiasm for continued learning.

It develops leadership skills and promotes teamwork

Most experiential learning activities have students working together in groups at times. Through these team projects, students learn how to work more effectively together, developing a plan of action and utilising the unique qualities of each team member. In turn, students also gain real-life leadership skills and learn how to apply critical thinking and adapt to changing circumstances.

It delivers an exceptional return on investment (ROI)

Experiential learning is both personal and effective in nature, influencing both feelings and emotions as well as enhancing knowledge and skills. It goes way beyond traditional textbook learning and ensures that there is a high level of retention, thereby delivering exceptional ROI over a traditional learning program. Most experiential learning projects are career orientated and through these, students discover and develop their own skills, aptitudes and passions which in turn help them to define their college and/or career paths.

In short, experiential learning works! Its benefits have been well documented over centuries. We really don't need to re-invent the wheel to revive hands-on STEM. We just need to pump it up a little bit; ultimately, if children don't learn the way we teach, then we should teach the way they learn.

ABOUT THE AUTHOR

Christo Dreyer is an entrepreneur and a director of Seebox UK LTD, which distributes Seebox in the UK, Europe and Asia

seebox UK LTD

changing the way students are taught STEM in schools.

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'Learning to be an Engineer', the latest report from the Royal Academy of Engineering, recommends that there needs to be extensive promotion of engineering habits of mind in order to improve the science capital of young people. It also observes that more resources are needed to help teachers promote playful experimentation and equip them with the technology skills they need. ***Seebox fulfil all the above criteria and more!***

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TECHNOLOGY

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A pioneering educational game console that teaches science, electricity and electronics in a fun and practical way!

AT A GLANCE

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- **Cultivates an engineering growth mindset and real life skills**
- **Comes with a whole curriculum**
- **Suitable for Year 7+, no teacher required**

REVIEW BY JOHN DABELL

'Learning to be an Engineer', the latest report from the Royal Academy of Engineering, recommends that there needs to be extensive promotion of engineering habits of mind in order to improve the science capital of young people. It also observes that more resources are needed to help teachers promote playful experimentation and equip them with the technology skills they need.

Systems thinking, adapting, problem-finding, creative problem solving, visualising, and improving can all flourish using Seebox, a professional test instrument that fully engages students with engineering and helps them see its vast and rich potential as a career.

The futuristic-looking Seebox console is very clever and contains a whole ecosystem of learning content inside and allows students to learn by doing experiments on real quality electronic hardware combined with game software. Students watch animated videos that explain concepts associated with electronics, electricity and science in a fun way and then straight away get down to business and apply what they have learned to progress through a game. The videos are deliberately short and absorbing, with a highly engaging spaceship themed storyline that builds up in complexity over the course.

The journey students take through the game involves performing actual experiments with electronics using PC boards and components to aid deep understanding. Each 'playboard' contains the curriculum material and when connected to the Seebox it is unlocked. Each student has their own ID Tag and fingerprint scanner, and the Seebox keeps a close eye on their progress. It acts as a gatekeeper because students can only progress by watching every video, answering every question and completing every experiment. Seebox records the hours spent using it, the videos watched and which concepts have been mastered. Students can use Seebox at their own pace and the immediate feedback they get enables them to learn via experimentation without pressure.

Seebox has the potential to change the way electronics, engineering and science are taught in school. A premium product at £599+VAT, but the innovation and capabilities are second to none; and with affordable rental options available, this is great value.

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"Seebox has the potential to change the way STEM subjects are taught in school"

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Q&A: INTERACTIVE TOUCHSCREENS

Genee World

Ranjit Singh, Genee World CEO, sings the praises of touchscreens for collaborative learning...

T&I How long has Genee worked with the education sector?

RS Genee World is based in Wolverhampton – and has been built on a foundation of creating and delivering interactive solutions for the education sector. Founded by former teaching professionals, in 2005, our ethos is to provide the tools for teachers to deliver exciting and informative lessons, that engage and enthuse their students. Initially focusing on the Genee Vision range of visualisers, the portfolio soon extended to include audience response systems, interactive whiteboards and more recently interactive touchscreens.

Are schools currently making the most of touchscreen technology?

We are seeing increased demand year-on-year for interactive touchscreens, so we know that schools up and down the country have identified the benefits that they can bring. We find that our interactive screens are ideal for modern classrooms as they can enhance collaboration and sharing between students and teachers, resulting in improved learning outcomes. For schools where the teachers are unfamiliar with the technology, or who want to get even more out of the screens, we offer a number of training courses that will help everyone to feel completely comfortable with the new technology.

Why are your touchscreens especially suitable for schools?

Many members of the Genee team have been teachers, or involved with education, in their earlier careers. This experience directly translates into our ability to design touchscreens and educational software that specifically answer teachers' needs in the classroom. Genee SPARK is extremely powerful and versatile software that provides a teacher with an infinite canvas area. As well as importing documents and images from local files or the internet this software will run over the top of other applications allowing you to annotate, highlight and manipulate objects. Meanwhile, Project Flow makes it faster and easier to extend instructional content of all kinds in a multi-device learning environment. Sharing content with individuals, groups, the full class, or even remote locations allows teachers to devise interactive learning activities and benefit from collaborative participation.

Can they be used with any software?

Yes. Genee's Interactive touchscreens can be used with any software, for example you could incorporate Microsoft Excel, Word or Powerpoint into your lesson. However, an even greater benefit of Genee's screens is the access they provide to the Genee App Store, where teachers can use Genee Credits to download a variety of education-specific apps. We've taken all the hard work away and teachers can trust that we will only allow apps onto our store once they have been vetted by our specialist Education team.

Tell us about the 4K screens...

All G-Touch screens provide teachers with the latest interactive technology and are designed to empower lessons. The 4K screens take presentation technology to the limit of what is possible – the crisp images bring videos and pictures to life in ways that were not previously possible. As the amount of content that is produced in 4K increases, it will become increasingly important to be using screens capable of displaying that content to maximum effect. Increasingly the future is 4K; schools will be able to future proof their classroom by selecting this technology now.

What do you offer schools by way of after-sales support?

Genee staff will be on hand to support the school before purchase, during installation and afterwards. We will run on-site pre-sale demonstrations to ensure that everyone understands the benefits that interactive touchscreens can bring to teachers and students alike. Once installed, we offer initial Get Going Training to familiarise customers with the screens, but we also offer a variety of in-depth training programmes that will provide detailed knowledge on the software. Our screens are sold complete with full warranty but we are proud to offer a technical support service that is second to none, including on-site assistance, where necessary.

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1. Great features

As well as all the stories from Teach Secondary (so you can catch up on previous issues, and share things that have inspired you with a single click), teachwire.net is crammed with contributions from writers we love – both established figures from across the education sector, and fresh, new voices. From Dr Finn Mackay's critical look at the issue of 'toxic masculinity' amongst young people (tinyurl.com/teachwiretoxic), to self-confessed geek Chis Smith's hilarious report about a recent maths revision weekend (tinyurl.com/teachwire geek), we've got your reading requirements covered.

2. Something to smile about

Education is a serious business, of course – but sometimes we all need to release the pressure, and laughter is one of the best ways of doing that. So when we find something that makes us titter, snigger or guffaw, we make sure we share it at teachwire.net – how aboutsome memes that only a teacher could understand, (tinyurl.com/teachwirememes), for starters?

3. Free resources

Our archive of downloadable lesson plans and other resources is the heart of teachwire.net – everything is absolutely free, and teachers just like you are adding new ideas to the collection all the time. You can search the content by age, Key Stage, subject or key words; whether you're after reading notes for Malorie Blackman's Noughts and Crosses (tinyurl.com/teachwirenoughts), or a new way to help students understand quadratic equations and graphs (tinyurl.com/teachwirequadratic) your colleagues have almost certainly come up with something that can help.

4. Competitions and great giveaways

There's always a range of brilliant prizes on offer at teachwire.net – and we keep it as simple as possible for you to get your hands on them, too. At the moment, we have 10 all-terrain storage trolleys (tinyurl.com/teachwiretrolleys), plus a collection of award-winning books worth £750 (tinyurl.com/teachwirebookprize) to pass on... what have you got to lose?

5. Literary inspiration

Reading for pleasure is such a crucial part of young people's education that we've dedicated a whole special section of teachwire.net to it (tinyurl.com/teachwirebooks). Featuring reviews, fiction-inspired lesson plans, author interviews and more, it's the perfect destination for bookworms of all ages, and the ideal place to find something to tempt even the most reluctant reader to take something off the shelves and give it a try.

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A touch of genius

Are you getting the most out of your touchscreen? Education adviser **Sue Cook** wants to make sure you are...

Sue Cook, a former primary, secondary and SEN school teacher is passionate about improving learning outcomes in the digital classroom. Now a product specialist for interactive touchscreen brand, Clevertouch, Sue teaches educators how to get the most out of their interactive classroom technology. From her experience of providing training in schools, she is concerned that teachers aren't getting enough support to make the most of the educational opportunities that their touchscreen brings to the classroom.

"When I was teaching, we used older style, single point interactive whiteboards and projectors, which offered little scope for classroom collaboration," she observes. "Participation from students was limited to one child at a time, which made it harder to cater for all styles of learners and I would spend many hours creating resources to engage every pupil in my class.

"The software and technology available today makes building engaging, collaborative lessons very easy, which frees up teachers' time and lets them focus on what's important."

Training and confidence

In Cook's experience, lack of training and confidence using the technology is a significant barrier. Many teachers carry on using their interactive screens as whiteboards and as a result, aren't making the most of the resource or the school's investment. Sue believes that not involving teachers in the planning and implementation of the technology from the outset and not having a provision for training is a major part of the problem.

"Many teachers return after the summer holidays to find a new interactive touchscreen in their classroom," she explains. "Yet they have no idea how to access the features, which would enable them to make the learning process more encompassing and engaging for all styles of learners. Running a class leaves very little time for teachers to experiment, so they continue to use the screen in a linear learning style, with old resources."

Learn together

Reiterating that teachers need to be encouraged to experiment and capitalise on many of the features and software that come with their touchscreen, she continues, "If time is short, don't be afraid to learn with your pupils. Interactive technology unites everyone in a classroom, increasing engagement and participation from even the most reluctant learners. It creates a dynamic learning experience with more teamwork, collaboration and positive outcomes for everyone."

To try a Clevertouch Plus free for a week visit www.clevertouch.com/free-for-a-week.

ABOUT THE AUTHOR

Sue Cook is a former teacher, who is now a product specialist for interactive touchscreen brand, Clevertouch.

SUE'S TOP 10 TIPS:

1. Many teachers fear that their pupils are more tech savvy than they are. Instead of worrying about it, get the class involved in your learning journey, make it a team effort from the start.
2. Don't be afraid to ask for help if you are unsure about something – most manufacturers offer free phone support.
3. Make full use of all the support resources available – websites, training, forums etc.
4. Start small – begin by setting yourself a target of using your screen for a few lessons a week and build up from there as your confidence grows.
5. Share your experiences with your fellow teachers. Five-minute peer-to-peer sessions are a great way of learning new techniques and product features.
6. If you feel you aren't using your screen to its full potential, contact your manufacturer or installer to book training/coaching. Most offer training that fits around the school day including twilight or INSET sessions.
7. For schools that are about to choose an interactive touchscreen, consider having one on loan for a week to let teachers and system managers try it out before making a decision.
8. Schedule an initial training session immediately after new screens have been installed to run through basic features and give staff pointers on how to incorporate them into lessons.
9. For optimum results, a second training session will give staff a chance to address specific questions and progress.

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Q&A: TOUCHSCREENS

iiyama

Steve Kilroy, UK sales manager for iiyama, describes how the right touchscreen can enhance teaching and learning in your classroom...

T&I What difference can modern touchscreens make to teaching and learning in the secondary classroom?

SK Touchscreen technology is step up from traditional IWBs as it offers greater image quality, definition, brightness and ease of use. An interactive display does away with shadows and the accurate touch response means they are simply easier to use. When combined with Windows 10 for example, or any version of Office going back ten years, you have a really easy to use presentation solution that does not require endless training. iiyama simply gives you the tools to educate and present, showing the educational sector that it does not need to invest in huge complex software packages to enhance teaching. Our end of the bargain is simple, just supply the sector with a high quality feature rich touch screen display which offers exceptional image clarity.

Why are your screens special?

iiyama originally focused on high end, durable, 24/7 hours of operation, very accurate and exceptional quality screens for the interactive signage and kiosk market. However, we were inundated with teaching staff requesting to purchase our screens. So what makes us special is using that same philosophy of high end solutions for retail customers and making them available for educators, with a few alterations to really enhance that user experience. Being a display manufacturer and known for high quality, we can command great buying power and are in the enviable position to actually deliver commercial grade high end touch screen solutions at an attractive price point. We have some nice new features as well, such as built in voting software, the ability to connect and project to the screen wirelessly through a laptop, iPad or Phone and the ability to annotate using some simply built in tools.

How robust are they? What's the expected life span?

Our screens are designed to last. The only thing that limits any LCD technology are the LED backlights, which are guaranteed to last around 50,000 hours. What that means is you will see a dip in brightness after that time. However, we only use commercial grade (as opposed to consumer/ TV grade) panels and components. We understand the importance of 'up-time' in education and want to ensure we provide the best technology possible. However, should anything go wrong we have our own engineers and teams throughout the UK and we offer a five-year onsite dismount and reinstallation warranty.

Are they an energy efficient solution?

Most screens are nowadays. The move to low power LEDs is somewhat universal. The best way to view this is to look at TCO vs an interactive whiteboard and projector. The common theme is that projector bulbs fail, dip in performance or become obsolete very quickly. Meaning educational institutions waste valuable time and money on replacements. So the best way to look at this is the total energy saved over the entire course of ownership, looking at the repeated purchases for schools and how that affects energy consumption back through the entire supply chain down to the raw materials that make up a screen.

How much importance do you place, as a company, on customer service?

Huge importance. We have a very skilled and dedicated technical team and we ensure we meet and exceed customer expectations. We want to ensure that the customer we win to iiyama now, remembers us in 10 years. How do we achieve that? Firstly, deliver a really great

product, secondly, back that up with great after sales service. I constantly monitor the support for the UK and we have a common sense approach to support, ensuring the customer first and foremost is happy and feels valued at every step of the process.

And what about ongoing support for schools that buy your products?

Offering the warranty to support screens is a critical thing here. Also, we don't do software; we teach people how to use Office and Windows properly. Often, educational software packages for interactive teaching are costly, and require huge training and resources. So think about saving time and money first.

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ATTENDANCE MATTERS...

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GROUPCALL.COM/RESOURCES

Pupil absence has a detrimental impact on attainment, progression and wellbeing.

Over the past 15 years, Groupcall has been helping schools achieve their attendance objectives - such as Flakefleet Primary that reduced unauthorised absences from 7% to 0.2%.

Our products allow teachers to take registers on any device, wherever they are, instantly communicate absences to parents and seamlessly write responses back to the MIS.

As well as giving you the tools to monitor and improve attendance, our complimentary products enable you to free up administration time and reduce costs. We helped The Warriner School save over £12,000 in their first year of implementing our software.

Together we can boost attendance.

If you're not already using Groupcall Messenger or Emerge, get in touch to find out how we could help your school:

WWW.GROUPCALL.COM/ATTENDANCE

Q&A: ATTENDANCE

Groupcall

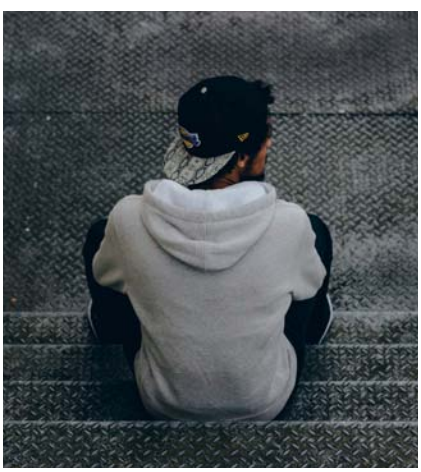
Andrew Mulholland, marketing director, considers how Groupcall's solutions can help schools improve attendance

T&I Schools are facing a number of issues at the moment. What do you think are the most prominent ones?

AM Schools are getting a hard time of late, with budget cuts, rising workloads and teacher shortages making up most of the news, but, as they will all know, there are some high priority internal issues that they face, such as that of attendance and truancy. Absences have been on a decline since 2008, but in recent years there has been an increase. These are problems on a much more personal level for the school than government cuts, but they can derail a student's education significantly if left unchecked.

How can edtech help to tackle attendance and truancy issues within schools?

Everyone working in a school is busy, and it can be hard to keep as on top of absences and lateness as is needed. Edtech is in a great position to monitor trends that would otherwise escape the notice of staff, such as absence patterns, and alert them to any possible issues. Time is of the essence with truancy, and technology responds straight away, solving problems before they become crises.



Where does Groupcall come in to all of this?

The potential for Edtech to improve attendance is tremendous. Groupcall Messenger and Emerge are purpose built to synchronise with a school's MIS, taking their data and making it readable, manageable and actionable. Messenger for one allows admin staff to send targeted messages to the parents of any child with an unauthorised absence as soon as it is recorded, also collecting responses back from parents as evidence... a complete audit trail.

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What sets Messenger and Emerge apart from other systems in this regard?

It is the ability to react so quickly that sets Groupcall apart from other products. It's been designed so it's intuitive/easy to use and processes are streamlined and simplified. Messenger integrates with all MIS products; a register gets filled in and attendance is tracked. Straight away, Messenger can send out a text, email or push notification in one of about 100 available languages to find out what is going on. These products are also usable out in the field or on the move, keeping you connected with your school's data, even when offline.

What other benefits do Groupcall products have for schools?

Messenger and Emerge offer a level of flexibility that you will struggle to find elsewhere. They work together seamlessly and can be accessed from wherever you are. Messenger is the perfect tool for schools to reach out to parents and Emerge is the best friend of teachers, allowing greater working flexibility on a computer or mobile device.

To find out more, call 020 8506 6100 | email sales@groupcall.com
www.groupcall.com

SERIOUSLY SPECIAL

From clunky gear to streamlined, sophisticated and highly desirable – has assistive technology had an image overhaul, asks **Sal McKeown**

Let's be honest, for many years special needs technology often had that 'hand me down' look, and rarely made the jump to mainstream. How times have changed. Take fidget spinners, originally designed for young people with autism, ADHD and anxiety disorders to help them concentrate better in class. Last year they were all the rage with YouTube videos demonstrating how to do tricks and fidget spinners changing hands for silly prices of £40 or more. They were so popular, in fact, that some schools banned them – and that has to be the ultimate accolade.

A right, not a lottery

We are lucky enough to live in a golden age of The Cloud, convergence and mobile first. Software and resources are no longer stored on a hard disc in a machine, in a building, accessible only between the hours of nine and five. Now they are out there in the ether, available 24/7 and increasingly designed to work and to look good on a phone screen. Sleek, private technology in the pocket has superseded the clunky, heavy devices of yesteryear.

For example, once upon a time mind mapping tools stood separate from software; now a program such as MindView 6 is a Microsoft partner and will integrate with Office. This is no longer just for people with dyslexia. It appeals to visual learners or those who prefer to work with pictures and colours to generate information and ideas for an assignment. Yes, it will offer high contrast, audio notes and predictive text but it will also generate timelines to create what some refer to as "visual action plans". There are also rumours, currently unsubstantiated, that candidates in English Language exams will have to show evidence of planning – and those who use Inspiration or MindView 6 as "their normal way of working" will be able to use it in examinations too.

Testing times

However, the pressure is on to make both GCSE and A-level exams more accessible to disabled pupils. Last year, a change in access arrangements for GCSE, A-level and vocational qualifications allowed text-to-speech and screen reader tools to be used by candidates in all exams, including those which assessed a candidate's reading abilities. Secondary schools seem to be moving away from human scribes and readers in favour of assistive technology alternatives for students who require additional access arrangements in exams.

It seems that a growing number of students, and not necessarily just those with specific needs,

"Sleek, private technology in the pocket has superseded the clunky, heavy devices of yesteryear"

are able to use word processors in their exams now if that is their usual way of working. As a result, many SENCos in secondary are looking around for tools, such as DocsPlus, or Texthelp's Read&Write, which combine that day-to-day writing support with 'exam-friendly' options for those who qualify for extra help.

Several organisations are working to ensure that PDF-based exam papers are compatible with assistive technology. Standards and guidelines on the production of PDF for use in exams are currently being drafted. BATA is planning an event to raise awareness of the standards.

Mainstream solutions

But this is a theoretical perspective. What does assistive technology look like on the ground? Molly Watts has Usher Syndrome, the most common form of congenital deaf blindness. She talks about the changes she has seen in technology: "I know back in school they tried to give me all the clunky gear. I felt, as a 12 year old, I wanted to be like my friend; it was confidence crushing."

Studying for her A levels she found that her iPhone, iPad and Macbook served her well and these days she is a great ambassador for the Apple Watch. "They have all the built-in preferences, you have zoom, voice over, display accommodation, speech to text. There is also the App Store – yes some are paid, but they are fully accessible to someone like me, which is great. This is more inclusive, this is mainstream technology that I am using that lets me run my business and my charity, the Molly Watt Trust."

The virtual advantage

Where next for assistive technology? Virtual reality (VR) and wearables I suspect. VR has been around in some schools since the 1990s. Students use glasses or a headset to explore and interact with a 3D, computer-simulated environment; experiencing what would normally be difficult or impossible for them to experience in real life.

Special schools have helped young people with major physical disabilities experience the joy of skiing without leaving the classroom or visiting sites such as Stonehenge without the boring or uncomfortable coach travel. These days I get press releases about VR is making its way into science classes but students with disabilities are one step ahead: at St.Vincent's Specialist School for Sensory Impairment students have started to create their own VR apps.

One to watch?

OrCam (www.orcam.com) is very futuristic. Its product MyEye describes itself as the world's most advanced wearable artificial vision device. It converts visual information into spoken words and lets people with little usable sight be independent. Look at someone and the clever camera will search its facial recognition database and tell you who it is. Use it in a supermarket and it can identify whether you are handing over your debit card or a loyalty card to the cashier.

The camera will sit on the arm of a pair of glasses and via headphones or ear buds will read any text, from any surface: books, handouts, smartphones, computer, posters, labels. It's a lot easier and more discrete than a CCTV, an assistive technology of yesteryear. It's amazing; it is also finding its way into selected classrooms and is one to watch out for this year.

ABOUT THE AUTHOR

Sal McKeown is a freelance special needs journalist and author of Brilliant Ideas for Using ICT in the Inclusive Classroom (Routledge) and a book for parents, How to help your Dyslexic and Dyspraxic Child (Crimson Publishing).

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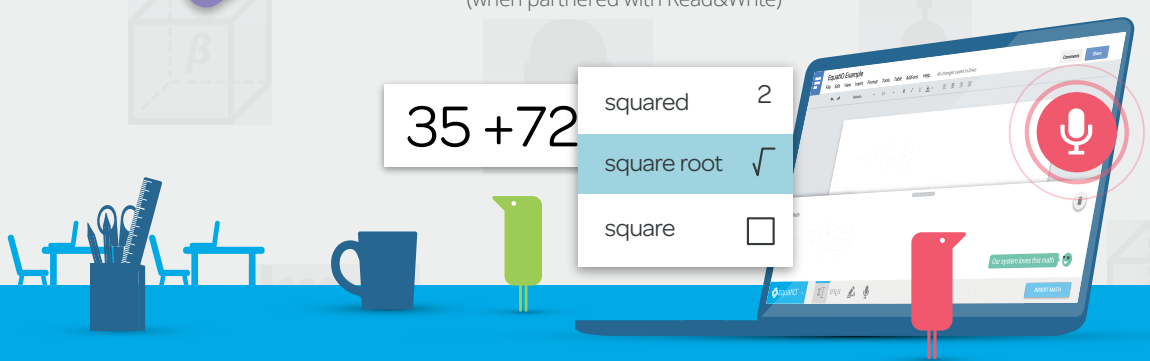

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MATHS

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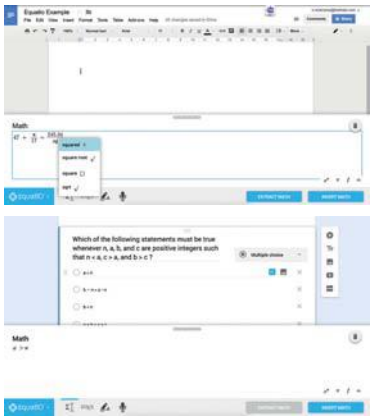

AT A GLANCE

- **Write digital equations and maths expressions in an instant**
- **Uses powerful predictive technology to guess what you are writing, saying or typing**
- **Hear maths expressions read out loud**
- **Create digital maths quizzes**

REVIEW BY JOHN DABELL

I've always found it tricky writing a maths expression or equation on a computer or tablet. How do you add the square root sign? I can never remember if I'm supposed to press 'Alt' and type in three numbers, or tap 'Option' and a symmetrical consonant; or should I just 'Esc'? And of course, students encounter the same problems. Despite the fact that many can hack into the FBI or NHS with ease, they still struggle to produce advanced fractions, powers and other mathematical symbols on their screen of choice. It's a frustrating experience, wastes lots of precious time, and despite our edtech-soaked classrooms, we end up reaching for paper and pencil. I want something to flip the maths paradigm without having to learn absurdly complex code and think like a programmer.

This is why I have fallen absolutely head over heels in love with EquatIO, a ridiculously clever tool that enables users to create maths equations and formulae by typing, handwriting or dictating just about any maths expression directly onto a keyboard or touchscreen. Forget worksheets and whiteboards, teaching maths with technology has taken a giant leap forward.

The power and potential of EquatIO is enough to make you salivate. A student can enter basic or complex equations using their keyboard or voice, or make a handwritten entry on a touchscreen. Amazingly, the software then converts the maths inputted into tidy, vibrant and precise on-screen formulae by utilising a built-in library of ready-made formulae, equations and other math expressions. It works in a similar way to predictive texting; EquatIO can guess what you're trying to say, ignore your 'umms' and 'errs', correct mistakes, and even clean up after you. This is hugely exciting because it results in genuinely supportive technology that enables students to read and write maths with confidence and independence.

This is a resource that can remodel, reinvent and revolutionise the ways we do maths by enabling students and teachers fully to utilise technology for powering learning. Inserting, editing and interacting with digital maths has suddenly become super simple and, unbelievably... fun!

EquatIO has obvious uses within chemistry too, and because it is compatible with Google Docs and Forms, it is the perfect soulmate for Google Ed-centric learning environments. It will work on Windows, Mac and Chromebook, too.

From a cost perspective, a single subscription is £80 per year, but whole school subscriptions start from as little as £450 per year (dependent on school size); making EquatIO an affordable wayto Control, Alt and Succeed.

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- ✔ **Intuitive, effortless and intelligent**
- ✔ **Takes the pain out of writing digital maths**
- ✔ **Time-saving and life-saving**
- ✔ **Inclusive and empowering, meeting the needs of all students**

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Protect and empower

In a world where young people and their phones are rarely parted, teaching online safety has never been so important – or nuanced – says **Matt Lovegrove**

There has never been such a clear need for quality online safety provision in secondary schools. Young people are profoundly attached to their mobile devices, and use myriad apps to communicate and share. We will all have opinions on age restrictions, online presence pressures and even whether all of this does anyone any good in the long term. But we must accept that young people's social media usage is deeply embedded, and their reliance on it will only grow.

Questions remain, though. Questions like: "What happens when they don't use this technology properly? When they communicate with people who want to do them harm or when they openly post things that could damage their future opportunities?" This is where online safety comes to play. Schools need to address these questions head-on to properly support their pupils – enabling them to become safer and more responsible technology users, and to equip them with essential digital skills.

What to look out for

Online safety is multifaceted and generally includes the following areas:

- Having a digital presence – digital footprints, the need for a positive online image
- Preventing cyberbullying – defined as the repeated sending of hurtful, threatening, teasing or taunting messages
- Communication with strangers – potential grooming
- Preventing sexting – now often referred to as 'youth produced sexual imagery'
- Searching – the ease of access to inappropriate, illegal, harmful, unreliable or fake material
- Commercialism – hidden costs, targeted advertising
- Maintaining privacy online

Directly taking these issues on is more effective than beating around the bush. Pupils appreciate honest, open and empathetic advice and guidance. It's imperative this is linked to the apps and websites that they use daily. Start with the pupils and their needs by asking them what apps they use - and how they use them. Ask them what they'd like support with, what questions they have, what worries them about what they see and do and how they deal with inappropriate material.

Raise your subject knowledge

You may feel out of your depth after this. Young people adopt new technologies quickly and may be using services you're unfamiliar with. To combat this, use the NSPCC's Net Aware guides to quickly learn about how the apps and websites pupils are using work and about the risks associated with these. Thinkuknow also publishes useful guides, particularly if you need to learn about risks pupils face while using various services. You could even ask a focus group of children to bring in their devices and talk you through the latest apps – they will enjoy doing this.

Don't scaremonger

Avoid scaring pupils. There are enough things for young people to worry about in modern life without them being scared of using the services they enjoy. Instead, focus your time and energy on helping them use technologies positively and in ways that benefit them. I always talk about the benefits of using technology before moving onto discussing risks.

Tell stories

Relate whatever you do to real life. Tell them stories about when you fell for a news article which wasn't true, received an email from someone looking to extort money or when you were tricked by an offer or promotion that wasn't as it seemed. Pupils appreciate and are interested in things that they can relate to, and they'll engage well with you when you share your experiences.

Map it out

Whenever I work with secondary pupils, I always start by asking them to map out their online lives. Creating spider diagrams allows them to reflect on which services they use and what information about themselves these services hold. I ask them to consider where their photos are stored, who could have access to them and whether they're happy with this. I talk to them about the importance of maintaining some form of digital privacy and the need to be careful about what they say.

I ask them: "If I were to search for you online, would you be proud of what I'd find?" With older pupils I go on to talk about employment and how negative posts could affect their opportunities.

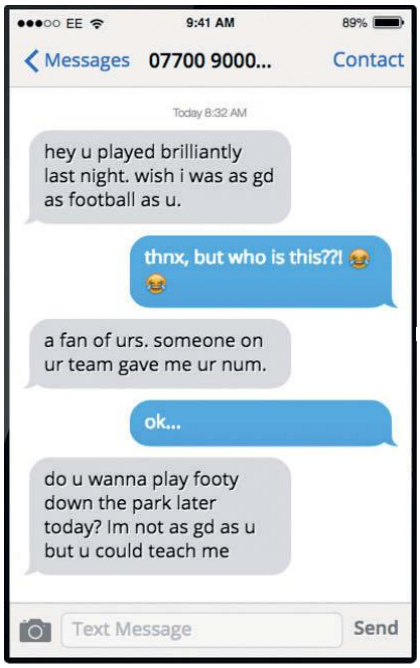
Positive communication

It's important pupils understand they are responsible for what they publish online, and what they say. I sometimes use a service like www.ios7text.com (see image, right) to create fictional screenshots of conversations and give them time to think about how they would reply if the messages were being sent to them.

I use activities like this to start discussions about potential grooming and cyberbullying. Asking them about how they know who to trust and how to respond to threats opens up interesting conversations around dealing with situations pupils may face now or in the future.

Sexting

Dealing with sexting isn't easy, but it's an important issue that needs careful consideration. The UK Council for Child Internet Safety recently issued excellent guidance on dealing with sexting issues when they occur (www.tinyurl.com/ukccissexting), but it's important for prevention education to be in place to help minimise issues. Films like CEOP's (Child Exploitation and Online Protection) 'Exposed' provide good hooks for conversations and help young people understand how quickly things can go wrong. Talking about positive relationships, safe sex, consent and pornography can also help prevent sexting as pupils will develop a better understanding of healthy relationships and of what is appropriate.



Searching

Pupils need to understand what is real and what is not – something that's becoming increasingly difficult in an age of 'fake news'. Teaching young people to use a variety of different sources to verify facts is useful, as is having discussions about how what they see may not be real. Pupils need to understand that images can be changed and facts distorted for various reasons, and that what they see online does not always represent reality. Pupils enjoy looking through fake news articles and before/after images of models to help them understand how things are sometimes distorted.

Meeting the need

The South West Grid for Learning's 'Digital Literacy' plans cover all – and more – of the above areas and are free to use. And, again, The Thinkuknow site also contains free teachers' resources and lesson plans.

BioStore

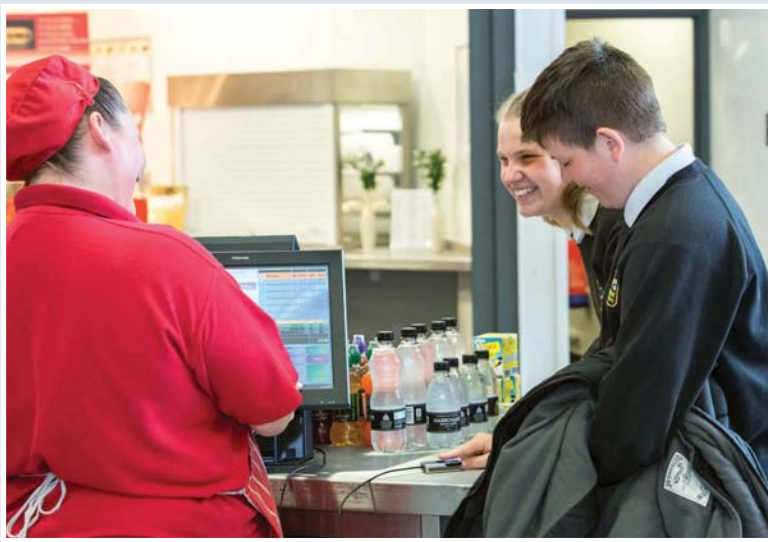
FasTrak

Cashless Catering and Attendance System

Cost effective solutions to improve security, reduce administration and unify multiple student services

BioStore offers a range of solutions for primary & secondary schools, colleges and universities supported by a secure central ID management solution.

Multiple services such as cashless catering, library management, access control, locker management and even the student union, can all be managed by a single authentication method using a fingerprint biometric or smart card.



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Q&A: BIOMETRIC TECHNOLOGY

BioStore

Nigel Walker, managing director of BioStore, explains the benefits for schools of investing in biometric technology...

T&I What are the benefits of using biometric technology for identity management?

NW Biometric technology provides fast and secure identity management, that makes solutions around a campus incredibly simple to use. Fingerprint scanning is a high-security solution that ensures accurate authentication within a second, and helps eradicate fraud from the system. For the administration team, time and money is saved. There's no password management needed, and there is no need to spend money printing off new smartcards. From a student's perspective, biometrics are as convenient as it gets. All a student ever needs is their fingerprint to access all the services they need.

Why is this particularly important for schools?

A biometric fingerprint is a powerful solution in education for the simple reason students and staff quite literally always have it to hand. There's nothing we can do to stop students forgetting or losing their homework – but we can ensure the authentication they need daily to access all the services a school provides is never lost, stolen or forgotten. There is no down-time

when a student can't access essential services while waiting for a replacement card or password. Biometrics remove the cost and hassle that can be caused by other authentication methods, and ensure that students always use their own authentication, and not someone else's.

What aspects of the school day can be made easier with BioStore?

One of the major advantages of a biometric system is the positive effect it can have on catering. Biometric cashless catering's speed and accuracy can help greatly reduce queues and encourage more students to get a healthy daily lunch. Many other solutions can be integrated into a biometric identity solution as well, which can help deliver an extremely unified and simple experience for students and staff. Attendance, cashless catering, computer log-in, printing, vending machines, visitor management and library services can all be integrated.

How confident can schools, students and families be regarding the security of biometric data?

Security is essential in a biometric system. BioStore uses AES256 encryption at all times for the data in the system, which is internationally recognised as extremely secure. If the data fell into the wrong hands, they would not be able to read it. But more importantly, the data BioStore collects for its system is completely useless outside of the school's system. An image of a person's fingerprint is not saved by the system at any point. BioStore instead creates a template based off 40 to 60 minutia points on a finger. The rest of the image is discarded.

How easy is the transition for schools who decide to use BioStore for all its systems?

If schools already use a BioStore system for biometrics or card identification, expanding the system to include more applications is very simple. The same identity management information is used on the new licence and software, which can be set up by us or a partner. Setting up a biometric system for the first time, such as cashless catering, requires registration of all staff and students, and is typically achieved in one day (for schools under 1000 students). Our wealth of experience ensures seamless integration with existing school systems, leaving schools with the ability to add and integrate more solutions as required.

To find out more visit biostore.co.uk

NEW CONNECTIONS

In a world where we live our lives through our phones, smart schools are tapping into technology as a way of engaging with parents, as **Kelly Clark** has been finding out...

Walking into a school office or picking up the phone to pose a query to a teacher can be daunting for parents. That age-old feeling of being in trouble when you're sat waiting to speak with the head never seems to go away for some. So, what if they could simply stay within their comfort zone and have a relaxed chat over social media... with a goat? That's the direction Varndean School, a secondary in Brighton, has taken, setting up a Twitter account for its five pygmy goats. "I thought it would be fun," says Hilary Goldsmith, director of finance and operations. "It also shows students that social media is not just all about getting followers and Likes, or all about personality contests. It's a really fun way of interacting with our community." The goats arrived in September as a pastoral support, nurturing good behaviour and teaching children how to take care of animals.

Now, the animals are given a voice over Twitter, where interaction is mainly with parents. "We all know that conversation children often have when they get home, telling their parents they haven't done anything all day. This way, parents can log into Twitter and see photos of their children interacting with the goats; that's not something they would normally see as it wouldn't make it onto our website or newsletter. They are also the children who would not generally be the headliners; they're the quieter students, but this is a way of demonstrating what they are achieving."

Recently launched is the hashtag #AskAlan where the school community can pose questions to Professor Alan T Goat – another light-hearted link back to the school. As well as encouraging conversation, the goats have inspired parents to get involved in raising money, which also creates a new link with the school which may not have otherwise been there. "It's certainly a fun way to engage with parents," observes Hilary. "It's about having a light-hearted interaction with them rather than the only communication they have from school being pleas for money or requests for help. It's a constant stream which shows them we are accessible."

What parents want

Social media is so important to Honywood School, in Essex, a full-time marketing and brand manager has been employed. Carol-Anne Frogley says: "We want to make sure we engage with parents fully and that they are involved as much as possible with the development of their children. We are really pushing social media as a promotional tool for the school."

Platforms such as Twitter and Facebook are being used to showcase what the school and its students are getting up to, as well as a way of communicating information to parents in a format that suits them.

"What has been really successful is our coverage on social media of residential trips," explains Carol-Anne. "We are able to post photos each day and our parents have really valued that opportunity to almost experience the trips alongside their children. It means parents can feel that little bit more engaged with what is going on. With Facebook, in particular, we are directing the content at our families. It's a window into the school day and enables them to see what goes on."

For the first time, the school has cancelled its traditional press advertising for open evening and is instead devoting a fraction of that budget to social media sponsored posts. "After surveying parents, we were not convinced that enough would be picking up a local newspaper to warrant that spend. Instead, we are targeting the exact demographic we want to reach via Facebook advertising. That's not a decision we have taken lightly, but it's about acknowledging the world is moving forwards and giving people information on the platforms they want it."

The school is also investing in a new website and has set up a YouTube channel to showcase learning in action to parents.

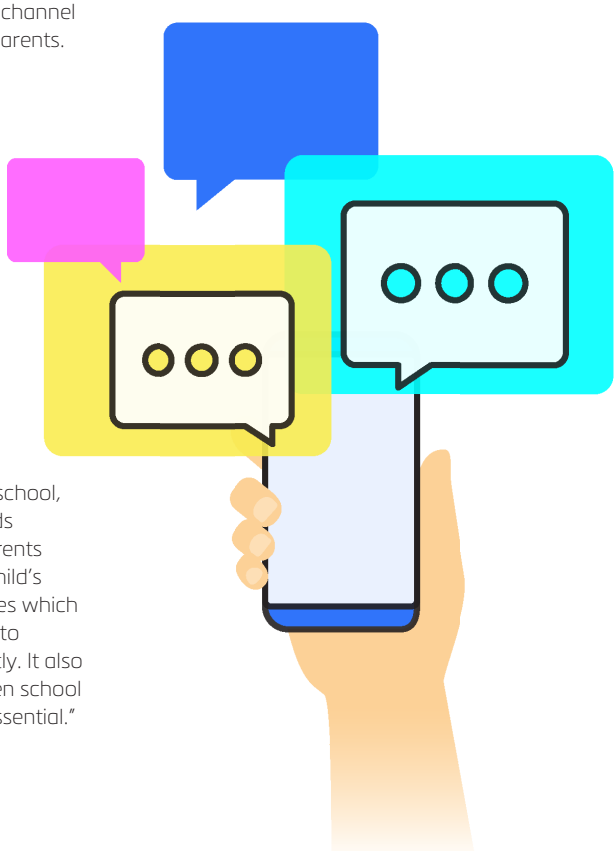
Moving forward with apps

Boswells School, in Essex, is among those looking to create their very own apps in future. Parents are already using the established, worldwide Show My Homework app, where they can log in to see what homework their child is set and their deadlines so they can provide appropriate support at home. But, ideas are being developed to move things further forward. Cheryl Noble, assistant headteacher, says: "As a school, we are increasingly moving towards electronic communication with parents to keep them up to date on their child's progress. The fantastic opportunities which smart technology brings allows us to communicate rapidly and frequently. It also reduces costs which, at a time when school funding is high on the agenda, is essential."

While the apps are already in place to communicate a weekly headteacher's bulletin as well as details of school events, timetables and achievement points, the school is keeping abreast of other opportunities to increase the ease of access to information so it is live and readily available.

Leon Brown, a maths tutor in Liverpool, has developed an app his parents and partner schools can use to offer appropriate support to students between lessons. "It's a great way of getting them involved in reinforcing the concepts I've taught. For example, one of my parents was able to explain percentages and ratios in relation to what they were buying on a shopping trip. Maths becomes a lot easier to understand when they are able to relate its concept to the real world. Parents are useful for doing the job of getting children to do this work."

The app alerts the teacher to a child missing completion of exercises or specific difficulties they are having with a topic. The technology also produces visual reports on performance and can set tasks for parents and children to complete together socially. "There are now more opportunities than ever for getting families to become more involved in their student's learning. Learning shouldn't be restricted to the classroom; reinforcement of learning should be encouraged through application to the real world as much as possible."



LOST: *female talent*

If we want more women scientists, we need to start identifying potential at a much younger age, argues Sarah Haythornthwaite

When I was studying engineering at university I was one of seven women in a class of 120. In the intervening years, as women have entered the professions, business and politics in ever increasing numbers, it would have been reasonable to expect engineering to undergo a similar transformation. But it hasn't.

Barely 16% of engineering and technology undergraduates were women last year. Only 9% of the engineering workforce in the UK is female, the lowest proportion in Europe. The picture is equally bleak in the rest of the sciences outside medicine. Women only make up 14% of the workforce in science, technology, engineering and maths (STEM), and only 11.5% of management.

It's not all cultural

The problem doesn't lie in the number of girls taking STEM subjects at GCSE – as many girls as boys study maths and the sciences, and on average they achieve slightly higher grades. Yet when it comes to A-levels, significantly fewer girls than boys choose to study maths, further maths and physics in particular. Only 20% of students studying A-level physics are girls, a proportion that hasn't changed in 20 years.

No one seriously thinks that aptitude is the issue. The problem, we are told, is cultural. Various studies claim that girls lack confidence, or role models post-16, or they think that science is 'uncool' and 'nerdy' and not sufficiently about people, which also conveniently explains why they find medicine attractive.

Any measures that address this cultural imbalance are worthwhile. But are we looking at the problem in the right way? Would it make more sense to focus less on cultural factors post-16 and more on the way we identify and develop scientific ability pre-16? Perhaps the best way of tackling a gender deficit at the end of school is to accept how much better we could be at recognising scientific potential in both sexes at an earlier age. If scientific ability were identified sooner, might more students, and many more girls, opt for a STEM career later in life?

The verbal bias

Our education system is heavily biased towards verbal skills. The curriculum and testing regimes place a premium on the ability to grasp word and number

FIVE SUCCESSFUL PEOPLE WITH HIGH SPATIAL ABILITY:

- **Elon Musk**, CEO of Space-X and Tesla
- **James Dyson**, inventor and engineer
- **James Watson** and **Francis Crick**, discovers of the structures of DNA
- **Luiz Alvarez**, Nobel prize-winner in physics
- **William Shockley**, Nobel prize-winner in physics

sequences, on oracy and literacy. It is not very good at identifying and developing spatial learners, who tend to think initially in images before converting them into words. Differences in spatial ability by gender are insignificant and in any case tell us nothing about individual performance.

There is, however, significant correlation between high spatial skills and scientific and engineering ability, according to Project Talent, a 50-year US study of over 400,000 students. Children who are both highly gifted in spatial and verbal reasoning abilities tend to do well across the board. But our analysis of GCSE scores in the UK, suggests that those who have high spatial reasoning but poor verbal reasoning scores markedly underperform*.

What is particularly striking is that the gap in exam performance is not confined to English or the humanities. There is also a significant, if less pronounced, divergence in maths and science. In last year's maths GCSE, for instance, 89% of children with good spatial and verbal abilities achieved an A*-B. Conversely, only 52% of those with high spatial intelligence but poor verbal reasoning skills achieved the same, a 37 percentage-point difference. In physics GCSE, 86% of children with good spatial and verbal abilities achieved an A*-B compared with 58% of their verbally challenged peers. In chemistry and biology the gaps in performance are similar.

Wasted potential

This represents a huge waste of potential. Almost 4 per cent of students in the UK can be classified as having high spatial but poor verbal reasoning abilities – approximately 400,000 children across primary and secondary schools. There is no intrinsic reason why these children shouldn't perform well if their spatial ability is accurately identified and their verbal challenges addressed. There are assessments of cognitive abilities that will help and there are strategies schools can employ.

Teachers should understand the techniques that will support the spatial learner, for instance, such as using models and diagrams, allowing children to move and gesture, and talking through real life scenarios and practical examples.

We also need to accept that not all children will do a task in the same way or that there is only one 'correct' approach. Most teachers mirror our education system – they tend to be verbally biased. But they shouldn't assume that the way they think, and what they find easy or difficult, will be echoed by children. An inarticulate, low-achieving child may complete intellectual spatial tasks that teachers find difficult with great ease.

It shouldn't be luck

It's also not a bad idea to show children how different types of learning strengths can lead to success in certain subjects and careers. If students, particularly girls, were constantly reminded that good spatial thinking could lead to a bright future in science and engineering, wouldn't they be more inclined to persevere with STEM subjects?

I was lucky. I had a decent balance of spatial and verbal reasoning skills and went on to a career in engineering at British Aerospace. But how many women of my generation weren't so lucky because poor verbal skills hid their innate talent? More importantly, how many are we continuing to miss today?

The annual shortfall of STEM skills in the UK workforce is, according to the Campaign for Science and Engineering, 40,000. If we could unlock spatial learners' scientific potential at an earlier age and engage their incredible talent, perhaps we would have more success persuading girls to stick with science beyond 16. And if we could do that, imagine how much smaller that figure could be.

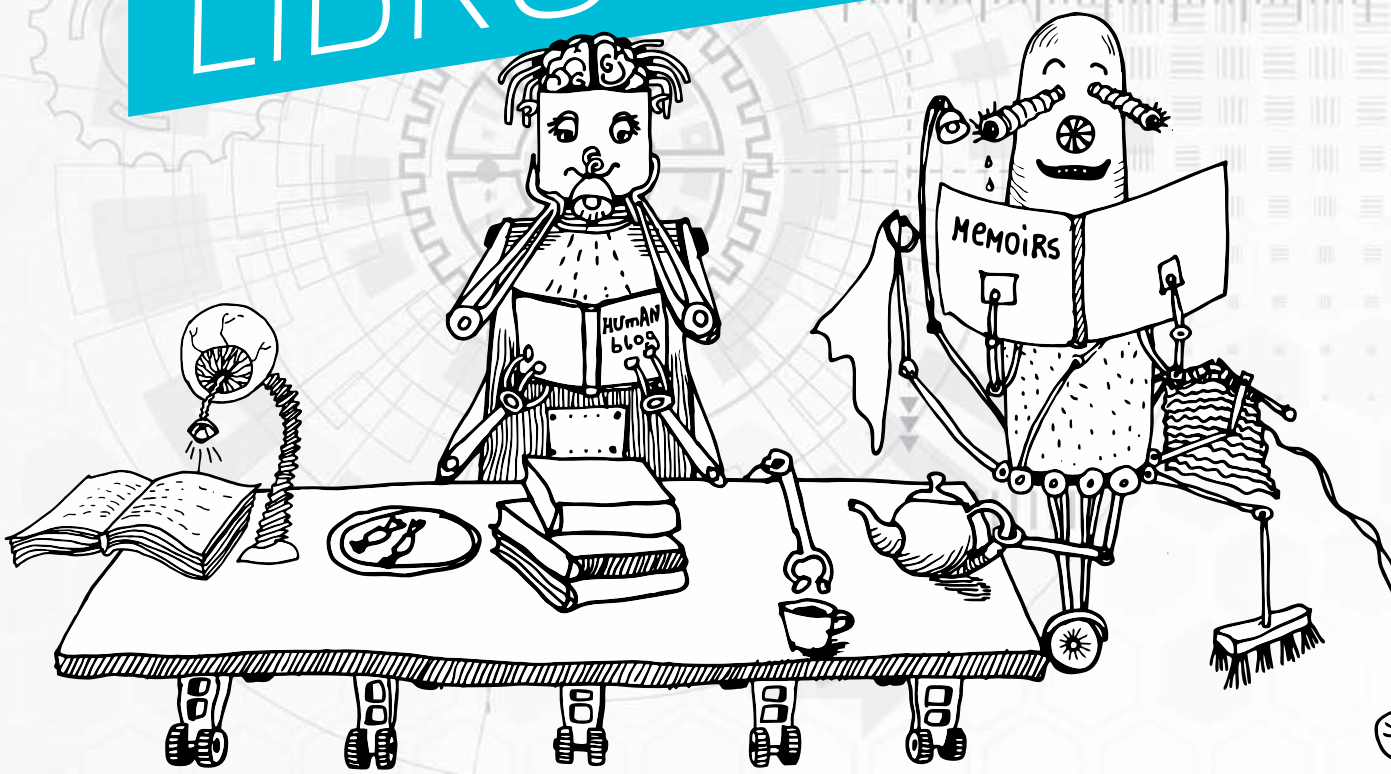
GL Assessment's 'Hidden talents: the overlooked children whose poor verbal skills mask potential' is available to download at www.gl-assessment.co.uk/hiddentalents

*The analysis was based on modelling a pool of more than 20,000 secondary school students who completed the Cognitive Abilities Test CAT4 in Years 7 to 9 and GCSEs in 2016.

ABOUT THE AUTHOR

Sarah Haythornthwaite was a lecturer in engineering at the University of the West of England. She is now director at GL Assessment.

THE RISE OF THE LIBRO-BOTS



Welcome to the new age of school libraries – where technology is adding a new element of excitement to the shelves...

The role of school librarian used to come with a heavy admin load; and the humble card index was king. Not anymore, though – because these days we have the all-singing, all-dancing digital library management system. (It catalogues stock! It tracks reading activity! It lets you curate useful online resources!)

"Digital library management systems host – and regularly update – the catalogue of materials available to your school," says Barbara Band, School Library Consultant and past President of CILIP, the Chartered Institute of Library and Information Professionals. Students can access the system remotely, find where resources are located and browse those resources. Freely available online material can also be added to the library (by librarians or teachers) instantly extending stock, without a price-tag.

Savings and statistics

"The systems save storage and space," says Paul Clough, Professor of Information Retrieval at the University of Sheffield. "You're not restricted by the need for physical access to a particular text, image or video."

"Digital library management systems might also produce useful statistics," adds Barbara. "The 10 most frequently lent titles, or which students have never borrowed a book. These numbers can help to highlight library usage, students' interests and possible reluctant readers."

All this functionality frees up time for librarians to devote to skilled tasks like evaluating books and encouraging students' reading and research skills. And that can make for a buzzier, more effective library.

WE ASKED FOUR BIG PROVIDERS... *WHAT MAKES YOU UNIQUE?*

MICRO LIBRARIAN SYSTEMS (microlib.co.uk)
"As well as providing the full suite of library functions, we want to encourage reading for pleasure," says Andrew O'Brien, Managing Director of Micro Librarian Systems. "Our latest product, Reading Cloud, provides a safe social networking area where students can discuss, rate and recommend books, blog and vlog, and get recommendations of other books they might enjoy, based upon the authors they like. The interface and functionality changes to suit different age groups – from primary up to FE."

HERITAGE (isoxford.com)
"Heritage is our only product, so we're very targeted and give all our time to it!" says Sales Manager Emma Duffield. "It's a professional tool, designed to support qualified librarians. Any school that buys our system benefits from free regular upgrades to our latest version. We're used in 50% of FE colleges, so it's great for students when their school uses the system – as they move into further education they already know how to access the library's resources."

ACCESSIT (accessitlibrary.com)
Ken Wickstone, UK IT Manager says, "We don't charge an initial software cost, we charge schools an annual licence based on number of pupils. We don't charge anything for extras or upgrades: it's all included. One function we're very proud of is One Search, a search tool that simultaneously searches a library's own resources and trusted external educational resources, like TED talks or Google Scholar. It ensures students have the best chance of finding high quality material with every search."

SOFTLINK (softlinkint.com)
"Our library management software for schools has been designed with students, for students," says Melissa Morrison, Library Consultant. "It's reliable, compatible and offers a fully customisable, modern search interface, including a new 'drag and drop' facility. This allows students using a touchscreen to drag items into their basket (in line with a site like Netflix). The system is easy for both students and staff to use – one popular feature looks at students' personal borrowing history and makes suggestions of other books they might enjoy."

For a full list of questions to consider when choosing a digital library management system, visit **tinyurl.com/digitallibrarysystem**

Making the selection

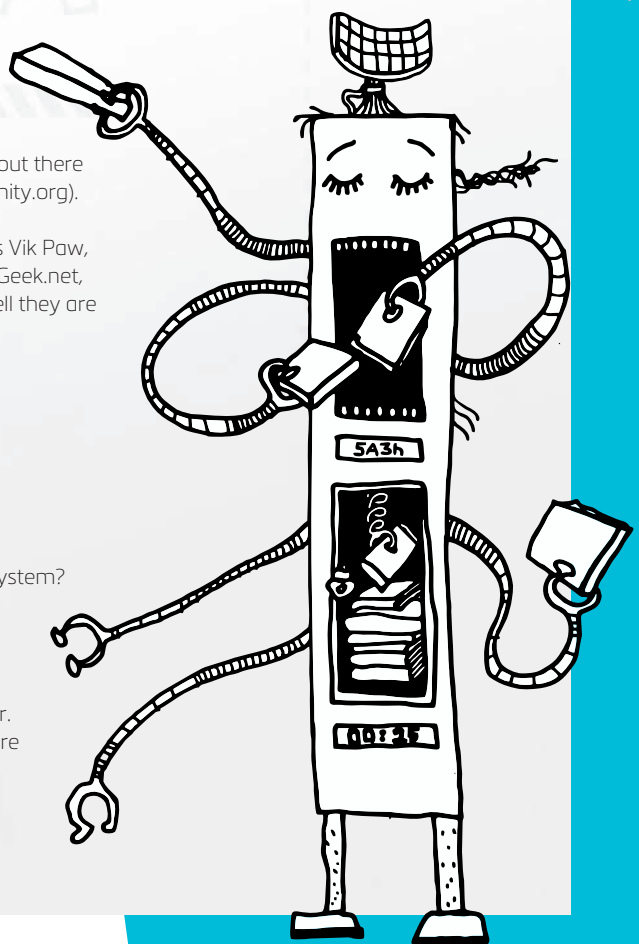
But how do schools choose which system to use? There are several providers out there (including the free, open-source system Koha Library Software (koha-community.org). Provision and costs vary.

"The majority of the mainstream solutions will have the basic features," says Vik Paw, Information Systems Specialist at Intuitive Education and a moderator on EduGeek.net, the support community for IT professionals working in education. "But how well they are implemented may differ. They'll also have different features and add-ons."

Before you buy, request a demo. Questions to ask include:

+ What's the cost, and are there charges for upgrades?
+ What level of technical support can you expect?
+ What compatibility does the system have with other online platforms?
+ Does the system synchronise with your current Management Information System?
+ What reports are available and how easy is it to generate your own?
+ What extras are offered?

Whichever system you choose, Barbara recommends evaluating it once a year. "Look at the resources and functionalities you're paying for and how well they're being used. If they're not being used, don't renew them."



PERFECT MATCHES

An innovative approach to careers guidance could ensure young people gain exactly the skills that future employers will demand, suggests **Laura Bush**

For years employers have voiced concerns that school leavers and graduates are arriving without the literacy and numeracy skills needed for the job they are hoping to do.

We are facing the reality that if our education system is to fully prepare our school children for their chosen career or further education, the skills they acquire should match those demanded by the careers waiting to be filled; if skills are not matched to their career aspirations, young people are at risk of failing.

The question is, 'how do we identify the skills demanded in our changing economy?' Partnerships with industry representatives can be used to identify the technical skills required for each industry and to help set qualifications. However, new hires, while equipped to operate specified software, may not be able to comprehend the necessary technical documents. Similarly, some students may not be able adequately to read the study material required for their chosen university degree.

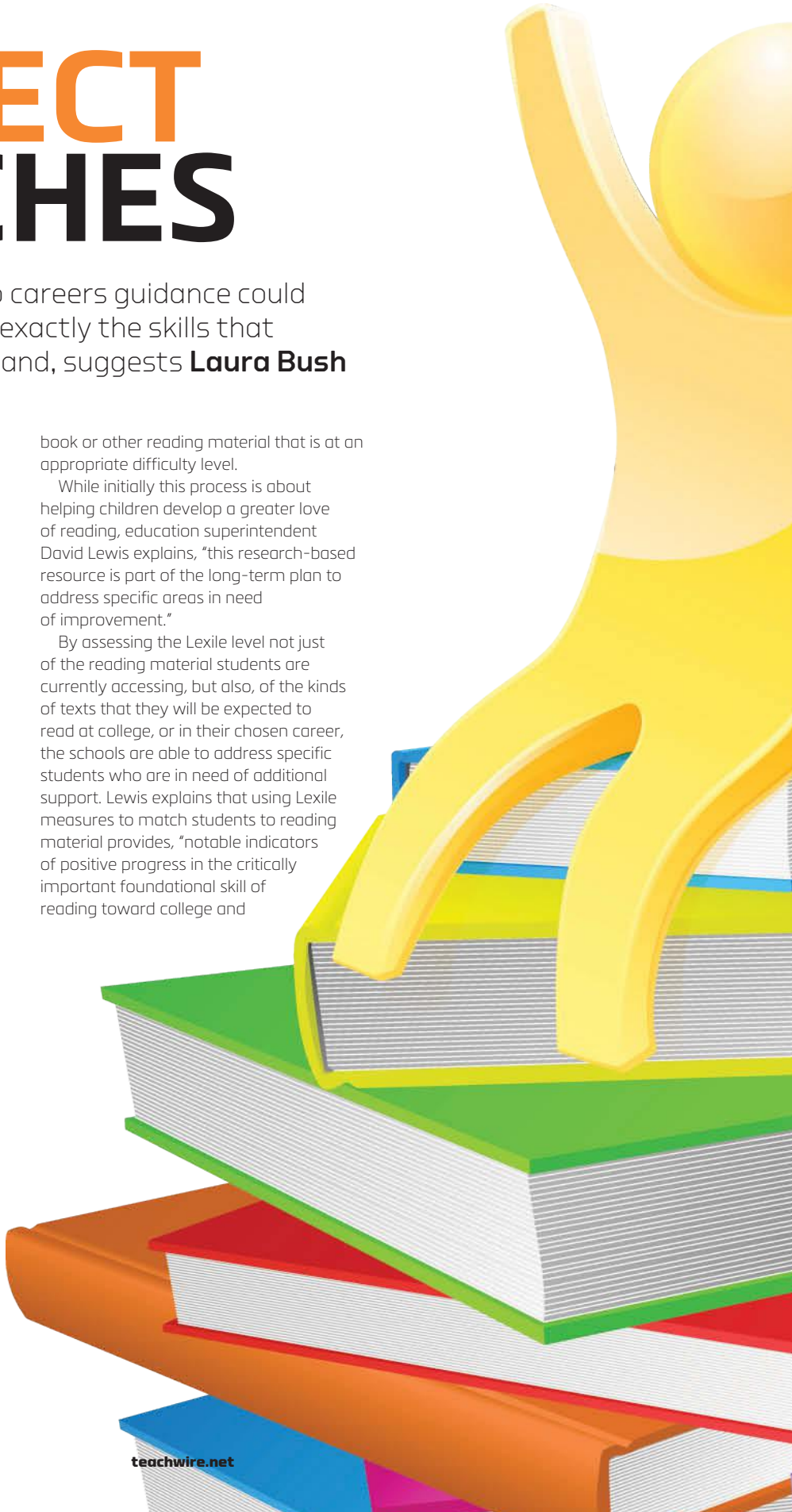
So, how do we solve the problem of ensuring that each student's literacy level meets, or exceeds, the level required by their further education or career choice?

Learning from the US

In America, this is already done very well; Muscogee County School District in Georgia provides us with an example. The district wanted to improve reading and writing at its 13 lowest-performing secondary schools. These schools use the international Lexile Framework for Reading, devised by MetaMetrics, to quantify both the complexity of a text (book, study material) and the reading ability of each learner. By effectively matching the two, a reader can choose a book or other reading material that is at an appropriate difficulty level.

While initially this process is about helping children develop a greater love of reading, education superintendent David Lewis explains, "this research-based resource is part of the long-term plan to address specific areas in need of improvement."

By assessing the Lexile level not just of the reading material students are currently accessing, but also, of the kinds of texts that they will be expected to read at college, or in their chosen career, the schools are able to address specific students who are in need of additional support. Lewis explains that using Lexile measures to match students to reading material provides, "notable indicators of positive progress in the critically important foundational skill of reading toward college and



career readiness."

Many education publishers and educators in UK schools already use Lexile measures. Results from reading assessments that gauge an individual's reading ability are then used by teachers and pupils to monitor progress, set reading goals, and efficiently target reading practice by matching the reading level of a text to the ability level of a pupil, in order to facilitate reading growth.

But if, like US schools, we knew the exact level of reading ability required for specific careers, or further education courses, pupils could be armed with the knowledge not only of exactly what their ability is, but also what level of skills is relevant to their personal goals. A reading growth trajectory could then be plotted that would be unique to the individual and their chosen course or career.

A perfect match

At MetaMetrics we are continuing to work with colleges, universities and employers to assess the level of reading ability required by each course or job.

For example, a 16-year-old future video game designer can be informed that she will need a reading ability of 1300L to successfully function in her chosen career. If she and her teacher know that she is struggling with 1100L texts, they can target her reading practice to strengthen her comprehension, increasing complexity over time, until she feels comfortable with reading 1300L texts.

In all, four hundred high interest, high demand jobs have been identified through the O*NET programme, which collects statistics and characteristics of jobs across a host of industries, and we have measured the complexity of materials used regularly in these jobs.

If our aim is genuinely to support students in effectively and fully achieving their career objectives, while also helping employers find the right people with the right skills, identifying the precise literacy requirements for courses and employment options could make a huge difference. By taking a more analytical approach to education, teachers will be better equipped to ensure their pupils are ready for the next chapter of their lives.

ABOUT THE AUTHOR

Laura Bush is program manager, Global Services, at MetaMetrics

HOW DOES IT WORK?

Over thirty years, the Lexile Framework has been linked to numerous reading assessments in use around the world. Because many book publishers report Lexile measures for their titles, educators can use a student's Lexile measure to connect them with reading materials with an optimum level of challenge. A benefit of the Lexile Framework is that it accounts for the fact that each pupil has their own 'optimum'. A native English student with a love of reading could be targeted at a 75% comprehension rate, making use of their excitement to stretch their skills. At the same time a student new to the language could be targeted at a 96% match to reinforce new skills and build confidence. This targeted, 'just right', match facilitates reading growth.

More than 200 publishers and digital platforms, including Pearson, Scholastic, McGraw Hill, Achieve3000 and HarperCollins have adopted the Lexile Framework of Reading. Over 200,000 books, and tens of millions of articles have received Lexile measures. For example, The BFG by Roald Dahl has a text complexity of 700L while J.K. Rowling's Harry Potter and the Philosopher's Stone is of an 860L level.

We need to talk about STORAGE

The digital revolution can create practical challenges for classroom design, says Richard Picking - but there are creative solutions out there...

One of the key challenges in education is how to incorporate modern technology into the classroom, without loss to the aesthetics or the fundamentals of good order. 'Everything in its place' may be a time-honoured phrase but the proliferation of information, communications and the attendant increase in powerful, expensive devices has only underlined the validity of the message.

With many decades of experience in the education sector to draw on, Gratnells (where I am international marketing director) has developed an approach over the last few years called 'Learning Rooms', which takes this challenge on and aims to transform the environment in which teachers teach and learners learn.

The inextricable link between the learning environment and the performance of those within it, as embodied in 'The Third Teacher' concept attributed to the Reggio Emilia ethos, is now well documented, with support from the likes of Professor Peter Barrett and the Clever Classrooms report of the HEAD project. The relentless march of the digital technologies requires a continual re-evaluation of the spaces in which children learn and teachers teach; Ken Robinson in his acclaimed collaborative work with Lou Aronica entitled 'Creative Schools – Revolutionising Education from the Ground Up' says:

"Virtually every day there are new tools for learning and creative work in all sorts of disciplines and new programs and platforms that can help to customise education for every learner."

The rise of the tablet

In practical terms, however, we cannot re-design, re-build, re-configure and re-equip our classrooms with anything like the same regularity. What smart providers must do is to provide degrees of flexibility, mobility and the capacity to provide cross-over between traditional and new methods of storage that maintain harmony and balance in the learning room.

The rise and rise of technology has brought power, data, control and increased efficiency to classrooms both large and small. Schools and colleges, increasingly subject to financial accountability but with perhaps more freedom to operate than before, now represent a new opportunity for tech suppliers. One way to take advantage of this is for education market specialists to partner with experts in the new technologies.

For those who remember the introduction of the whiteboard, considered

a revolutionary event in its time, the current rate of adoption of the new technologies in schools must be a matter of wonder. The launch of the iPad in 2010 enabled students and teachers to create unique opportunities for personal learning at every level. Tablets have become everyday devices and today's children are born into a world of 'digital immersion' through the power of touch, motion and sound. BBC media reported in 2014 on a study of new technology users in 671 state and independent schools – almost 70% were regularly using tablets and numbers were predicted to more than double between 2014 and 2016 from 430,000 to 900,000.

Safe, efficient – and stylish?

Where large groups of learners gather, the ubiquitous availability of phone, tablets and data loggers creates its own market for ancillary, storage and functional products. In today's learning environment, children are very tech-savvy, with technology being a large part of their day-to-day lives. Mobile devices can be used both inside and outside the classroom and the need to ensure these devices are always charged and ready to use is key to managing lessons and preparing ahead.

As a consequence, there is a requirement for storage solutions that can sync and charge tablets quickly and efficiently to ensure they are ready for use again, whilst at the same time providing a secure and safe way to store the devices and fit seamlessly into the learning environment, blending with existing classroom furniture.

Key factors that need to be taken into account when considering the purchase of storage and charging solutions have been identified as functionality, mobility, safety, security, storage and ease of use.

Beyond the important functional aspects of the technology, there is also an opportunity to explore aesthetics. Colour, design and integration with other physical aspects of the learning room are subjects that are attracting more and more time and research. The link between classroom ambience and learner performance is now widely accepted.

Opportunities ahead

Far from seeing technology as a threat, much of the education sector is gleefully embracing the power of the digital era. Providers, recognising the potential and size of the market, will respond accordingly. According to BESA Research Data the UK Education budget in 2015 was just over £90 billion with between £400 million and £2 billion available to spend on resources and services. 40% of that total was accounted for by 'digital resources'.

While schools may well have defined policies about what digital and electronic equipment can and can't be taken into the classroom, there is a clear case for additional provision in the digital era.

The digital revolution is transforming the way children play, access information, communicate and learn. Using space efficiently in the digital age presents a fresh set of challenges for everyone from designers and architects through to both teaching and non-teaching staff in schools.

ABOUT THE AUTHOR

Richard Picking is international marketing director at Gratnells

Get back in charge of your portable devices

Store

Keeping track of portable devices - tablets, smartphones and dataloggers - is made easy with **Gratnells PowerTrays**. They come in two sizes – a deep tray and an extra deep version, and can each store 10 tablets, within existing furniture.

Charge

Gratnells PowerTrays have integrated USB charging outlets, so the devices charge whilst they are being stored - you're **always ready for class**.

Sync

Up to **10 devices** can be easily **synced at one time** using the integrated USB input port. Compatible with 1000s of USB devices.

Secure

The Gratnells PowerTrolley stores up to three PowerTrays in a **secure, lockable** unit giving you the **power to charge up to 30 devices at once**. Fitted with lockable castors and available in a number of colours, the PowerTrolley is compatible with standard school and office furniture.

PowerTray

The PowerTrays come in two sizes – a deep tray and an extra deep version, and can each store 10 tablets.

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The PowerTrolley can adapt to house either 3 tiers of deep trays, charging 30 devices at any one time or 2 tiers of extra deep trays, charging 20 units.

Information and Order Hotline...

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powertray.gratnells.com

Gratnells

Why I Love...

Ms Keen, deputy head at Purford Green Primary School, doesn't want to give her Gratnells PowerTrolley and PowerTray back!

The challenge

Purford Green Primary School has 30 iPads, shared between different classes and year groups. The tablets are extremely popular with the learners and this often requires moving up to 20 devices at a time between different locations in the school. Re-charging sometimes takes place in the classroom and each evening all tablets, including a number of storage cases and holders, are removed to the security of a lockable storage room. Recently, a Gratnells PowerTrolley, plus three PowerTrays, were supplied for a six-week placement trial - and passed with flying colours.

The test

Use of the Gratnells PowerTrolley and PowerTrays was allocated across a number of teachers over the six-week period in order to maximise usage, assessment and feedback. Score sheets and feedback forms supplied by Gratnells were used to rate the products across six features: functionality, mobility, safety, security, storage and ease of use. On a scale of 1 (high) to 5 (low) the kit was rated as very good across no fewer than 5 categories, with mobility scoring an outstanding maximum mark.

The feedback

Users were impressed with the trolley's ease of movement – particularly for children who enjoyed moving it around and putting it away. This, combined with the unit's stability, safety and even weight distribution, made it a highly reassuring choice for everyday classroom use. The flexibility of the charging process was also popular – it was found that children could easily and independently access and charge tablets either singly or in groups within trays.

The highlights

Perhaps most important for teaching staff was the ability to use and charge devices where and when they required them, often dividing the trays between classes and charging while learners were accessing and using tablets. As a bonus the trays could be stored within the existing classroom furniture. The small footprint of the trolley was identified as a further benefit, making it unobtrusive and easy to store away securely.

The conclusion

Ms Keen, project leader and deputy head at the school, says, "The Gratnells PowerTrolley/PowerTray combination will be a real asset to any school, with its manoeuvrability, ease of use, flexibility and safety. We loved it, and we don't want to give it back!"

Find out more at www.powertray.gratnells.com or call 01279 401550

Gratnells PowerTrolley

Purford Green Primary School moved into an extensively remodelled building in April 2012 and is proud of its excellent facilities and light, spacious, well-equipped classrooms. With its emphasis on standards, skills, challenge and opportunity it was considered a perfect testing ground for the Gratnells PowerTrolley and PowerTrays, which passed a six-week trial with flying colours.

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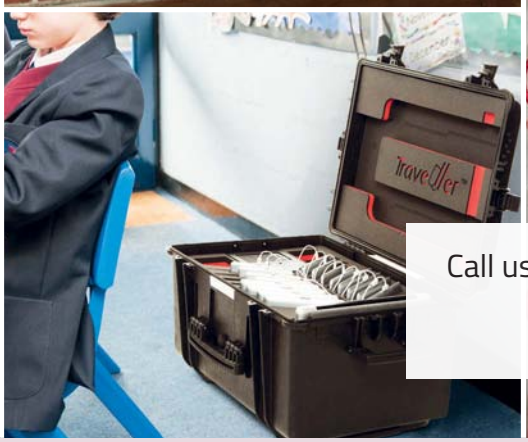

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CREATIVE CPD

Because great teachers are learners, too...

WHO'S TEACHING THE TEACHERS?

So, you've been told to step away from the shiny piece of tech. That it will not help your kids learn by itself. That it's all about how you use the technology. And this is true. But how, you may ask, do you learn that?

Continued Professional Development (CPD) is often lauded as the solution, but who are the providers of this elusive CPD? How do you ensure a one-day training course leads to sustained change? And how do you keep teachers motivated beyond shouting 'It's the Future!'? We don't have all the answers, but here are some alternative ideas, to kick this section off.

The language of opportunity

Firstly, the Holy Grail of edtech CPD has not been found yet. Not even on Google. But – there is a lot of sensible, CPD guidance that you may already know about. Research on what CPD has a sustained impact can be applied to tech as much as it is to other areas of teaching. There are some good articles available on this from organisations such as the Teacher Development Trust (see page 106 of this magazine) and Stone to get you started, but don't expect a quick fix. It's about clear vision, keeping learning outcomes central, motivating for change, and then revisiting and reflecting on whether you're having the impact you intended.

Secondly, if continually talking about the future isn't motivating your teachers – try the language of opportunity and closing the gap. At the moment, without school support, it is the children whose families' can afford it that will end up becoming most tech literate, and ultimately benefit from the vast growth in technology jobs. A school that is committed to educating its children for technology can help close that gap.

Play to your strengths

Finally, remember that not all of you teachers will end up loving tech, and that's OK. Outdoor education can be a useful comparison. Teachers agree that all kids should have the chance to see the countryside, the sea or a farm, and that many pupils won't get this at home. But that doesn't mean all teachers need to love camping, or run camping trips. Schools can be creative about how they ensure all pupils access the outdoors – sometimes tapping into an individual teacher's enthusiasm, or sometimes sharing out the load. It is the same with tech, except less muddy. The journey to embedding a culture of technology might be just as arduous as an expedition, but equally rewarding when you get there.

Michael Mann, senior programme manager for education at Nesta

90.5%

of education professionals think that using technology at work is beneficial

Source: CV-Library

JOIN THE SHOW

The replacement of RAISEonline with a slimmed down package will bring a new set of challenges for schools and Inspectors. From September, a series of FFT roadshows are being held across the country, which will outline the key changes and look at how FFT Aspire can be used in combination with the DfE's replacement system to ensure that schools can effectively evaluate their performance and measure progress. Find out more and book your place at **tinyurl.com/fftroadshows**

TECHNOLOGY IS CENTRAL

From a distraction to a learning tool – Craig Ring explains how Rooks Heath College is embracing BYOD in the classroom

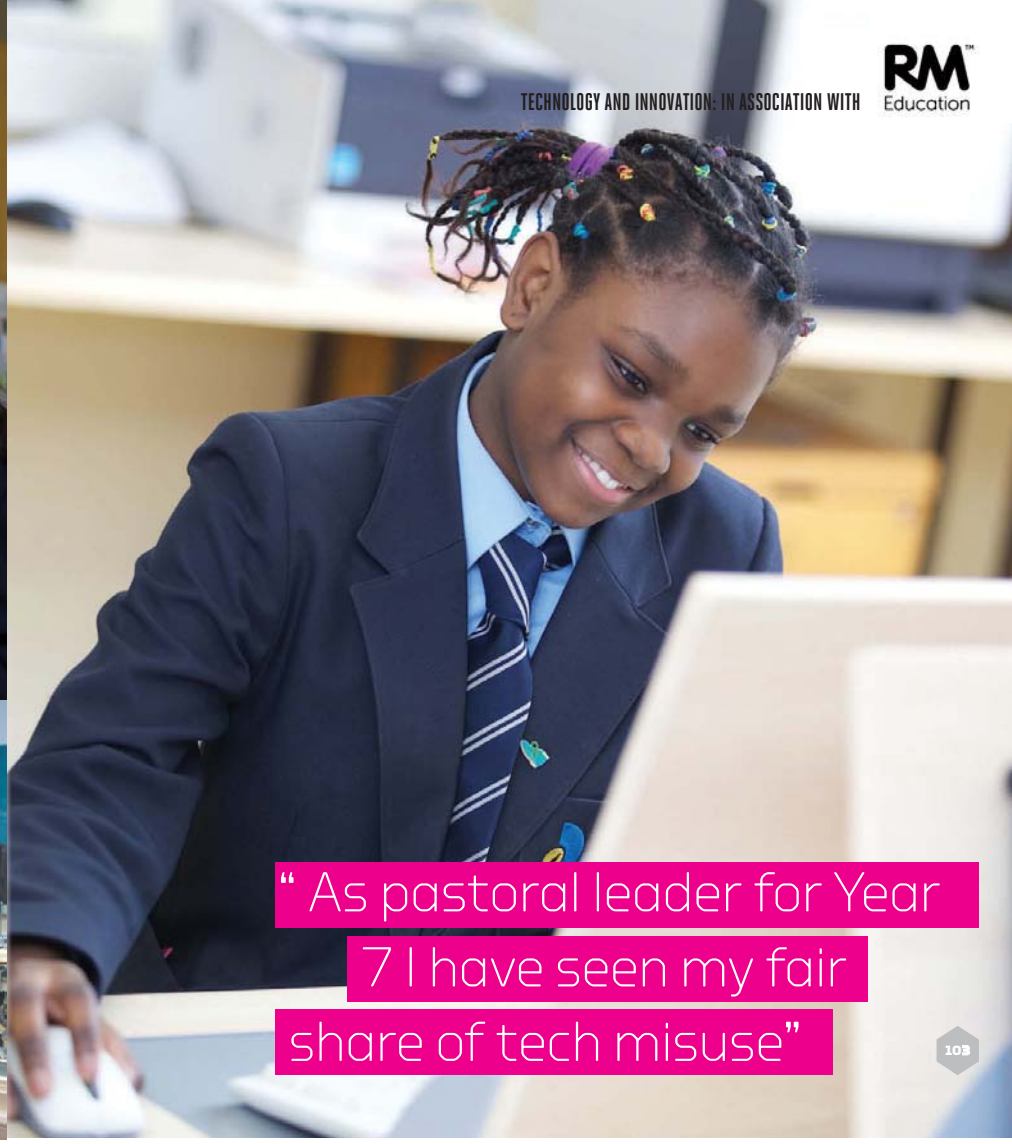
For as long as there have been mobile phones, there have been students who will be distracted by them in the classroom. I have seen it myself, and I doubt there's a teacher out there who hasn't wanted to throw a device out of a window for disrupting their class. This animosity between teachers and mobile tech has been reflected in many school phone policies - keep it switched off, in your bag or in your locker.

Despite embracing technology in the classroom, and as a proponent of the concept of 'Bring Your Own Device' I can understand why schools, including my own, may be nervous of replacing textbooks with tablets. As Pastoral Leader for Year 7 I have seen my fair share of tech misuse, and it would be unfair to assume that every teacher who is reluctant to introduce allow devices into their classroom is simply a technophobe.

The digital skills desert

But there are significant benefits to a more flexible approach to personal tech in the classroom – where BYOD is embraced and students are taught how to use devices appropriately and effectively to enhance their learning.

My school; Rooks Heath in Harrow, agrees. Continuing a project which began life in the music department, the school is now intending to move from a school-wide ban on personal devices to a BYOD model. Our students are already using mobile tech in their lives outside school. They communicate using video, WhatsApp, audio clips and through sharing pictures –



"As pastoral leader for Year 7 I have seen my fair share of tech misuse"

and these multi-channel collaboration skills can be transferred to the classroom.

Technology is central to the learning experience, helping students to work flexibly, hone investigative problem-solving skills and connect easily with teachers and peers – and BYOD is just part of this. At Rooks Heath, BYOD will form part of a wider student-centred approach to tech adoption. We use Canvas, a cloud-native Virtual Learning Environment, to power a tech-enabled approach to better learning. Adopting a flexible approach to delivery of learning, powered by Canvas (and which will include BYOD) means that students can learn anytime, anywhere, just as they would do in the real world.

Turning a BYOD approach into reality

But while many can see the potential benefits of BYOD, for many, including us, turning theory to reality is a longer process. Our BYOD strategy is still in its infancy, and while we hope to reap the rewards of a more flexible approach, planning and implementation does take some time.

For teachers – and perhaps more pressingly, for support staff and management – BYOD can feel like relinquishing control. Which is why my advice for schools is to establish clear guidelines from the outset, to ensure that any BYOD policy is controlled and useful. This will also help address security and privacy concerns – key considerations when implementing any new policy.

Clear objectives are crucial

Establishing firm objectives is also crucial. Put simply, technology for technology's sake is bound to fail. If you can't say, 'I want BYOD to do XYZ, and this is how we'll use personal tech in the classroom' – then simply, don't do it. And, equally important, schools must get better at evaluating whether they have achieved significant return on their investment on an ongoing basis. Setting rigorous objectives and key performance indicators is crucial, as is making sure that you're achieving what you want to from the get-go.

Lastly, to ensure the success of BYOD at Rooks Heath, we're looking to widen engagement and involve all interested parties in making sure the policy is a success. For example, parents can be the most fearful group when it comes to new technologies – but can also be the biggest advocates, as long as they can see how it can benefit them, and their relationship with the school. A more flexible approach to communications technology can bring parents and children closer together, and allow parents to play a more active role in their children's learning – and it's vital that we demonstrate this.

So, by being clear on policies, rigorous of setting objectives and by being open and communicative with all parties, BYOD can deliver real benefits to the classroom. And we're looking forward to reaping these rewards at Rooks Heath.

ABOUT THE AUTHOR

Craig Ring is pastoral leader for Year 7 and head of Canvas at Rooks Heath College, Harrow.

Q&A: TRAININGTOOLZ

Kirsty Collinson suggests an innovative alternative for whole-school CPD

T&I Why is it so important for schools to be able to take control of their own in-service staff training?

KC Schools have an ever expanding requirement for mandatory training, from recruitment and induction to safeguarding and CPD. And it's not just teachers who have the legal requirement to participate; non-contact staff, contractors and governors all have a requirement set out by the DfE to undertake various courses. To buy all this training in would not only be logistically challenging, but hugely expensive, so schools are turning to their own staff to create and deliver peer-to-peer training.

What are the benefits of online training for schools in term of time? And budgets?

Getting all the relevant members of staff in one place at one time to conduct internal training is no mean feat and is invariably going to impact on the teachers already packed timetable. By comparison, online training can be created once and then completed by the trainee at a time that is convenient to them. No need to book people and resources, saving both time and money. It also means that the training can be repeated as and when required for new starters etc.

How can TrainingToolz.com support this process?

TrainingToolz allows schools to quickly and easily convert their training material into an online course to share with their colleagues. The platform is also flexible, so you can create tests, quizzes, surveys – any kind of interactive communication. This also makes it perfect for policy distribution. Not only that, but because the all the content is tracked online, you can quickly provide evidence of the activity that has taken place in your school.

How easy is TrainingToolz to use

It can be mastered in minutes. The platform is intuitively designed with all the features needed to create effective training courses - no need for a degree in design or technology! Simply add content, videos, images and questions into the template and hey presto, you have a training assignment ready to go. It doesn't even cost anything to get started. You can create your courses at your own pace and don't need to activate a paid subscription until you are ready to start training. Even then, it's only £25 per month.

www.trainingtoolz.com Call: 0113 868 0403 Email: zed@trainingtoolz.com

Q&A: E-SAFETY SUPPORT

Tina Elson explains how to ensure you are meeting DfE safeguarding requirements

T&I How can e-safetysupport.com help schools meet the DfE's safeguarding requirements?

TE Safeguarding and promoting the welfare of children is everyone's responsibility. E-safety is a significant part of the overall safeguarding picture which is detailed in the DfE Keeping Children Safe in Education, Guidance for Schools and Colleges. To help schools identify key e-safety requirements from the guidance, we've compiled a checklist for schools. This can be used as a starting point or an aid to reviewing current policy and practice. From there, schools can go on to using our e-safety resources, in particular, our suite of CPD certified e-safety training for staff.

What else does it have to offer schools?

E-safety is more than just educating young people, it's also about protecting staff and maintaining the school's online reputation. That's why we offer a range of resources from age-appropriate lesson and assembly plans, e-safety training for staff with additional guidance on their personal and professional use of social media sites through to tools for SLTs that allow them to assess current understanding and set effective policies for their individual school.

What about other stakeholders, like governors and parents?

It is important to consider that the DfE guidance states that "This statutory guidance should be read and followed by governing bodies". Ofsted has placed greater emphasis on effective governorship in this area. Effective engagement with parents is also an important consideration as they are in a key position to spot signs of safeguarding issues including radicalisation for example. This is why we offer bespoke governor and parent training as part of our membership package.

Would you say that e-safetysupport.com is a popular and cost-effective solution?

We have been delighted with the success of E-safety Support. DfE requirements include staff training and our membership has grown to 15,000 and we have seen over 88,000 online training courses completed by our members to date. Our staff training alone has the potential to save schools thousands of pounds in training costs – fixed price membership offers members unlimited use of the various online training courses along with access to all our e-safety resources. Our annual membership for primary schools is just £349 and for a secondary just £599.

E-safety Support

Visit: www.e-safetysupport.com Call:0113 360 7838 Email: info@e-safetysupport.com

Could **technology improve** your **practice?**

David Weston suggests five ways to bring your school's CPD programme up to date – and fit for the future

All of us who work in schools want to unlock the potential in our students and colleagues. Frustratingly, it's easy to pour in effort but see little change. But studies have demonstrated time and again that one powerful key is carefully-designed continuing professional development (CPD).

Here are five fantastic technologies to unleash the best in your school's CPD programme.

1 VIDEO

Video can play two powerful roles. Firstly, teachers can video their own practice to give themselves a new perspective on what's going on in the classroom. The danger is that we become too focused on ourselves and not enough on what students are doing. However, with practice and support, and when combined with evidence from student work, video can be powerfully embedded into CPD.

Key tips are: to make sure that teachers feel real ownership of any video that is taken, that trust is high and that the quality of audio captured is good enough. Systems like IRIS Connect, Lesson Box, Star Lesson and Swivl often have remote microphones which the teacher can wear, and have systems which allow the teacher to control who has access to any clips.

The second role is to capture practice in action and use it to prompt reflection, to raise expectations and to challenge orthodoxies. Teachers tend to enjoy watching short clips of classrooms in action and compare to their own experiences. When we are inexperienced with something, video can be a really useful tool to watch and copy – novice learners benefit the most from worked examples.

2 ASSESSMENT AND EVALUATION TOOLS

Effective teacher learning focuses on the impact on students. The most powerful questions that teachers can ask themselves are: "what will students' learning look like when my own learning has been a success?" and, "have I made a difference yet?"

One of the most exciting areas in education technology, for me, is the application of technology to assessment. Teachers can use, for example, hand-held class devices to get quick feedback about how effectively students are learning. They can buy in nationally standardised and flexible tests to give objective and benchmarked information about students' attainment and progress. They can utilise online tools to carry out comparative

> "There are many online communities where teachers connect, share and debate. This has been an incredibly powerful catalyst to the movement of ideas and thinking."

judgement – a fantastic approach to marking essays and harder-to-define tasks.

Put this together and you can put technology-enabled assessment at the heart of great teacher learning. This can help decide the focus of the CPD, empower participants to evaluate their own impact and produce valuable data for mentors and facilitators to guide the process.

3 SHARED DOCUMENTS

Technologies such as Google Docs and Microsoft Office 365 have opened up powerful, yet simple ways of collaborating. Teachers can work together on a single, shared document which they can all edit simultaneously, no matter where in the world they are.

This opens up exciting possibilities in CPD. Firstly, teachers can collaboratively plan lessons, splitting the task up while keeping everything organised. Secondly, multiple observers can then comment on the lesson by adding notes to the plan in real time, during the observation. Finally, expert practitioners and advisers can give their input, both on the lesson plan and on any images of work or clips of video captured from the lesson.

Importantly, this sort of technology helps to structure conversations and facilitate more effective collaboration. It ensures that records are kept and that the evolution of the document can be reviewed as an aid to later reflection.

4 SOCIAL MEDIA

There are many online communities where teachers connect, share and debate. This has been an incredibly powerful catalyst to the movement of ideas and thinking. Twitter is probably the highest profile discussion medium in the UK, with debates and blogs being shared that are highly influential within schools and the wider education system.

Many teachers, myself included, have really felt that the world has opened up by joining in such discussions. You can get much more immediate access to leading thinking and can watch detailed debate taking place. The downside is that 'tribes' form rather easily on social media – Twitter is certainly no exception.

However, with an open mind and a determined approach of always exploring the ideas which you find the most challenging, teachers can use Twitter to access thinking which would otherwise be hidden. Many teachers engage in blogging about things that they have tried, research they've read or debates in which they've been engaged.

5 ONLINE CPD COURSES

With school budgets increasingly tight, many schools and CPD providers are exploring the option of engaging in online training. There are a huge number of courses available, many of which are free, and which can open new avenues for training.

This sort of CPD requires careful thought. A motivated teacher using a high quality course can use it to think about new ideas. However, engaging only online is unlikely to be sufficient to deeply impact ingrained thinking or habitual classroom practice. An online course should, therefore, only be seen as one ingredient in a wider programme of teacher learning. Another issue can be that, without any visible peer influences, it becomes very easy to engage only superficially or to drop out entirely.

The flip-side is that teachers may feel safer to engage in learning online than in person. If I feel that my behaviour management is poor and would feel vulnerable to admit it then I may feel more inclined to seek out advice online with relative anonymity. This is, of course, a sticking plaster to a deeper problem of trust and culture, but it could be helpful in some circumstances.

ABOUT THE AUTHOR

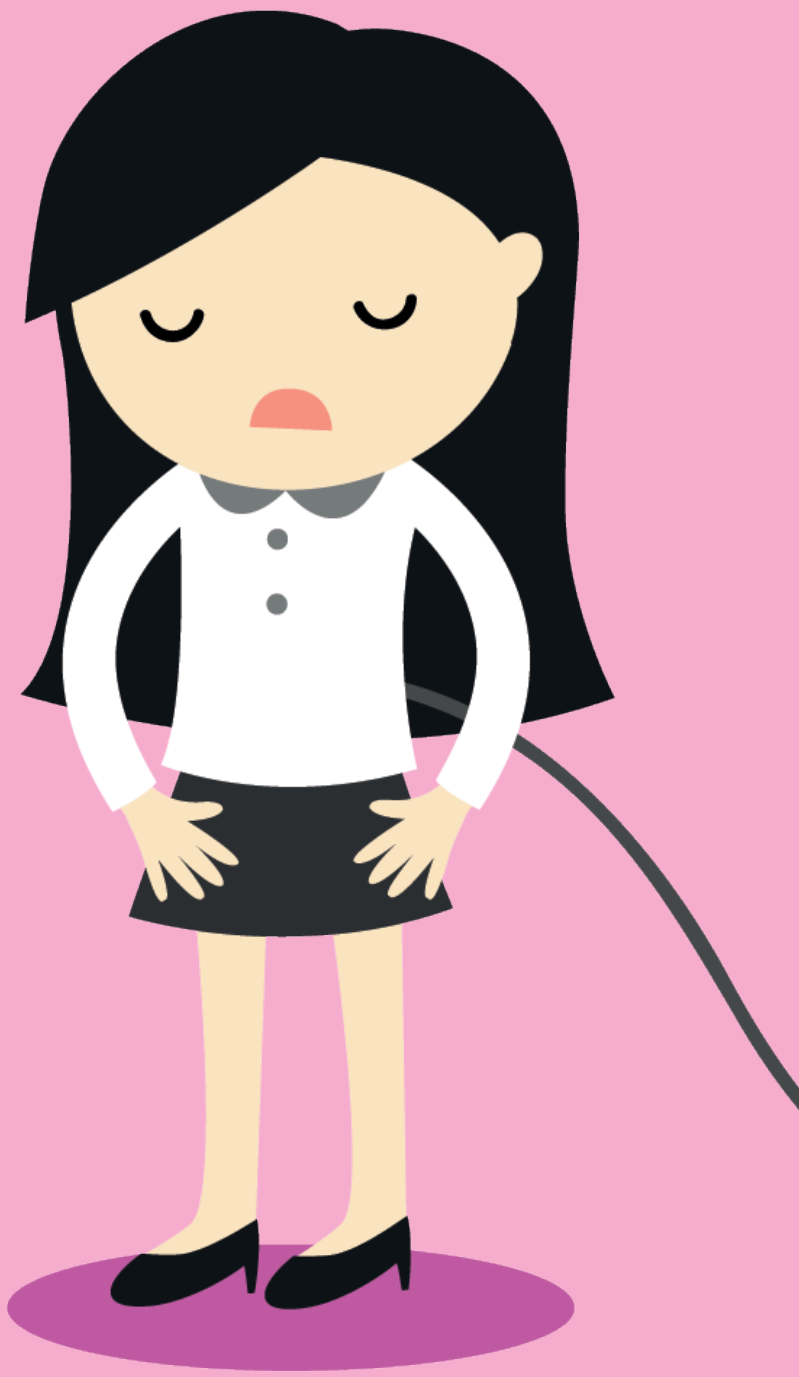
David Weston is the Chief Executive of the Teacher Development Trust (TDTrust.org). A former science and maths teacher, he was also Chair of the Department for Education's Teachers' Professional Development Expert Group. Follow David on Twitter at @informed_edu and the TDT at @TeacherDevTrust.

IN CONCLUSION...

Technology holds huge promise; it could be used to strengthen or even transform teachers' experience of CPD. While no panacea, these five approaches have the potential to impact deeply on your school's CPD.

STRESSED? There's an app for that now...

If you're feeling under pressure (and what teacher isn't?), your smartphone could offer a surprising source of support



It is a well-known fact that as soon as there is a half term holiday, teachers get sick. And there is apparently a scientific reason for this: teachers are under enormous pressure; they work evenings and weekends and don't get the chance to recharge their batteries, so they develop what is known as 'cumulative fatigue'. Once they switch off, their immune system downs tools and they catch everything that's going.

Teachers often don't recognise that they are stressed. They feel anxious, they can't sleep, they worry about their health – but often don't know why. Mental health professionals have long waiting lists so, while some teachers might go to a doctor to get a prescription, many more self-medicate with alcohol, recreational drugs or comfort eating. Teaching is not a healthy profession.

Apps won't replace professional human help, but they are available 24/7 and offer access to information and a range of helpful tools that let people track moods and find ways of being more in control.

Take control

Some of the most effective and widely used apps have come from the corporate world. David Brudö, co-founder and CEO of Remente (remente.com), noted that in Sweden, mental concerns were the most common reason for sick leave. While professional help was more readily available than in the UK, he wanted, "a resource solely dedicated to preventative measures and to maintaining the wellness of the mind." Remente helps people assess how happy they are with life, identify the areas that they want to improve, and set realistic tasks to be completed on a daily and long-term basis. Remente is recommended both for individuals and organisations, and is free to download from the App Store (where it received a Best New App Feature) and Google Play.

Hear and Now (biobeats.com/hearandnow) is a biometric app which helps users to be aware of and to take control of their stress physiologically, using their smartphone. It was trialled with banking giant BNP Paribas. On average, each participant's physiological stress was reduced by 23% within 15 minutes of using the app and a 10% reduction was still in effect 75 minutes later.

"Stress releases the fight or flight hormone," explains David Plans, CEO of BioBeats. "It is a survival mechanism and teachers may be faced with real or perceived threats to their well-being every day at school. If their response is left unchecked, individuals will develop symptoms of stress such as sleep disturbances, headaches, poor resistance to infections, restlessness and even panic attacks."

Training and support

In some cases, an app is just part of the service offered. The Positive Group (positivegroup.org) runs courses for teachers and students aimed at boosting psychological well-being and resilience. They have been running a programme for schools from The Girls' Day School Trust (GDST) showing teachers how to roll out the methods to their pupils. So far, they have worked with 25 teachers, nine schools and over 1000 students. The training consists of four modules over three days with an online platform and an app to use back at base. Teachers use an Emotional Barometer to measure their own energy levels and those in their classes.

"The app is fantastic; quick and easy to use," says Ruth Cole from Blackheath High School. "It has caused a real buzz and people have enjoyed discussing the different tools and their feelings."

Apps are largely unregulated – and of course, some are a waste of time; but on the other hand they are cheap, or even free in many cases, so there is every incentive to shop around and try different ones. Here are a few that come recommended by teachers (who have asked to remain anonymous):

"MindShift (iOS and Android) helped me to work out what caused anxiety. Some were obvious: my Tuesday afternoon class! Others less so, like being with people I didn't know well. It has helped me identify how and when my thoughts are racing, and slow them down."

"I like Headspace, (headspace.com) a mindfulness app where you start with ten-minute meditations and build up. Like yoga, this helps you manage stress and they offer different visualisations and cartoons for those not good at visualising."

"SAM (sam-app.org.uk) lets you track and control worries and users can share feelings with others using the app. It was the Best Anxiety App 2016 chosen by Healthline. I like the fact that it was created by University of the West of England; it makes me feel it is more professional than some of the others."

"Buddha Quotes with Music is free on the AppStore (bit.ly/BuddhaQuotesMusic-iOS). Some of the music sounds like an afternoon Danielle Steele movie but there are chants that work for me."

SIX WAYS APPS CAN HELP:

1. Identify the source of the stress
Pacifica (iOS and Android) lets you track your daily activities by writing or via audio. The app then helps you understand what activities might be triggering different moods and emotions, especially stress and anxiety.

2. Use mood trackers to keep a note of times
For example, iMoodJournal (iOS and Android).

3. Gain control
Use a planner app such as Owaves (owaves.com). It reduces stress by letting people visualise how they will spend their day.

4. Improve your sleep patterns
Try sleepcycle.com; your phone analyses your sleep, graphs patterns, and wakes you up in the lightest sleep.

5. Prevent harmful behaviours
Highly recommended, Calm Halm (stem4.org.uk/calmharm) provides tasks that help users resist or manage the urge to self-harm and it's completely private and password protected.

6. Break bad habits
Drinking or smoking and other unhealthy pastimes are examples of distraction/reward/avoidance behaviour. Bad habits are hard to break, but new generation apps use techniques that can make the task a little easier. Kwit (iOS) makes a game of giving up smoking; DrinkAware (iOS and Android) tracks units and calories.

The Help Desk

Naace CEO **Mark Chambers** addresses your queries about technology in the classroom - and beyond it

Mark Chambers is CEO of Naace – the National Association for all those interested in technology in education. Naace is a community of educators, technologists and policy makers who share a vision for the role of technology in advancing education. Members benefit from a great range of industry discounts and shared knowledge:
+ Support through community, networking & collaboration
+ Career enhancing opportunities
+ Instant access to a wealth of online resources
+ Naace member exclusive opportunities Representation nationally & internationally.

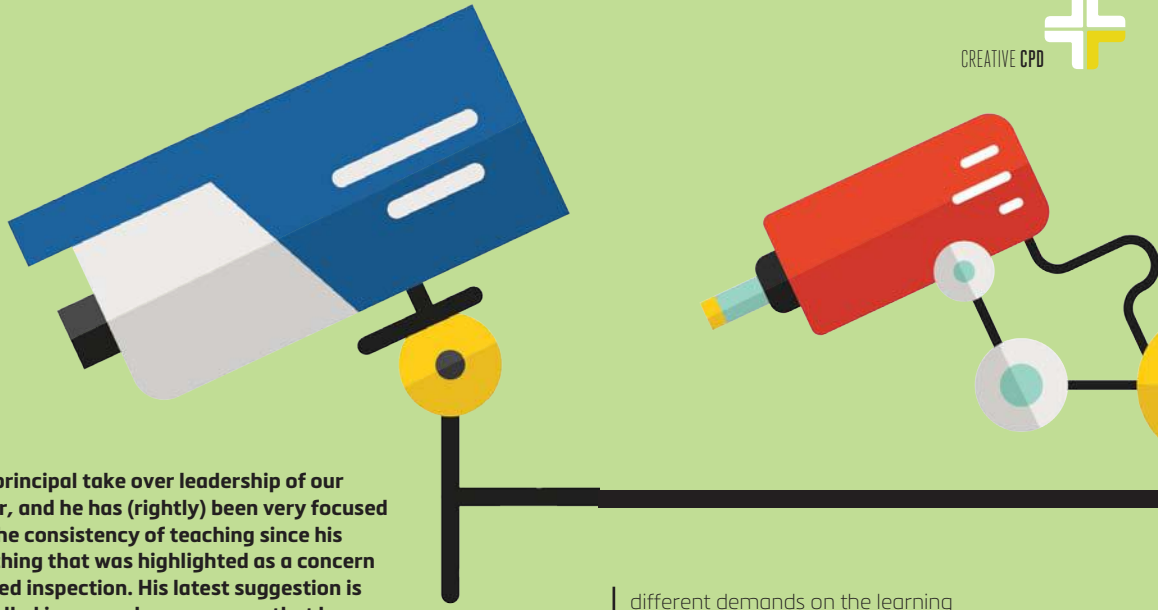
Find out more, and join, at **www.naace.co.uk/join**

I accepted my first teaching post (English) in September 2016. My NQT year has been pretty successful. However, there's one part of the job that I'm struggling with: I seem to spend a vast amount of my 'free' time dealing with emails – from colleagues, leaders, parents and the students themselves. As a school, we prioritise great communication; but I am starting to dread every time I check my inbox, and am spending longer and longer during the evenings and weekends tackling all the queries that come my way. How can I stop this 'creep' into my personal time, without letting down the people who are approaching me with genuine issues that need my attention?

Struggling with work life balance is a challenge that many of us share, and being disciplined enough to rescue some of your personal time requires careful planning. Here are some tips that you may wish to consider:

- If you are not already familiar with them, spend some time getting to know all features that your mail box offers; it will be time well spent!
- Make use of mailbox rules to forward emails from specific users or subjects to designated folders. This helps reduce that feeling of 'drowning' in messages and makes it easier to prioritise.
- Get rid of junk mail by marking it as such when it first arrives to avoid it in the future.
- Can you identify patterns in the type and frequency of enquiries? Are there alternative ways of offering a response? Could you set up some FAQs on a profile, or host a Skype session or discussion forum?
- Add a friendly out of office message reassuring readers that you have received the email but will get back <when>; and consider using the 'forward' button or adding links to responses to 'empower' others to support each other (students/staff), rather than answering everything yourself.
- Prioritise to whom you feel you must respond during evenings/weekends, and stick with this; plan in some distinct, phone-free time, too.

If communication is a key priority for your school, then having a whole school communication strategy is key. This should give due consideration to the work-life balance of staff as well as considering the communication tools available and how they can be used most effectively.



We had a new principal take over leadership of our school last year, and he has (rightly) been very focused on improving the consistency of teaching since his arrival – something that was highlighted as a concern in our last Ofsted inspection. His latest suggestion is that we have cameras installed in some classrooms, so that lessons can be recorded for training purposes. I am deeply uncomfortable about this idea; is it really something that's widely recommended these days, as he insists? And if so, are there any rules/boundaries we, the teaching staff, could and should request are in place?

Your headteacher is correct, video is an incredibly powerful tool for professional development. However, there are some key questions that should be asked prior to any system being implemented so that you and your students are protected. For example:

- Has the new principal made provision for compliance with the Data Protection Act? Is the supplier of the equipment aware and ready for the changes to this that will become enforceable from May 2018?
- Is it a guarantee that videos will not be recorded or shared with any other party without the express permission of the subject of that video? How will your "right to be forgotten" be guaranteed?
- Is the new principal developing a Code of Practice that the community can discuss and own before any recording is considered?
- Is it the case that the system may be used, with the teacher's permission, for collaboration, coaching and enquiry learning, and remains under control of the individual teacher at allstages and in all circumstances?

Video for professional development is not a backdoor to surveillance; it can be the focus of a vibrant and inclusive community of practice that is hugely beneficial to the individual and consequently to the school. However, this won't be achieved simply by installing tech; far more will need to be done, including the provision of appropriate training, safeguarding and policy. It's impossible here to cover all aspects of this exciting technology – but with careful planning, community engagement and a clear purpose and focus to the installation your principal may well be onto something that has the potential to help the school progress to the next level.

Our school – an average-sized academy, with no sixth form – is currently considering whether to invest in personal, mobile devices for all students, or to go down the route of a BYOD scheme. What do you think are the pros and cons of each approach? And could a mix of the two ever work?

First of all it's important to observe that this conversation should always start with teaching and learning before moving onto the question of which device/technical approach to take. Considering device first often results in excessive expenditure before staff truly understand and are engaged with the potential. However, assuming that your school has already gone through this process, here are my thoughts:

With both approaches, there is an overriding technical consideration, that is, ensuring that the school IT infrastructure is fully capable of supporting it, with appropriate storage and wireless solutions, safeguarding approaches and security strategies. Without these both approaches are doomed and unfortunately many schools fall over these hurdles.

A commitment to BYOD has to be more than simply a response to financial constraint. It is true that schools can fail to recognise the implications of a 1:1 solution, with requirements for replacement and maintenance crippling many a school budget post BSF. However, encouraging the appropriate use of personal devices makes radically different demands on the learning institution; its philosophy, pedagogy and policy all need to be radically altered if the community is to engage purposefully with BYOD in preference to 1:1

In a BYOD solution, most students will have their own devices and school can make sure that others do to ensure equitable access; young people will be more comfortable using their personal device and support will be far more cost effective. There is evidence that learning out of school can increase hugely and that positive interaction with their peers and with teachers can yield significant benefits to achievement. However, school will need to work hard at reducing inequality, at ensuring appropriate use, purposeful student engagement, classroom management, and managing compatibility issues as they arise.

In a 1:1 solution all students will have their own device and all applications will work (if the technical support is effective, appropriate resourced and trained). The installed base will be easier to support and maintain technically, and some of the same benefits of increased engagement and interaction can be leveraged to improve outcomes for students. Learning can be more controlled, and once staff and students have been appropriately trained they can become comfortable with their devices and begin to realise the potential of their use. However, underpinning this is a huge replacement and maintenance cost that, if it is not well managed, will become a cliff off which the initiative will, at some point, dive.

In fact, the division between BYOD and 1:1 is somewhat artificial, in that if a 1:1 approach is being followed it is probably the case that the school will actively be discouraging BYOD – but if the BYOD approach is being developed than further provision by the school to achieve equitable access will mean that the school is also committed to 1:1.

What lies ahead?

If you're wondering what the future holds for edtech, check out these 10 predictions from the experts at RM Education...

1 Pupils will expect seamless technology in school

Toby Black, managing director

As the drive for learning to more closely reflect life becomes greater, pupils will have higher expectations of the technology available to them in the classroom; they'll expect it to be seamless, as it is in their homes and personal lives.

2 Peer-led support will form a key part of safeguarding

Kat Howard, online safety lead

Peer-to-peer mentoring schemes are reinforcing positive and supportive behaviours, and helping pupils to take responsibility for their own online safety. Schools will start to make these schemes accessible to pupils from an earlier age, empowering future learners to be safe online.

3 Machine Learning will be at the centre of everything

Mark House, senior product manager

In truth most schools are using it every day already but are probably not aware. G Suite and o365 use ML extensively in their productivity suites to help users get things done more intelligently. Most exciting is the ability to provide reliable and valid predictions to student school performance, and in doing so make meaningful interventions.

4 We're all going to need more bandwidth

Kevin Kong, product manager for connectivity and ISP services

Schools are consuming ever-greater volumes of bandwidth – a trend more pronounced in secondary schools due to the widespread adoption of cloud technologies. Bandwidth consumption increases by around 40% year-on-year, so it's will become critical for schools to get their infrastructure right to support this.

5 Outsourcing will become inevitable

Kevin Robinson, services consultant

While some schools might think it's more cost effective to run all their IT systems 'in-house', there are substantial risks in doing this because schools are limited to one person or one skillset. Outsourcing will help schools to reduce costs, future-proof technology, cover absence and transfer the risk to the service provider.

6 Systems security must become more robust

Silvana Tann, relationship manager

The prevalence of malware and ransomware is a growing cause for concern, and in an age where data is so critical, schools need to become rigorous in mitigating these kind of attacks. Having remote technical support that can detect risks before they reach your networks, and putting a clear governance policy in place for opening emails, will become more critical to system safety.

7 Flipped learning is here to stay

Brian Fahy, RM Unify commercial development manager

The trend towards flipped learning and a more collaborative classroom is continuing at pace. Online platforms that help to foster collaboration in the classroom – such as Google Classroom, One Drive and Microsoft Teams – will become more central to learning.

8 Using 1:1 devices will become standard

Rachel Baker, network account manager

The need for affordable 1:1 classroom devices will see a surge in demand for such products.

The use of technology to share lessons and ideas 'live' and in real time with other schools, companies and establishments around the world will become much more common.

9 Critical data will be stored in the cloud

Chris Taylor, product manager

As we become more security-conscious, schools will look to store more data in the cloud. Using tools like Google Drive removes the need for memory sticks and allows teams to access their work in the cloud from anywhere – using secure passwords.

10 BYOD schemes will be the norm

Martin Pipe, head of service Scope & Design

Providing that proper planning and the right infrastructure are in place, we will begin to see the majority of UK secondary schools adopting BYOD in some form as part of a wider plan to reduce costs, save time and increase engagement.

Find out more at www.rm.com

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Keeping your school ahead of the curve

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We're 100% focused on supporting UK schools with technology solutions that save money, increase efficiency and help teachers and learners alike to be more successful.

Our seven core solutions are designed to work together to address the key issues, priorities and challenges facing schools in the UK today. It's why we are fixated on understanding things like your school's ambitions, goals and needs whenever we're in conversation with you and your peers:

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- Networks for education
- Broadband for education
- Online safety for education
- Management Information Systems for education
- Teaching and learning
- Hardware and devices

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Over the last year, we asked over 1,000 schools to choose one word to describe education. The results were fascinating. Crucially, the two words that resonated most were 'change' and 'challenging'.

Changes, such as those to the curriculum, examinations and ICT, featured prominently, alongside challenges on your people's time, the quality of teaching and learning and managing increasingly strained budgets.

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Orlagh Horgan is events manager, RM Seminars

73%

of school IT leaders feel their students have access to better devices at home

Source: Fujitsu

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Register your place at the RM Seminars now – rm.com/rmseminars

TURNING CHALLENGES INTO CHILD'S PLAY

Steve Manderson reveals how taking a fresh look at a school's existing technology can deliver quite surprising results

All schools face different challenges. Trinity Catholic School, where I work, is no exception.

We are located in one of the most deprived areas of the UK, so children come to school already facing multiple issues that are typical of living in an inner-city area like Nottingham. We have 8% of the cohort on the SEN register, nearly a third on free school meals and more than half of our children are speaking English as their second or third language.

Despite this, we have over 96% attendance and a positive Progress 8 score. And when you look around our school and feel the buzz of energy and purpose. It is clear that our 1,100 students are happy and achieving well.

One of the reasons is our staff's positive attitude and their willingness to work together as a team, putting the needs of our children first and going the extra mile.

We know times are hard financially and we make good use of the resources we have available.

This has worked particularly well with our approach to our technology, in particular our management information system (MIS), and finding out how we can make best use of it to help drive school improvement.

Using tech to raise attendance

Our excellent teaching and support teams believe that no child should be disadvantaged by their background or circumstances. To put this into action, we use a huge variety of initiatives to help support students in their learning. But for students to take advantage of all we have on offer, we need them to be in their classrooms.

Attendance has always been pretty good at the school and generally sat above 95%. But in my view, 5% is too many students

not attending lessons. Illness aside, we need students in school, on time, every day to learn. So, we began to think about how to increase attendance further.

We had quite a basic registration system at the time and it took around 90 minutes each morning for an attendance lead to complete the paperwork and make any necessary calls home to parents regarding absence or lateness.

We decided to take a fresh look at how we could use our existing SIMS MIS to help. We introduced electronic registration in every lesson and this gave us the tools we needed to identify latecomers and absentees more effectively.

We now have assistant progress co-ordinators whose role is to review our attendance information each day. They can quickly see who was off yesterday, who missed a lesson and follow up on any issues with parents. The result is that attendance has climbed to within reach of 97%, which means more children in school learning. Truanting lessons is almost completely non-existent and on the extremely rare occasions it happens, pupils are picked up immediately. It is near impossible to get away with it!

The daily collation of data and ring round now takes just 20 minutes each morning, saving over an hour a day which can be focused on other tasks. Not bad for starters.

Shifting the focus on behaviour

Our next step in our quest for improvement was to tackle low level behavioural issues. Our students are well behaved generally, but, as with many schools, it is not unusual to have an issue with lesson disruptions caused by groups or individuals in certain lessons on some occasions.

We used a merit system to reward good behaviour, which although it worked well was time-consuming and pieces of paper, for both merits and poor behaviour marks, were getting lost.

Our renewed interest in finding out what our existing technology was capable of reaped further rewards as we discovered the MIS could manage our behaviour and rewards system online for us. We asked teachers to record details of all incidents instantly and electronically, as they happened. It took just a couple of clicks as the system was already open on their desktops following registration.

After a couple of weeks, we could see that it was really working well. The older children in particular would jump through hoops to get an achievement point. The reason being that all information was sent home to parents via text and often a teenager's request to go to the cinema with friends at the weekend was more likely to be met with a 'yes' if a merit or two had been sent home that week.

Just looking at the achievement levels for this year alone, I can see that we have exceeded 16,000 merits already and incidents of poor behaviour have gone down dramatically. This online merit system is by far the most effective and successful reward system we have seen to date. Importantly, it has cost nothing. The motivation in the achievement points themselves has been reward enough.

A whole school journey

Now that we have effective strategies in place for improving attendance and behaviour, we've also started looking at how we can involve parents more in their children's education.

We have always been used to sending pupil reports home electronically twice per year, which is not unusual, of course. But we also use the data to show the progression of children in previous years too – not just academically, but for behaviour and effort too. This is extremely powerful and creates the basis for a great dialogue with parents.

We had one child, who in Year 7 was among the top 30 students in terms of behaviour and achievement. The same report in Year 8 showed that he had dropped over 100 places, from near top to lower middle. This information helped us have a discussion with his parents which, in turn, prompted the change in behaviour that was needed. The boy successfully finished his GCSEs and is now attending the sixth form. I have no doubt that without this tracking in place, there's a chance he may have slipped through the net until much later in his school life and our opportunity to help would have been diminished.

Our approach to overcoming challenges means that today, we are thrilled to be able to say that we have amongst the best exam results in the county year on year, a positive Progress 8 score and 65% of our students leave with 5 GCSEs including English and maths. Despite our many challenges, we have a school we are truly proud of – and taking a fresh look at our technology has helped with that.

STEVE'S TOP TIPS ON USING TECHNOLOGY FOR SCHOOL IMPROVEMENT

+ Look at what technology you already have available – are you sure you know what your existing systems are capable of?

+ Many schools try to tackle all their key challenges in one go. Take a step-by-step approach. Start with attendance, for example, and when you are happy with your progress, move on to behaviour. Try not spread yourself too thinly.

+ A merit system is worth its weight in gold, but needs to be simple to manage. It is likely you already have systems that can help. Use them.

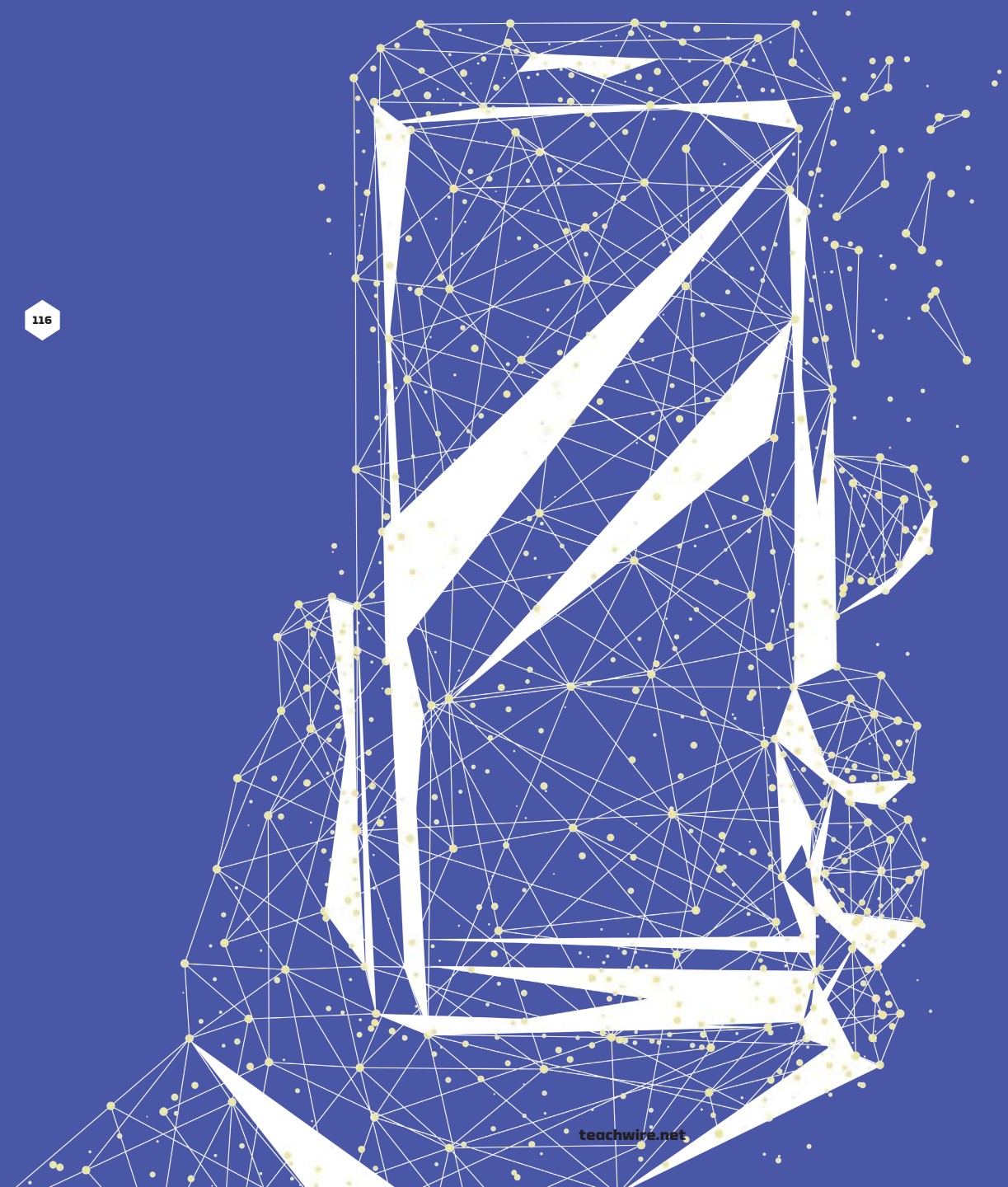
+ Check out how you can use any information you are already recording to engage with parents.

ABOUT THE AUTHOR

Steve Manderson is an assistant headteacher at Trinity Catholic School, Aspley, which is part of the St Barnabas Multi-Academy Trust, Nottingham.

THE CONNECTIVITY CONUNDRUM

Can your school's current bandwidth provision meet the needs of staff and students? And if so, for how long will that be true, asks **Kevin Kong**



As a broad trend, schools are consuming ever greater volumes of bandwidth for connectivity. This development is considerably more pronounced in the secondary market, due largely to the widespread adoption of cloud technologies and schools having access to the technical expertise needed to embrace these technologies.

Cloud technologies have opened up a world of potential, but as more elements of school operations are stored in a cloud environment – and as the wealth of educational resources on media platforms like Youtube become an increasingly important part of the curriculum – the demand for bandwidth and the ability to stream multiple videos in a live environment is crucial.

This demand is as essential for teachers as it is for learners; if a teacher's trying to give a history lesson and asks their class to log onto an app or learning platform, they need to be confident that the technology won't fail or slow down their lesson.

A call for investment

At present, the majority of secondary schools are paying for bandwidths of around 200MB over a 1GB line, which is the very minimum that parents, teachers and pupils should expect. But as technology becomes more embedded into pedagogy, we're now seeing more schools invest in 500MB or even 1GB services to allow for more concurrent use of cloud-based platforms and apps.

This is an encouraging trend, but the seamless use of technology in secondary schools is intertwined with the UK's wider infrastructure, and from that perspective, we're not exactly leading the way. The UK currently trails behind our European counterparts in terms of the affordable availability of high bandwidth solutions.

Though improving, many areas – especially rural locations – are ill-equipped to cope with increasing demand for faster download speeds from our swelling digital population, and from the growing need for on-demand technologies to be available and reliable in the classroom.

Ultimately, there's a continuing need for more government-driven investment into upgrading our national infrastructure to improve internet coverage and speed across the UK, by increasing the investment in fibre provisions and continued regulation of the fibre market to ensure competitively amongst Telcos.

The recent announcement by the Government of a £400m Digital Infrastructure Fund to increase access to 'Full Fibre' broadband in the UK is a tremendous first step, but it needs to be a sustainable strategy rather than a one-off.

Consider the alternatives

Greater focus should be given to making the market share fairer by bringing in alternative broadband providers to give consumers additional options to the typical Openreach or Virgin Media-based solutions.

Companies like Gigaclear, for example, directly address the challenges faced by rural homes, schools and businesses by installing independent fibre infrastructure and enabling access to fast and reliable internet connections. Typically, these areas are served by unfeasibly long lengths of copper cables – resulting in a subpar learning experience for schools.

In terms of the impact on our education sector, the worst-case scenario would be that if our systems and structures can't cope with increasing demand, it could ultimately stunt the adoption of new technologies in the classroom – and we can't afford to let that happen.

From a budgetary perspective, cloud technologies bring a wealth of benefits to schools and can create significant reductions in operational spend, but they depend on a solid infrastructure and the right broadband solution with the right safeguarding and security systems in place.

And while it's understandable for schools to be averse to new investments in the current climate, technology often requires a short-term investment for a long-term gain; if schools can get their infrastructure right today, they'll reap the benefits for years to come.

Instant improvement

However, for seriously cash-strapped schools struggling with connectivity, there are some simple and effective actions that can make immediate improvements; a brief internal review of how frequently different online resources are used around the school, and how much capacity they take up, will reveal what's putting the most strain on bandwidth.

It could be that during break times, Facebook usage peaks, or pupils are watching catch-up shows on Netflix in their lunch hour; activities which can take up significant amounts of bandwidth. Schools can then block or restrict access to these sites via their firewall or filtering solutions, limiting usage so that pupils can only access educationally-focused or mission-critical apps and platforms.

From what we see, the average bandwidth consumption in any establishment increases by 40% year on year. Technology and its role in education is evolving so rapidly, and whatever service or solution schools invest in today may not be sufficient in three years' time.

Broadband is one area where it's extremely difficult to accurately plan ahead for usage. Therefore, we recommend that schools concentrate on matching their immediate requirements with the most cost-effective solution, but to also ensure that there is a clear upgrade path in place to meet their future needs.

We'd also advise schools to be wary of signing any contracts with broadband providers that last longer than three years – this will help to ensure that schools have the flexibility to expand and scale up their operations without restriction, as and when they need.

5 QUESTIONS SCHOOLS NEED TO ASK ABOUT CONNECTIVITY

1. What are your school's immediate needs? Do you need faster connections, more bandwidth, or greater security on your line?
2. Does your school have a line with enough capacity for all your users to log on at the same time?
3. Does your school have a backup line if the first line goes down?
4. Does your current contract tie your school into using one particular provider or service for more than three years? If so, can they help you scale up your broadband provision in the future as and when you need to?
5. Does your broadband service have built in safeguarding and security solutions that tie in with your school's policies and protocols?

ABOUT THE AUTHOR

Kevin Kong is Product Manager for Connectivity and ISP Services at RM Education, and has supported numerous schools and educational frameworks in establishing critical infrastructure services.

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Q&A: CONNECTIVITY

RM Education

Kevin Kong, Product Manager for Connectivity and ISP Services at RM Education, discusses how schools can make sure they have the connectivity they need for best quality teaching and learning

T&I: Is there still an issue with connectivity in schools? Why?

KK Schools depend on connectivity for a lot of critical systems but due to both limited access to higher bandwidths and shrinking budgets, countless establishments are still missing out on maximising the full potential of the internet. So yes, there is still an issue with connectivity in schools. The internet offers massive benefits to education, it aids curriculum development, and opens up opportunities to be more efficient, flexible and collaborative. Having access to the services that the internet offers can even allow schools to alleviate financial pressure in the long run by reducing the complexity of the traditional local network and moving towards more cloud services.

Is it really necessary for schools to look at a specialist broadband provider?

Put simply, yes. A school broadband connection requires a high level of performance, it needs to be fully reliable, as well as provide trusted safety and security to protect the infrastructure along with the whole school community. A school's needs are based on the delivery of the curriculum, and the administrative and operational requirements of the school.

With the use of online technology constantly on the increase in educational establishments it's more important than ever that schools partner with a trusted broadband provider that understands the very distinct needs of the education market. Schools should be confident that their service provider can deliver the end user experience that staff and students need.

What about online safety – how can you support schools in protecting students, whilst still allowing them to make the most of the internet as a resource?

It's vital that schools have a filtering solution which is flexible enough to support safe online learning whilst also protecting against content which could be unsuitable or disruptive for your school community.

Filtering in educational establishments has changed dramatically, it used to be a matter of locking down almost every site so that staff and students had restricted access. Now there's a real need for filtering to be flexible enough to allow users to access the wealth of educational resources available on the internet. With the focus on individual and age appropriate filtering and reporting requirements set out in the Keeping Children Safe in Education (KCSiE) guidance from the DfE, our filtering solution, RM SafetyNet allows schools to easily differentiate the filtering experience of students, staff and groups.

How complicated is the transition for schools likely to be from their current provider to RM?

Transition to RM Broadband is really easy as each service is managed by a dedicated co-ordinator who's responsible for making the journey as smooth as possible. We've been transitioning schools for over 26 years so are highly experienced and know how to mitigate any issues that may affect telecoms deliveries. We've also designed our services to minimise the overhead on the schools, for example we configure our network so that schools don't have to change their IP ranges on their network which is a common requirement for other ISPs. Additionally all our Core services are cloud hosted, therefore, the school does not have to install new hardware onsite or have to worry about the ongoing management of the services.

What do you offer by way of ongoing support for schools that choose RM as their broadband provider?

Operating exclusively in the education sector, we fully understand the specific requirements of schools and have therefore tailored our support service around these. Our support service is available to our customers 24x7, via telephone, email or our online portal. The Service Desk are always available to provide reactive support, additionally your Internet Service will be proactively monitored to ensure optimum uptime is maintained.

Our nationwide network of service and account managers provide a personal customer service to our schools. This helps customers achieve the best value and make best use of the services we provide, but also allows them to lean on our experience in the wider education ICT sector to help improve learning outcomes for students.

Visit: www.rm.com/broadband Call: 0800 046 9802 Email: rmbroadband@rm.com

THE FUTURE IS CASHLESS...

...so here are some things to bear in mind if your school is still debating making the switch, says **Nigel Walker**

We might have got fancy new translucent five pound notes, and securer-than-ever dodecagon-shaped one pound coins in the last twelve months, but no amount of state-of-the-art currency is going to change the direction in which Britain and much of the world is heading. Cashless solutions are swiftly going to become the norm in most societies. And as far as UK schools are concerned, the use of cashless catering systems is already very well established.

For schools that haven't adopted such a solution yet, what benefits are they missing out on – and what things do they need to keep in mind when making the switch?

Speed and capacity

Of course, the main intention of switching to cashless catering is generally to make getting lunch quicker and simpler for students. In this way, queues can be reduced and footfall increased. This can increase the revenue and profitability of the service and help the kitchen work to maximum capacity. However, schools do need to ensure they actually have the resources to cope with an increased demand – in terms of staff, kitchen output and seating.

One way of doing this would be by investing in larger kitchen and dining facilities. But the quicker and more affordable option schools might consider is staggering lunch times between the year groups. It might mean the dining hall is open for longer, but if the numbers justify the extra time, then the profitability should not be affected.

The adoption of cashless systems can often help improve kitchen efficiency overall. An online cashless system will create data that can be analysed for areas of improvement. For example, it can help kitchens identify what is or isn't popular on their menus, adjust their workflow accordingly, and control stock better. Systems that allow pre-ordering also help better manage stock and speed the flow during busy times.

Right for your school

Of course, even with a cashless solution, students must make a payment – and there's more than one way to do that at the 'till point'. Schools can decide to provide students with PIN codes or passwords

to make their payments, or they can use a system based on a smartcard. But many opt for a biometric option, typically a fingerprint. That's because biometrics have the advantage of using something students can't lose, forget, have stolen or loan to someone else.

Schools should take time to choose the best solution for their situation. Perhaps they already use smartcards for attendance; the cashless catering system could be integrated onto the same system. Importantly, schools should be prepared to be open with parents and include them in the decision making process. Through consultation, schools can find the best method for their students, keeping in mind the need for alternatives that help ensure flexibility.

And while it's the students on a day-to-day basis who will benefit most from cashless catering, schools should keep in mind that parents are also big winners too, and let them know that.

Parents can top up their child's account easily from home with cashless catering solutions. They can also keep a close eye on what their child is eating, ensuring it fits into a healthy balanced diet. The same can't be guaranteed when parents send their child to school with lunch money. Vending machines, the local corner shop, or even the chippy on the way back home, often end up as the real recipients of that cash.

Inclusivity and funding

Perhaps the number one benefit of going cashless is the boost it can give to the take-up of free school meals. There are far too many children out there, entitled to FSM, who simply don't get them. Sometimes parents are too proud to sign up, or young people feel embarrassed when they receive their meal for free, while their friends pay. No child likes to be singled out in this way. Cashless catering gives users of the system their confidentiality back. Students receive and 'pay' for their school meal in the same way as every other child. This can therefore be used as an encouragement for parents to sign up – and of course, more take-up of FSM means more pupil premium funding for the school.

Cashless catering improves inclusivity in that way for free school meal entitled students, then; but schools also need to be aware that they need to accommodate parents who do not have a child on free school meals, but who might not have the capacity to top up accounts online from home. Schools should look for solutions that allow for PayPoint locations to be used. And cash loaders should always be available on school premises, so accounts can still be topped up using cash. Failing that, schools should accept cheques sent in by parents, and do the topping up for them.

An added bonus is that parents who buy into the online payments solution for catering are likely to be open to using it for other things, too, such as paying for school visits, peripatetic music lessons and so on. In this way, cashless catering can benefit other school processes, and raise parental engagement.

In short, there's more to cashless catering than first meets the eye. While getting more children a healthy lunch on a daily basis will always remain the key benefit, this kind of system can impact schools in a multitude of ways. And while there's a number of things that schools need to consider when making the switch, they can also rest assured that the benefits will most likely go far beyond what they might first expect.

ABOUT THE AUTHOR

Nigel Walker is managing director of BioStore

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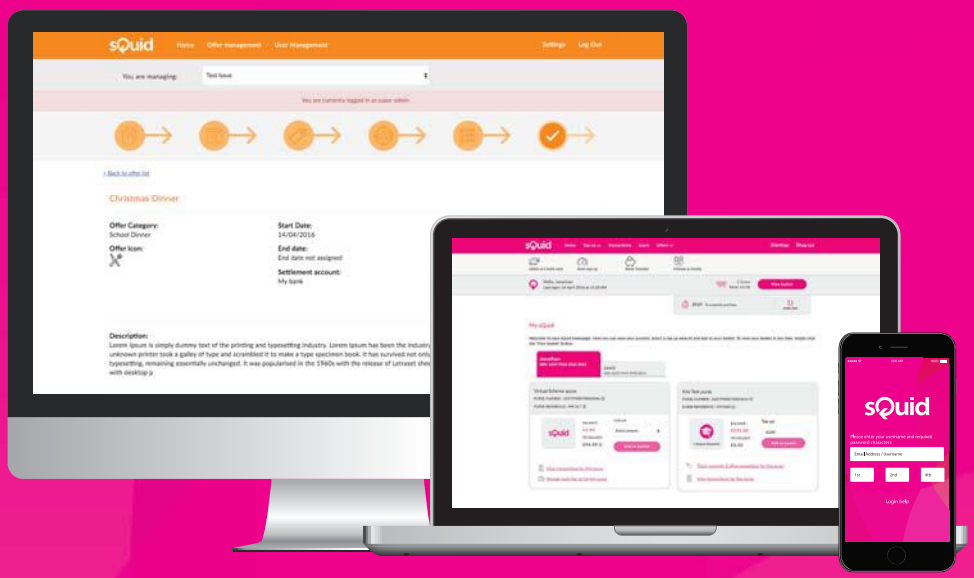

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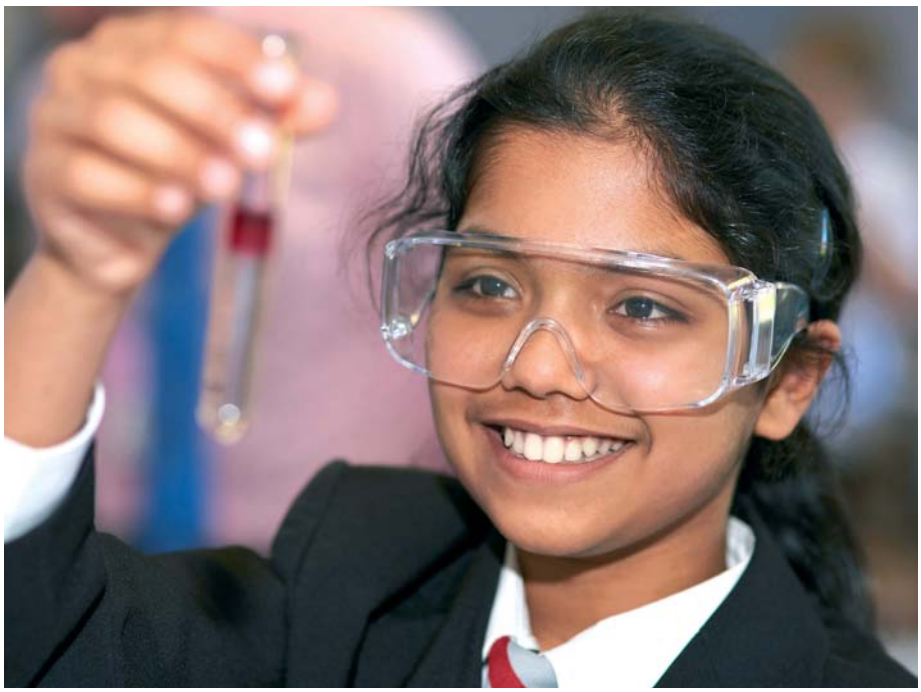

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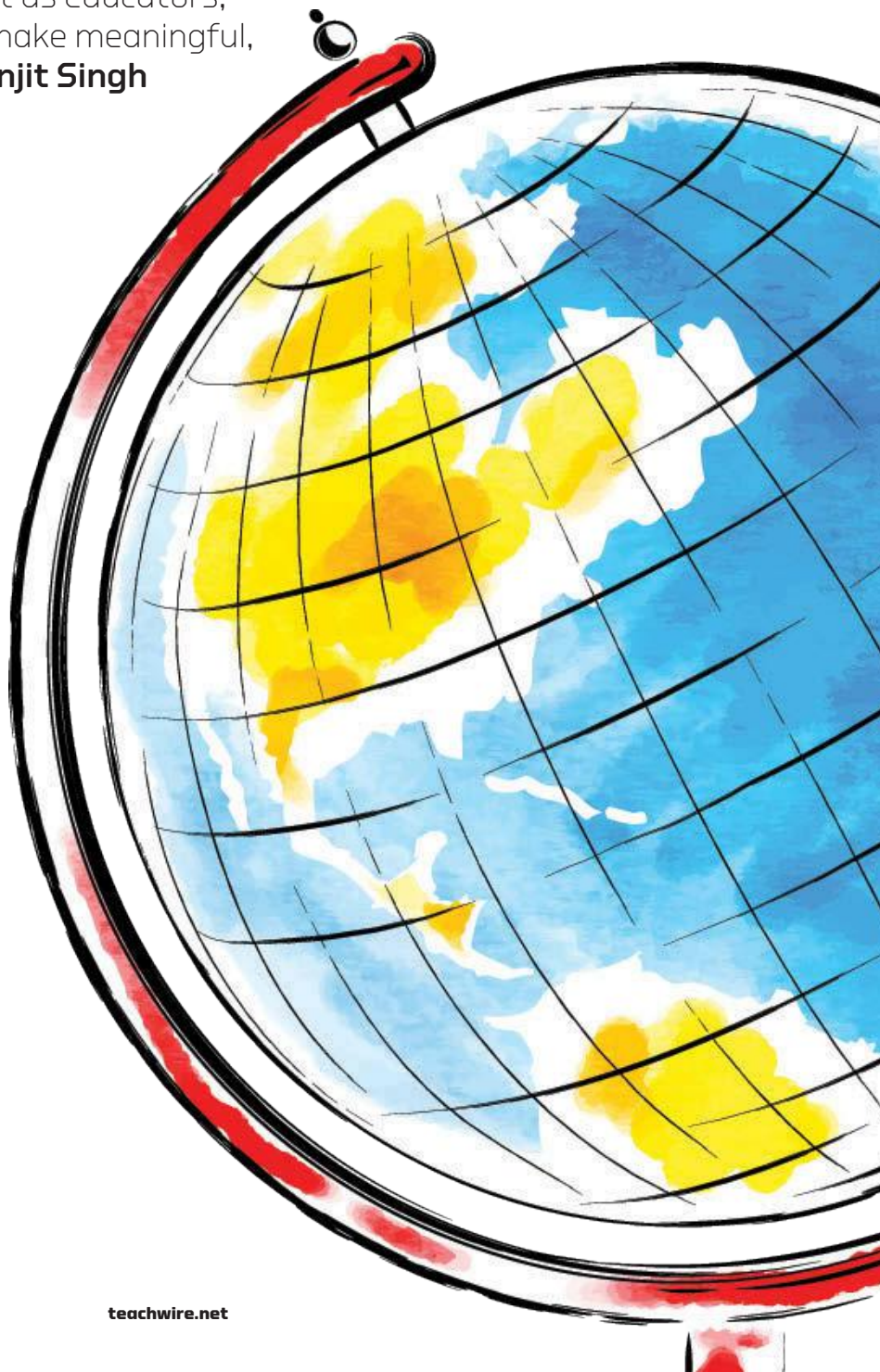
A WORLD OF OPPORTUNITIES

Adults often complain about young people being 'isolated' by technology – but as educators, we can use it to help them make meaningful, global connections, says **Ranjit Singh**



People are constantly looking for new ways to expand their horizons and connect with the world around them. In the year 1300, the invention of the compass arrived in Europe; the 1800s saw the development of the first cars and the invention of telephone and radio communications; by 1914, the first commercial flights between St Petersburg and Tampa paved the way for modern air travel; and in 1989, the internet as we know it was born.

We are constantly innovating, and this sense of discovery has always been in our DNA, but alongside this is a need to develop global mindsets, which has never been more important than for our young people today. As they move into the future, the social and political landscape between nations and the global economy will inevitably change, so being able to work with people from across a wide variety of cultures, backgrounds and nationalities will be essential.

An immersive environment

We often hear that the best way to really understand and learn something is to immerse yourself in it. It's part of the reason why conversation-based teaching programmes, and actually spending time in a different country, are far more effective for learning languages than phrase repetition. But while it would be fantastic to bring students on around the world field trips, this isn't realistic or feasible. So, how can we inspire this sense of immersion within schools?

This is where technology comes in. The acceleration of edtech and digital communications over the last few years has allowed teachers and learners to access a wealth of knowledge and inspiration online. As we continue to make the classroom more digital, we're establishing the potential to literally bring the world into the learning space, using the latest technology.

One of the most interesting developments in this is the increased use of virtual reality (VR) in education. Students are able to use headsets to travel anywhere in the world, without having to leave their desks. While this technology is becoming more affordable, we have a long way to go before it can be considered as a go-to in classroom learning. However, there are ways in which schools can use this type of experience with the technology they already have. For example, there are many 360° videos available online which can be accessed through a range of devices, in order to guide pupils through a dynamic, real-world landscape where they can explore it themselves.

Human contact

Another important factor to consider in this is the human aspect of learning. By talking to others about their experiences of life, or their understanding of a subject, we develop a richer contextual knowledge and develop a new perspective. In this way, communicating with other pupils from across the world presents an incredible opportunity for enrichment. The most dynamic way of achieving this of course is through video conferencing platforms, where students can ask each other questions, present ideas and discuss topics as a group. This means that young people who would never usually be able to work together are effectively in the same room, participating in the same lesson.

Of course, because of timezones, there may be some difficulty in establishing these sorts of sessions, but that doesn't mean that you can't create a collaborative space for these pupils. Using a team creation platform means that the children can contribute to the same document whenever they can. For instance, you could run a question and response exercise, where one class writes a list of questions on a topic that the other class answers before writing their own questions and so on. You could even run this as a partner task, where two students from different parts of the world write a project together that they can present to their respective classmates.

Responsibilities and rewards

Children have a natural affinity for technology and often know more than their parents and teachers when it comes to digital content. However, this freedom to create and communicate does need to be guided in terms of digital citizenship to ensure that they're behaving responsibly and appropriately online. This is a huge part of their career development as well, simply because they will need to have a positive digital footprint that people, and potential employers, will find if they search their name. This includes what they share with each other on social media, comments they leave on websites, and their content on blogs and other online outlets. Working on this in an international way means that children not only know how to respect people locally, but also those from different backgrounds and cultures, further developing their empathy and their ability to communicate well.

International lesson ideas to try this year...

+ Classroom field trips
+ Cross-continental and live Q&A sessions using video conferencing
+ Global research projects
+ Partner exercises through shared documents

There is a distinct excitement that comes from this immersive, international mode of learning. Much like the joy of seeing a letter from your penpal, the thought of an email or instant message response from your friends across the world is a great motivator for young people, and the development of technology has made this immediate, so that you're not waiting weeks for a postcard or letter. Your pupils could send a message to friends in Germany, Japan, Australia, or anywhere else in the world, and have a response waiting for them the very next day!

Technology has given us the ability to forge global friendships and explore new places and cultures from home. By encouraging this discovery as part of education, more and more young people will be inspired to travel internationally and get involved with worldwide opportunities, work and industries. Using the technology at our disposal means that we can achieve this from anywhere and across any distance. It is something that should become a consideration in all schools, not just to learn languages or understand cultures, but in a cross-curricular fashion to develop a truly collaborative approach to learning. The world is huge, and there is still plenty to explore, but the classroom is an infinite space, into which we can bring a great deal of this wonder.

ABOUT THE AUTHOR

Ranjit Singh is CEO of Genee World

Better, Safer and **More Efficient**

Electronic visitor management systems are a safeguarding must-have – but can also provide valuable data for school improvement, suggests **Alain Squitieri**

Electronic sign in and visitor management systems are a relatively new phenomenon in education. They came about due to the increased need to safeguard children in schools; but since their early inception, they have evolved into much more than just a tool for protection.

With no concrete guidance from Ofsted, there are a lot of schools panicking that they are not doing enough – or the right thing – when it comes to managing DBS checks.

Keeping an accurate Single Central Record (SCR) for DBS checks is an essential part of ensuring child safety, but to date, there is no national guidance on the format for the SCR. By using a sign in system as your SCR, schools can ensure that every visitor and staff member has had the necessary checks completed.

Schools also perform rolling DBS checks – every three or five years for staff, and every three months for onsite contractors. The way in which this is managed differs from school to school, and is usually built up from various legacy processes and changing guidance from Ofsted. Because sign in systems can manage a school's SCR, they can also easily manage when DBS checks are due to expire and when they need to be completed electronically through notifications and alerts. This not only saves administrators a lot of time trying to track them manually, it can also remove a lot of the nerves surrounding DBS management.

Attendance tracking

It's not just safeguarding, though, where sign in systems are having an impact; for example, when children arrive late it's easy for them to fall through the gaps and head straight to class. Schools can utilise their sign in system to provide late passes, reasons for lateness and get photos as evidence to make sure individual attendance targets are kept well on track. Some schools have even found that by having a sign in solution for late arriving pupils it has boosted attendance as Ann Davey, executive head teacher at Havelock Schools Trust, explains: "With the best will in the world, lateness does happen. What we've found though, is by having a late sign in system it's actually helping to reduce the number of children who are late."

The ability to manipulate and utilise this attendance information allows schools to provide instant reports, with feedback sent

daily to heads of year detailing late arriving pupils, and means that attendance officers have much better access to accurate data when monitoring performance.

Emergency evacuation

Accurate data, coupled with an integration into a school's MIS, gives schools complete control when it comes to managing emergency evacuation situations. Evacuations can be slow, disorganised and inefficient; but accounting for all staff, students and visitors following an evacuation is critical. Confusion in the assembly areas can lead to delays in rescuing anyone trapped in the building, or unnecessary and dangerous search-and-rescue operations.

No longer do staff have to collect all the various books to tell them who is onsite - sign in systems can provide all this information from one location. Schools can either print a list or access it through any mobile device. This gives schools real time information as to who is onsite across multiple locations.

Staff access

In schools with multiple entry points, it can be difficult for staff to come to the main reception to sign in every day, resulting in a lot of wasted time being spent wandering the corridors. Because of this, staff often forget to sign in or out, or just don't have the time do it, as getting to class is their number one priority.

As a result, sign in information held at reception in a school often simply doesn't correlate with who is actually on site. By utilising a school's existing ID cards, staff can come in at whichever door is easiest for them, they just scan their card and this accurately shows that they have signed in, allowing them to immediately focus on teaching and learning.

Multi-site Solutions

We've seen a huge change in the education landscape in recent years. The formulation of multi-academy trusts (MATs) has meant there are now often several people in an organisation who work across different sites, from executive head teachers right through to facilities managers. With so many staff members in and out across multiple sites it can be hard to keep track and know exactly where they are based.

By hosting a sign in and visitor management system on a school's own server, or virtually on the cloud, it allows communication between systems that are on separate physical networks to facilitate the sharing of data between multiple systems in real time.

Each individual school system can remain a self-contained unit, reporting various collections of data to one central database. As such, each system can then be configured in a completely individual manner, using different integrations, modules and settings specific to that site. This MAT-centric approach gives schools greater flexibility to manage cross site reporting and means MATs can:

- allow staff to roam between sites by passing personnel records from the central database to remote individual school systems;
- automatically sign staff out of other satellite systems when signing in at a new one;
- allow staff to sign into the central database and run cross site reporting;
- allow access to all other personnel features on a cross-site basis;
- have access to a central cross site DBS/ personnel list.

With the current economic climate and the need for technology to do more for less and be delivered on a tighter budget, sign in and visitor management systems present schools with the opportunity to look beyond their initial capabilities. Schools can take the valuable identity information that they receive and retain, and repurpose it to help them run better, safer and more efficiently.

ABOUT THE AUTHOR

Alain Squitieri is Sales Director at InVentry (inventry.co.uk)

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The Inside Story

Phil Brooke - InVentry

Phil Brooke, owner and director of InVentry, has always had a passion for simplifying complex processes using technology, especially when it comes to education.

There are some people who walk into a new environment and immediately starting thinking of ways to improve things; finding solutions to problems that no one else has even noticed are an issue. It's amongst these people that you'll tend to find our nation's entrepreneurs - of whom Phil Brooke, owner and director of InVentry, is most certainly one.

Phil started his first business while studying at college, offering computing and technical support to local primary schools. He then went on to work as an IT technician in a secondary setting, progressing his career until he found himself in the role of network manager at St John Fisher School, at only 23 years old. It was here that when presented with an early version of a tablet, Phil's innovative use of technology allowed him to transform an outdated paper based system, by creating the first ever visitor management solution that was designed and built specifically for education.

Room for improvement

The issue that initially caught Phil's attention while at St John Fisher, was school safety and the efficiencies surrounding it. "Typically," he explains "there were several books in a reception area, one for staff, one for pupils and one for visitors that all need to be reconciled in case of emergency or just for general verification, all with no visual identification. This was incredibly time-consuming, and left schools vulnerable. I created InVentry to deal with these issues, and since then

we've developed it so that we're now the single central record for DBS checks in a school – for both staff and visitors. In the case of the latter, InVentry prints out clear, photographic visitor badges which are marked with the correct time, date and purpose of a visit. From a safeguarding perspective, it means a school always knows who is onsite at the click of a button."

A simple idea that has revolutionised signing in for schools has not only been built on hard work, but also the admiration of schools who are using it, as Phil explains. "In the early days we got recognition because people had seen InVentry in another school, to this day schools still approach us for the same reason."

Leading the way

Nearly 4,000 schools nationally now have InVentry, with the system handling a staggering 49 sign in request every second, but a lot has changed since InVentry started out. "It was a real game changer when we became a SIMS partner and provided full read and write integration" says Phil. "We were the first to offer a fully integrated sign in system to include late arrivals and early leavers. This information feeds directly into SIMS, enabling the school's attendance officer to keep on top of the data in a fraction of the time it would take to sort it all out manually. In a large high school, you could be talking about freeing up three or four hours every day for that individual to focus on looking for patterns, identifying issues, contacting parents, and so on."

As stories of edtech innovation go, InVentry is an inspiring example - and it's far from over. "We adopted the cloud some time ago to allow our evacuation app to access real time information across multiple devices," Phil observes. "Now we're taking it to the next level."

Phil has big plans for MATs and bringing the system into classrooms, allowing teachers to book in their own visitors, for example, or report incidents directly from their own laptop or tablet. These aren't fancy additions for new customers only, either - Phil is clear that once a school signs up for InVentry, they become a part of the development process. "We have a 99.7% retention rate," he states, with quiet pride. "Providing ongoing support and improvements, including training, has been a key to our success."

Timeline Highlights

2011 – First school receives InVentry which began life as visitor and staff management only.

2012 – Launched fire evacuation app, DBS checking and late student area in InVentry

2013 – Became the first sign in system to provide full read and write integration with SIMS

2016 – Introduced MAT functionality for multi-site sign in to support the changing landscape in education

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IT'S ABOUT THE ACCESS, STUPID!

It's taken a while, but self-confessed technophobe **Julie Murray** reckons she's finally got the point of edtech

I'm fairly happy to admit I'm a Luddite. I suspect it's a little bit of hereditary, a laziness to get to grips with new contraptions, and a genuine love of analogue things like paper and pens. I've never really understood the rise in video calls on phones for instance. Each daily commute will offer up a fellow passenger complete with phone extended at arm's length, walking down the stairs of a bus, happily chattering away to their buddy. To be honest I find the whole thing pretty nauseating – but then, I'm rather a miserable person.

A more open world

However, today I had an epiphany. I walked past a woman, gesticulating eagerly into her phone as she made a video call in the corner of a train station. As I neared her, it became clear she was signing, and that either she, or the person she was calling, was deaf.

It hit me like lightning, and with some degree of shame, that regardless of what I felt about the technology and the uses I could make of it in my life, for this woman or her friend, technology was revolutionary – it had entirely changed the way they interact with people and understand the world. A relatively small, everyday innovation had given her access.

I think that's how we need to view edtech. Putting aside personal feelings of 'gimmick', but also dispassionately considering 'to whom will this give access?'; 'whose education will this revolutionise?'

Not what, but when

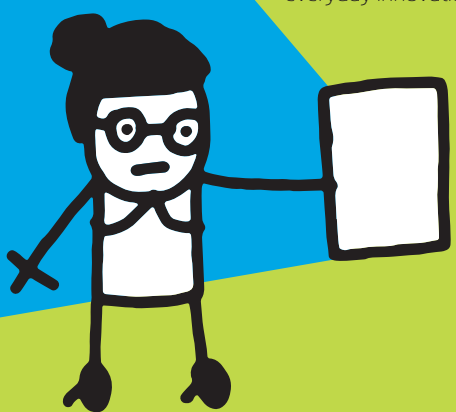
I've been to BETT for the last two years, of which I (bizarrely?) knew nothing when I was a teacher. There's so much there, from resources to teaching tools to software to VR headsets. What strikes me most as I wander the miles of stands is that we need to stop trying to find the technological silver bullet in education – we've got them all. Instead we need to focus on when to deploy the different bullets for maximum impact.

I now kick myself that I didn't use screen recording software for instance, to record explanations of the next KS3 assessment, so that students – and indeed parents – could look at the recording at home, rewind and replay it, until they understood what was needed. Not only would I have saved half a lesson going through the markscheme, but might have received higher quality essays in return - which I could then discuss with parents who were better informed and had a firmer idea of what I expected in my assessments.

It's not just about access for students, but for teachers too. I hate that I made so little use of Microsoft Office. If I'd known how to properly use pivot tables, and mail merges and track changes, I might have saved myself a whole heap of time monitoring data or emailing parents or getting students to improve essays. Would I have had to spend hours trawling the internet for resources if I'd known how to put together a basic animation in PowerPoint that would perfectly and visually explain the pendulum of the Tudors or the swing of each Reichstag election in Hitler's rise to power?

Everyday innovation

So, my technophobic view of edtech is essentially this – can we drop the 'ed'? Technology companies that sell to schools seem to have come around to knowing that tech is the means not the end – it has a place in the teaching toolkit but not supremacy over it. I'd like to see things go a step further though. Rather than focusing on bespoke and specialised devices fulfilling one or two functions (lordy, when I think of those voting pads which languished in the cupboard year on year!) – and which in their own way encourage technophobia – could we instead invest in training teachers up to use everyday tech more effectively? And always to ask, when adopting a new device, resource or approach: to whom will this give educational access?



ABOUT THE AUTHOR

Julie Murray is an ex-head of history & politics, who still retains a keen interest in education.

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