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## Welcome...



After the most unpredictable, demanding and exhausting period the profession has ever experienced, schools are effectively back in business. By July, students had returned to classrooms. Lessons were being taught. In the run-up to the end of term, we were even told that school bubbles were no longer a thing. So ... does that mean we can bid farewell to Zoom meetings, remote lessons and plaintive cries of

'Can you hear me? Are your mic and speakers on...?'

We doubt it. The loosening of pandemic restrictions came just as the Delta variant of the coronavirus was forcing classes, and even entire year groups to stay at home. As has often been the case of late, we simply don't know what the picture will look like once schools are due back September. We can hope for best, sure – but as staff up and down the country know all too well by now, one simply has to plan for the worst.

Still, whether the remote learning tools implemented over those frantic spring and summer weeks in 2020 are used at scale again or not, they've brought about major changes in the way schools now operate. Whether it's engaging parents in a variety of new ways (p68), providing catch-up classes (p84) or addressing the needs of learners with SEND in particular subjects (p92), the technology rapidly adopted by schools last year has many potential uses.

School leaders, heads of department and teachers have thus learnt a great deal about the business of acquiring technology and rolling it out though as noted by Ben Antell (p75) and Ed Fairfield (p78), it's worth exploring how both processes can be made smoother for yourself and your colleagues in future.

And then, of course, there's what the students are learning. A recurring theme this issue is that computer science involves more than just coding. with Tony Parkin calling out the apparent loss of digital literacy from the core computing curriculum (p98), and Adrian Briggs echoing similar sentiments, from the perspective of a former IT professional turned computer science teacher (p10).

If the past year has taught us anything, it's that our established routines, assumptions and habits can be upended at a stroke. If the message from subject specialists is that students need a solid grounding in not just how IT works, but

also how it's used and how it can affect us in order to confront tomorrow's unknown challenges - then it's perhaps time we started listening.

Best wishes

**Callum Fauser**, editor callum.fauser@theteachco.com

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#### **ON BOARD THIS ISSUE**



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has been fantastic as a way to introduce technology, coding and digital skills to my pupils. It sparked new conversations and the level of engagement was great to see."

Robert Bradley, Director of Computing at UTC Reading

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Help your students recognise the rich possibilities presented by cutting edge tech, with this digital skills programme from Microsoft

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embedded AI already is in our lives, as well as how interconnected everyday objects can share information, and start to see the impact this is having on industry and the environment.

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## CELEBRATING STEM

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Why a lack of cyber of education in schools is harming students' career prospects Curriculum leader and former IT professional **Adrian Briggs** reflects on his efforts at broadening the appeal of computer science, and why there's much more to the subject than coding alone

**VITHOUT LIMITS** 

Computer science

ne of the problems we have at the moment is that a large number of students assume that computer science is 'just coding'. There's been so much emphasis on getting students trained up as coders, that that's pretty much all they think it is.

One of our key priorities at Middleton Technology School has therefore been to make sure they have a better understanding of what computer science actually is – not just coding, but also the actual workings of computers and an awareness of how to use the internet safely. Given how much more reliant students have become on technology in their homes, it's more important than ever that they can confidently and effectively use the devices they have.

We don't want them to be overly cautious, or afraid of the technology they have access to, but we do want them to use it for more than its basic purpose, while making computer science more accessible and available to everybody.

#### **Shifting attitudes**

The subject still carries some cultural baggage, but we've seen attitudes start to change. We've previously hosted many after-school computing clubs for primary children, who are already familiar with coding from lessons in their setting. It's obviously not been possible to host these in person of late, but we've been able to do so via Microsoft Teams. More broadly, our recent

use of online learning at Middleton has been interesting to observe. In my experience, at least, it seems to have given girls more confidence in computer science lessons, since they're not in the classroom and the boys aren't looking at them. That appears to be a cultural issue - girls have often been reluctant to raise hands in lessons and answer questions, because it's still deemed to be a 'boys' subject'. I've seen the boys actually become less vocal in online lessons, at the same time that the girls are starting to thrive.

Last year, we had a number of girls choosing to do GCSE computer science because they had ambitions to become architects, and could therefore benefit from knowing how to lay out network cabling and infrastructure in buildings.

That ties into the various programmes we regularly sign up for – not just on the e-safety side of things, but also code clubs for those kids who are into coding and game design, as well as initiatives related to practical computer science for those wanting to explore hardware and build

computers of their own. We've also signed up to become a Cisco Networking Academy, and have joined the iDEA Award programme, which lets students earn badges for developing their digital, enterprise and employability skills. Of course, we also still have our coders, who regularly participate in various hacking challenges and the worldwide Hour of Code event, as well as Safer Internet Day.

#### **Real-world examples**

Our subject puts us in something of a unique position. With technology changing all the time, our specification has to change with it at least every two years, as new things are added by the exam boards. Luckily for us, however, our students tend to be highly engaged with computer science in different contexts outside of the classroom, which we try to incorporate into lessons where we can.

That might involve us looking at recent news stories. We've previously done some teaching around hacking, ransomware and similar activities, building on the NHS hack that took place in 2017 – encouraging students to research the topic, and exploring its links to different areas. I'm always looking for ways of building similar real-world examples into the curriculum.

To highlight a more recent

CELEBRATING STEM

#### "I've seen boys become less vocal in online lessons, and at the same time seen girls thrive"

example, the PlayStation 5 games console was released at the end of 2020, but people have since found it very difficult to purchase one. We'll ask our students to consider why supplies of this particular device are so limited and what's preventing it from getting into people's hands.

A new addition to this year's curriculum has been artificial intelligence. I saw in the news recently that an AI in

Japan originally built to distinguish between different types of pastry at shop checkouts has been re-programmed to identify cancer cells. If I raise that with my KS4 computer scientists, their first instinct will be query that, due to the popular misconception that AIs are essentially robots, because that's what films have taught them. Well, this one isn't – but look what it managed to do!

#### Hands-on hardware

Up until the first lockdown, there hadn't been much call for us to closely examine how the department was resourced in terms of devices, technology and software. This year, however, the IT manager of our MAT, Great Academies Education Trust, was able to buy devices in bulk, which has been a massive boon for our students.

When it comes to teaching lessons around networking equipment and similar technology, teachers are often limited to just describing what a server or network switch is, since the physical hardware is often expensive and difficult to source. We've been very lucky, however. Having previously worked as an IT support engineer, I have a good relationship with our IT support guys, who now pass on to us any networking equipment they have that's been decommissioned or which they can't use anymore.

This allows me to not just show our students what a server physically looks like, but actually create an ad-hoc network configuration right there in the classroom that the students can study. The same applies to old computers, which we'll open up so that the class can get

#### **TEAMS TALK**

As the school's lead teacher of virtual digital technology, it was my responsibility to show the rest of the school how to use Microsoft Teams. That involved getting our staff in before September 2020 and showing them exactly what they needed to do, then doing the same for our students when they returned.

It was necessary to put a large volume of policies in place to ensure that pupils were sufficiently safeguarded, which involved a series of meetings where we discussed the IT freedoms we wanted them to have. My technical background allowed me to work closely with our IT support team and pass on what they were telling me to nontechnical colleagues in a way they could easily understand.

Early on in the process we received many queries from students and parents, so I made a series of support videos for both groups and made these available via a dedicated support page on the school's website which can be viewed via bit.ly/ts103-stem1



a good look inside.

What we really want to impart, however, is that a 'computer' is now effectively any technology they can hold in their hands. The more we're able to drill that into them – that computer science doesn't just revolve around big black boxes sat on desks – the more likely it is that we'll be able to engage them in thinking much more deeply about computer science.

#### **Next steps**

It was obviously harder than usual to determine last year's student destinations, but it seems to have been an interesting mix. It used to be just our coders going on to do computer science at college, alongside the odd one or two wanting to specialise in the internals of computers and pursue apprenticeships, but that's changing. We've previously had three students go on to do game design at Manchester University, two of whom were girls, which was fantastic to see. We're gradually increasing the number of girls picking computer science as an option, but it's still nowhere near enough.

There are now more hands on' students interested in applying for apprenticeships, though for the coders, the next step is still college. I'm now hoping that the incoming T Levels will help to mix things up further and give our students even more options to explore.



THE AUTHOR Adrian Briggs is curriculum leader of computer science and lead teacher of virtual digital technology at Middleton Technology School; for more information, visit middtech.com or follow @Middtech\_sch

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## **SELF-REGULATION AND SCIENCE**

**Dr Andrew Chandler-Grevatt** explains how subtle shifts in focus and self-regulation strategies can deliver better outcomes in your science lessons

ith face-toface teaching becoming ever more challenging in our post-COVID schools, many teachers have started looking more closely at how to develop students' abilities at tackling tasks more independently. Even beyond those immediate concerns, the broader picture is that independent learning remains a highly valued characteristic among school leavers and is widely recognised as an important life and work skill.

Science lessons are an ideal environment in which to develop students' selfregulation skills – here, I'll explain why.

#### What is selfregulation?

There has been significant research interest into self-regulation, particularly in terms of how it can be best taught to students. The definition of 'self-regulated learning' isn't set in stone, but can vary widely when applied to learning. The form of self-regulation that science teachers will likely want to develop is 'academic self-regulation' – that is, a set of strategies students can apply when planning how they will learn, monitoring their learning and evaluating how successful their learning has been.

While there is some crossover with metacognitive strategies, I'll be concentrating here on academic self-regulation before outlining a five-year approach to developing independent learners.

The Education Endowment Foundation has previously stated that self-regulation strategies can increase student progress by an equivalent of seven months. Its 'Metacognition and Selfregulated Learning' guidance report (see bit.ly/ ts98-eef-meta) highlighted just how important both self-regulation and metacognition skills are, and emphasised the useful

#### 1. Learning new content

A primary focus within science lessons will obviously be the acquisition of new knowledge. One common homework activity, for example, might involve asking students to learn the symbols for the first 20 elements of the periodic table – in itself, a potentially daunting task.

However, enacting a small shift from simply *setting* the task to presenting a strategy of *how to achieve* the task can increase students' chances of success. Introduce your learners to

#### "Self-regulation strategies can increase student progress by an equivalent of seven months."

role they can play across different subjects, given the difficulties students often encounter when applying generic skills to highly specific tasks.

Self-regulation can be a complex concept to grasp, but it's possible to introduce it to science lessons by making a few simple shifts in focus. The main overriding strategy for self-regulation is the 'Plan, Monitor, Evaluate' cycle, each stage of which can be applied to a student's learning process - so let's examine how three particular shifts in focus can go on to affect the use of common science lesson activities.

the aforementioned Plan, Monitor, Evaluate strategy by posing the following questions:

How will you go about this task? (*Planning*)
How will you check your progress? (*Monitoring*)
How will you know that you've succeeded – or what you need to do to succeed? (*Evaluation*)

The teacher can introduce some ideas for achieving this, and the students could be invited to suggest some strategies they might have used in their learning before. In this instance, flashcards could be made with the element names on one side and their corresponding symbols on the other for self-test purposes. Students could check their progress by browsing through the flash cards in a random order once with element names face up, then with the symbols face up, and finally with a mix of names and symbols showing. The students can test themselves, or ask someone in their household to test them, sorting the cards into separate 'learnt' and 'to be learnt' piles as they go. For elements they keep getting stuck on, helpful memorisation methods might include drawing pictures for the elements and their symbols, or attaching them to mnemonics and acronyms.

#### 2. Explicit modelling

A second example of a self-regulation strategy involves using physics equations to perform calculations. Instead of simply giving an equation to students, alongside some problems it can be used to solve, we can shift to promoting selfregulation by explicitly modelling the planmonitor-evaluate process when faced with a specific science problem.

In this instance, let's take the equation used to calculate power. The teacher models each step in using the equation to perform a calculation, while clearly explaining their thinking behind what they're doing.

First, the teacher describes *how* they plan to tackle the calculation. highlighting how it's laid out on the page and how they're able to make sure that they have all the information they need. As they go through the equation, the teacher then shows how they're able to monitor what they're doing - which will include checking that the values are attached to appropriate units and identifying any conversions that may be needed. Finally, there's the need to check that the answer 'looks right.'

An increasingly common technique is the 'I, We, You' approach. The teacher models the process (T), the teacher and class do the next example together ('We') and then the students have a go on their own ('You').

#### 3. Activating prior knowledge

Prior knowledge will commonly be activated using a form of retrieval practice. A shift towards self-regulation in this area would be to encourage dialogic talk that is structured and focused on the process of learning.

This can be done by giving students a list of prompts to consider and discuss, for example:

- What do we already know about photosynthesis?
- What other knowledge [big ideas or concepts] will be useful?
- What strategies have we

used before when learning a new topic?

• How could we improve how we learn?

It's important to develop students' competence in selecting, using and applying self-regulation strategies to support their learning. Just like any other skill, it will need to be modelled, scaffolded and developed until it can be independently demonstrated by the student.

I hope this article has shown that implementing self-regulation strategies into your teaching needn't require making significant changes, and that small shifts in focus and expectations can lead to markedly improved levels of independence among students.



#### 5-YEAR 5 Below is a pathway

for developing key selfregulation skills over the five years of secondary science that consists of three stages - 'trying out', 'using' and 'applying'.

#### Trying out

In Y7 and Y8 the focus can be on trying out selfregulation strategies. Teachers introduce a range of self-regulation strategies during these years, modelling them and encouraging students to try them. Students begin to evaluate them and decide which ones will work best for them.

#### Using

By Y9 students should be making frequent use of self-regulation strategies. They will now be familiar with a range of different strategies, and with the right support, be capable of tackling new problems more independently.

#### Applying

By Y10 and Y11 students should be routinely applying self-regulation strategies in support of their learning. They'll use a range of self-regulation strategies that work well for them, and apply them effectively when faced with challenges. By this stage, when the time for study and revision has arrived, students will be more independent in their learning.



#### ABOUT THE AUTHOR

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## FIFA for the Physics Win

**Gethyn Jones** explains how a four-letter mnemonic can help your students make short work of GCSE physics calculations...

s your physics department improvement plan barking up the wrong tree? If it includes such hallowed, yet shop-worn phrases as '*Improve six-marker extended writing answers*' then it may well be.

In the latest specifications for both GCSE physics and the physics sections of GCSE combined science, 40% of the marks are for calculation questions. Statistically, physics students are twice as likely to be asked to complete a multistep calculation for six marks than they are to write an extended answer in prose.

But how should we support our students? How do you move from a situation where the majority of students don't even attempt to answer the simplest calculation exam questions, never mind the more challenging multistep ones?

We've found 'FIFA' to be an invaluable tool for giving students the confidence to begin making incremental progress, which over time can lead to significant improvements. What is FIFA? It's a simple mnemonic that we encourage our students to use for every calculation, standing for 'Formula'; 'Insert values'; 'Fine-tune' (a deliberately vague term that occasionally equates to

'rearrange'); and 'Answer'. Let's illustrate its use by considering a typical 5-mark physics question – one which, prior to the FIFA initiative, the majority of our students wouldn't have touched with a barge pole:

'A car is travelling at 29m/s and has a kinetic energy of 525 600 joules. Calculate the total mass of the car. Show clearly how you worked out your answer and give the unit.'

#### Step 1 - write down the Formula

The required formula here, of course, is the kinetic energy equation:  $\mathbf{E}_{t} = 0.5 \times m \times v^{2}$ .

Higher paper candidates will have to recall this from memory. One argument which helped convince our students to memorise the 23 equations for GCSE physics was an analysis of a previous paper, which showed how a candidate who answered only the calculation questions correctly while leaving every other question blank would still have passed with a high grade 5. Calculations really can make or break a student's success in GCSE physics and science.

Many mark schemes will award a mark for correct recall of the appropriate equation. Even if our students did nothing else beyond this, they would have scored 1/5. This is worth emphasising, as some students can be

#### **THE QUESTION**

A car is travelling at 29m/s and has a kinetic energy 525 600 joules.

Calculate the total mass of the car. Show clearly how you worked out your answer and give the unit.

#### Standard approach:

 $E_{\mu} = 0.5 \times m \times v$ 

_	FIFA approach:
$m = \frac{E_k}{0.5 \times v^2}$	Formula: $E_k = 0.5 \times m \times v^2$
$m = \frac{525600}{1000}$	Insert values: 525 600 = 0.5 x m x 29²
0.5 x 292	<b>F</b> ine tune: 525 600 = 420.5 x <i>m</i>
$m = \frac{525\ 600}{0.5\ x\ 841}$	$\frac{525\ 600}{420.5}$ = m
$m = \frac{525\ 600}{420.5}$	<b>A</b> nswer: m = 1250kg
m = 1250kg	

paralysed by their desire for perfection – '*I'm not* going to get any marks for this, so what's the point?'

Replying with, "But you'll get at least one mark, so... why not?" will be a surprisingly powerful encouragement to many students (even if they won't admit it out loud).

#### Step 2 - Insert the values

Next, students extract the numerical values from the question. For this example, the second line that students write would be 525 600 = 0.5 x m x 292

This would gain a mark on many mark schemes, provided the correct values had been substituted into the correct relative positions. With the two lines they've written so far, our students will have scored 2/5, even if they make no further attempts at the question.

At this point, many teachers would encourage students to circle, highlight or colour-code the numerical values in the question. I'm agnostic on that, because such a process 'butters no parsnips' – that is, gains no marks. I tend to view it more as a displacement activity than a useful and effective action, but if students enjoy the colour coding, then I've no objections – providing they gain that second mark.

#### Step 3 - Fine tune

The term 'fine tune' was partly chosen for its ambiguity. Essentially, what we mean here is '*Do what you gotta do.*' Sometimes that might mean 'rearrange'; in other instances, it might mean 'convert units' (such as kilojoules to joules). Occasionally it will mean 'simplify!'

(Incidentally, we found that the concept of 'tuning' and 'fine-tuning' a radio set had to demonstrated to a generation of students more used to digital, rather than analogue entertainment!)

Back in step 2 we left our calculation answer as **525 600** = **0.5** x m x 292. The third line of our calculation should therefore be **525 600** = m x 420.5, since  $0.5 \times 29^2$ is 420.5. The students are now encouraged to work incrementally and sequentially, sub-step by sub-step, to complete the fine-tuning stage.

When I first started using the FIFA system, it was strange to discover that students who'd normally run screaming from the room if asked to rearrange the simplest three-term equation can easily take almost identical problems in their stride – but only when the symbols have been replaced with numbers...

The next (and in this case, final) sub-step is to rearrange (line 4): **525 600** / **420.5 = m.** 

#### Step 4 - Answer

The fourth and final step of FIFA is to calculate the final answer and state the unit. In this case, the fifth and final line of the answer will be m = 1250 kg which would gain the full 5/5 marks.

The correct final answer and unit on its own would also get 5/5 marks, of course, but the point of the FIFA system is to help students gain incremental marks along the way. It makes climbing what, to many students, seems like a very steep hill more manageable, as even a partially correct response will result in a significant confidence boost.

I'd recommend trying the FIFA system with students who struggle with fluency in mathematics, because chances are they'll struggle a little less as a result of using it. If you're of the *'rearrange first'* mindset, think of FIFA as cognitive stabiliser wheels – it can prevent a few knocks and bruises, and help students gain a little confidence before being ultimately discarded – though not, one hopes, before it's served its purpose...



ABOUT THE AUTHOR Gethyn Jones is a physics teacher living and teaching in London, and frequent edublogger; for more information, visit emc2andallthat. wordpress.com or visit @emc2andallthat

#### **'REARRANGE FIRST!'**

That's the phrase I'd have once squawked alongside the majority of physics teachers, firmly of the belief that the second step of our example question above should involve the following:

 $m = \frac{E_k}{0.5 \times v^2}$ 

However, there's a problem with this approach. In the majority of mark schemes, any errors in rearrangement or the subsequent calculation will result in zero credit. The 'safety play' is to always insert the numerical values straight into the equation before any rearranging attempts for 2/5 marks, rather than risk rearranging incorrectly and dropping back to 1/5 marks.

Rearrangement is also more cognitively demanding on students' mental resources, since they have to remember which of the symbols represent the unknown value and which represent the known, both before and during the rearrangement process – something second nature for expert teachers, but harder than generally acknowledged for novices! But if we substitute first, it becomes crystal clear what quantities are known, freeing up working memory for dealing with other aspects of the problem.

## "10 years from now, UK students will be left behind"

Tech CEO **Lady Mariéme Jamme** shares her thoughts on how STEM is currently being taught, and why coding isn't catching among students in the way it should be...

didn't go to school. I began to read and write from around the age of 16, then quickly moved on to reading intensively, before gradually getting into mathematics. Without a formal education, however, I struggled to get a job in my 20s because I didn't have the necessary credentials. Where I could, I would work cleaning jobs in hotels and restaurants during the day, before visiting my local library in the afternoons and evenings.

It was my difficulties at securing jobs that first inspired me to learn how to code. I immersed myself in basic coding skills, and just as I had with reading, began studying code much more intensively and eventually picked up seven different coding languages in two years.

#### A coding conundrum

Years later, I now wear two hats – I'm a software developer and coder, and also run a UK software company called Spotone Global Solutions which sells educational platforms, and supplies chain management software and enterprise resource planning solutions to government, private sector and charitable organisations.

Within the last couple of years I've begun trying to help marginalised girls across the world



#### "Those African girls who can code have experience of developing applications for the Android mobile platform, but many girls in the UK aren't even aware that Android exists."

without online access, and launched a charity called iamtheCODE, the aim of which is to teach a million women and girls how to code by the year 2030. We're now in 68 countries around the world and have taught 25,000 girls how to code so far.

I gave iamtheCODE a global focus, because I thought the problem of how to interest girls in coding was one you'd find in parts of Africa and South America, but I've seen just as many issues, if not more, in the UK. Here, the standard narrative is that we can do it all – but if you look at the take-up of coding among girls, what you'll actually find is that girls across South America, Africa, the Middle East and Asia are far better at coding their UK peers.

I've visited public schools and seen girls who have access to all the resources they could want, but little interest in using coding as a creative tool. By contrast, I've met many girls of similar ages in India and Brazil who can code in two or three languages and know all about CSS, JavaScript and more besides.

#### Telling a story

Personally, I would put this down to how wider conversations around STEM often overlook the crucial importance of coding to these girls' everyday lives. How did Facebook, Instagram, TikTok and all these huge internet platforms come to exist? They're there because of coding. And yet, approaches to digital skills and innovation in the UK tend to focus mainly on STEM. The messaging, language and narratives that surround STEM does little to get girls excited, but nor is there much talk of why coding is important, what it actually does and how

knowledge of coding can lead to successful careers in the tech sector.

STEM conversations often revolve around 'technology' and 'innovation', and focus far less often on specific areas such as data, statistics, AI, machine learning or big data. Girls are unable to get excited about any of those things, because they barely know what they are.

In my own conversations with girls attending school in the UK, there's little familiarity with this language, but also very few people helping them understand why coding is important. Part of my coding education involved performing tasks with Excel. I was able to recognise and learn how to use the symbols I needed in part by being good at maths, but I wouldn't say that maths made me a coder. I became a coder because I wanted to tell a story.

#### **Forging links**

Something else stopping girls in the UK from making further advances in coding is that we when we talk about 'technology' here, we still tend think of computers first, rather than smartphones. Those African girls who can code have experience of developing applications for the Android mobile platform, but many girls in the UK aren't even aware that Android exists. (There's also the fact that online access is widespread in the UK; in countries with more limited access, the ability to build applications that can run on an Android device without an internet connection is very helpful).

Education around coding could be improved by making clearer links between programming languages, the online platforms students are familiar with and what it takes to create them. What language would you need to know in order to help maintain BBC iPlayer, YouTube or Instagram? When giving lectures at schools and universities, I'll spend some time discussing the differences between a frontend and a backend, and what the role of a user interface designer might involve versus an engineer who will spend most of their time working with a platform's underlying code.

Coding can sometimes be presented in a way that attempts to make it look easy, but coding is often complicated and requires discipline. When coding is taught appropriately, girls and boys alike will need to properly apply themselves.

That said, the tools used to teach coding are now much more streamlined and accessible than they once were. It's possible for aspiring programmers to build their first applications within just two to three days using drag and drop design interfaces that are now commonplace, but we mustn't lose sight of how the core fundamentals of coding ultimately require some understanding of STEM subjects, as well as art and design when it comes to user interfaces.

#### **Moving forward**

We haven't sufficiently invested in developing the knowledge and skills of girls and boys in marginalised communities. I've been making regular donations of computer equipment to my local library, which is facing closure. I came to the UK as a broken 16-vear-old girl, having had a terrible childhood. I had no mum and dad, no experience of formal education, but from going to the library I was able to learn how to read and write in a safe space where I could immerse myself in books. That saved my life.

If we want to move forward from where we are, then we need to invest in teachers. Let's develop their digital skills and have the confidence and honesty to explain what programming languages actually are, so that students, and young girls in particular, can develop ambitions to build applications one day, and know what they need to do to get there.

Without that, we'll be wasting our time. If nothing changes, then 10 years from now UK students will be left behind by their peers in Africa, Asia and the Middle East, because the girls I've seen in those parts of the world are serious. They're the ones who'll be running tomorrow's equivalent of Google. If the UK genuinely wants to produce the next Mark Zuckerberg, Amazon rival or multimillion dollar tech company, then starting now, we need to give our young people a better understanding of not just the business that surrounds STEM, but also the software and hardware that drives it.



ABOUT THE AUTHOR Lady Mariéme Jamme is the Founder of iamtheCODE.org. You can hear her speak on The Good Business Festival's Reinventing Business Through Inclusion panel at https://thegoodbusinessfestival. com/on-demand/. For more details, visit iamthecode.org or follow @mjamme



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## "Creative learning is easier than ever"

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

#### **30 SECOND** BRIEFING

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

#### T&I What is LEGO® MINDSTORMS Education EV3?

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

#### Why should teachers invest in robotics?

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

#### What key skills and abilities does it help to build?

The robotics element of LEGO® MINDSTORMS® Education EV3



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



allows children to build core skills they will need for future careers. As well as technical skills including coding and engineering, students can develop resilience and communication, as well as the ability to hypothesise, collaborate, and think critically in a problemsolving environment; all invaluable skills and expertise that employers are looking for in the current industrial climate.

#### What sorts of activities can you do in the classroom?

LEGO® MINDSTORMS® Education EV3 is extremely versatile. Through various programming languages,



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



**Find out more at:** legoeducation.co.uk 0800 5346 0000 including Python, students can build and code anything from space explorers and driverless cars to robotic arms and sorting machines. Activities include using sensors (colour, ultrasonic, touch or gyro sensors) as well as motors, which students can then program using the central "EV3 intelligent brick", a small programmable computer that controls the motors and collects sensor feedback using Bluetooth or WiFi.

#### What do teachers say about it?

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

## Leisure vs. Learning

It might seem sensible to separate tech use for fun from tech use for education – but if you allow yourself scope to combine the two, wonderful things can happen, says **Jill Hodges** 

'm fond of loudly arguing that, "Coding is cool and practical!" So far, that message hasn't got through to passers-by in the street, but it certainly has to the children we work with at Fire Tech. Whether they're creating apps to help coordinate their school clubs, or designing amazing games in Roblox – when students can see their hard work turned into solutions that serve them and their friends, it's a game changer for their levels of motivation.

Harnessing this process, and applying it more broadly to students' experiences within the education system is a tricker proposition – but let's look at how that might be possible.

#### Uphill battles

The UK is currently grappling with a digital skills gap that's been exacerbated – note, not caused –by the pandemic. The past year has served to highlight issues that were already there. Schools in the UK are facing a constant struggle to educate children and equip them with the skills they'll need to be successful in almost any career requiring a modicum of digital nous.

During the pandemic, parents faced uphill battles of their own in coming up with creative ways to teach their children while home-schooling. With teachers at near breaking point after a relentlessly stressful year, coupled with an increasingly outdated school curriculum, these factors have all combined to result in students falling behind the curve.

This is where techfocused learning companies like Fire Tech can help to bridge the skills gap, by make that approach viable. Project-based learning is widely recognised as one of the best ways to absorb and retain learning, but it's labour-intensive and complicated to assess. And that's before we even contemplate how the pace of technological change is at odds with the time it takes to develop and update the National Curriculum.

#### "The key thing is to show young people why they should be interested in coding"

supporting children from a young age through a series of fun, interactive courses. Fire Tech is able to offer additional support to students outside of school, easing the pressures on already overloaded education system, but more funding is needed to allow companies like Fire Tech to support a greater number of students nationwide.

Schools need ready access to teaching resources that will enable them to effectively teach computer science and coding. Those two topics go hand in hand, with the best courses focusing on creativity and problem solving. There are, however, challenges for schools in recruiting staff that possess sufficient coding language skills and the technical confidence to

#### **Build back better**

Children today spend significant amounts of time immersed in technology, browsing the internet for hours via mobile devices and spending their weekends gaming online. Yet the typical school curriculum often fails to engage them in meaningful ways.

The blame for this partly lies with the UK government, which hasn't provided schools with the funding and support they need to offer extracurricular activities for students that want to learn more about the tech industry. Activities of this sort need to be sufficiently appealing and engaging if they're to succeed in

equipping students with

the skills they'll require to become confident learners and successful digital leaders later on in life. The government should be championing this kind of learning, facilitating additional support and courses where there's a demand for them.

Of course, we recognise that schools and teachers have their plates full at the moment, dealing with the aftermath of COVID – but we also feel that this is an ideal opportunity to, as the government puts it, 'Build back better.'

As economic activity increasingly migrates online, accompanied by data-driven value creation, and as physical workplaces come to be supplanted by online meeting tools, what

skills will our children need to thrive in their chosen careers? We believe that there are opportunities here for the government to focus on funding extracurricular activities - both to relieve existing pressures on schools, and to bring learning more in alignment with national priorities around digital skills.



#### The middle ground

One way of doing that is to locate the middle ground between the serious business of learning, and the kind of creative projects which can put students' recently acquired tech skills to the test.

There are many platforms and solutions out there that can make learning to code fun – by which I mean *actual* fun, rather than some patronising, eye roll-inducing notion of 'fun'. Fire Tech's courses are presented in a 'gamified' format familiar to most students, and taught by inspiring tutors able to provide first-hand support.

Fire Tech's approach gives teens aged 15 to 19 a glimpse of working life within a tech company, alongside interactive activities that seek to provide students with the tools they'll need to potentially become the tech creators, makers and leaders of the future. We want to unlock students' potential, and for them to have a taste of what it's like to work across a range of tech-based sectors, tackling various realistic, industryspecific projects as they go.

Students get to 'be their own boss', deciding when they want to complete their learning, while also being supported with regular check-ins from online tutors. By the end of a Fire Tech course, students will have produced a portfolio of work and projects they can then use to showcase their skills.

#### The next step

Outside of specific learning platforms, the key thing is to show young people why they should be interested in coding, and what's interesting about it for them. The purpose of programming is to solve problems by creating solutions, and ultimately change the world for the better.

Once students grasp the scope of what they're able to do with coding skills, their motivation will change from being driven to attain certain grades, to wanting to create something meaningful. We've seen kids create apps to assist their school clubs and fashion engineering marvels within Minecraft.

We need to give young people the skills and confidence to take the next step – to go from being consumers of technology to creators. In doing so, they'll unlock opportunities available only to those with sufficient tech skills in an economy that's becoming ever more digital.

Children's education has suffered enough setbacks over the past year or so. For the government to refuse additional funding and support to help children catch up on their learning sends entirely the wrong message to our younger generation



ABOUT THE AUTHOR Jill Hodges is a serial entrepreneur and the founder of Fire Tech; for more information, visit <u>firetechcamp.com</u> or follow <u>@firetechcamp</u> At Fire Tech, we have successfully developed learning resources for students aged 8 to 17 based around tech and digital skills development. With the backing of corporate partners that include top tech companies, Fire Tech's fun innovative and engaging learning resources encourage children to develop future skills. After all, these students will form tomorrow's

With well-paid jobs going unfilled, it's a critical area of learning that needs to be taken seriously than it currently is.

## **Creative spark**

A subject that demands curiosity, investigative skills and flashes of inspiration from those studying it will naturally benefit from a creative approach to teaching it, says **Paul Weeks**...

emember you're a rat," I say encouragingly to the anxious looking Y7 student now trapped between some rearranged desks. She looks around hesitantly and then, rat-like, starts to slowly explore her surroundings.

There's not much to see, apart from a small electrical button. She picks the button up suspiciously – looks at it, sniffs it, and tentatively presses it. Two things then happen. A bulb on the desk lights up and a volunteer behind the desk presents her with a Malteser. She gives a huge grin and immediately presses the button again. Another Malteser!

At this point I step in to prevent Malteser overdose, extract the student from our improvised Skinner box and send the 'technician' (another Y7 student) to collect another 'rat' from the lab next door where I've temporarily parked the rest of the class.

#### Becoming the animals

The context? This is part of our in-house Y7 KS3 science course, a half term module on animal behaviour. When I was originally writing the SoW and trying to think of lesson plans that could go beyond simple invertebrate choice chambers, I came to a realisation. It would be impossible for us to keep enough lab rats to do a class investigation on learning behaviour, but a simple alternative would be to have the students become the study animals themselves.

This single thought opened up boundless possibilities. We couldn't take the children to Africa to study primates, but we could bring the African savannah to school by turning the class into a troop of baboons (adult males, adult females and their young) being studied by a small subset of scientists. The latter would be tasked with observing the baboons' interactions, making deductions and seeing if the genetic data (acquired by 'darting' the baboons with paper aeroplanes in order to obtain 'DNA samples') supported their conclusions on maternity and paternity.

Similarly, we couldn't spend 10 years studying cuckoo/host interactions in the wild, but we could compress an evolutionary arms race into a lesson by role playing the host birds defending their nests, and the cuckoos trying to dump their eggs into said nests undetected. With each 'generation' the cuckoos are allowed an evolutionary innovation, and thus the adaptations of the cuckoo slowly evolve – eggs that match the host eggs in size and pattern, cuckoos that only lay their egg after the host birds start laying and so on.

parents about what they've done, who will then relay that to you at the next parents' evening.

It also works from a learning perspective. Six years on at A Level, students will still remember that time they were put in a Skinner box in Y7. rapidly pressing a button that rewarded them with chocolate. Most important of all, the students are involved and engaged with their own learning. They have to not only really think, but think *creatively* – the hallmark of all the best scientists.

The tasks described above may be fun, but they're also challenging and can lead to some unexpected learning outcomes. Take our baboon scientists, for example. They had to make deductions from short DNA profiles when attempting to match the infants with their parents, and were quickly able to confirm that the

#### "Six years on at A Level, students will still remember that time they were put in a Skinner box in Y7"

#### Unexpected outcomes

Why does this approach work? Well, as you can imagine, it's great fun – the students are immediately engaged and interested. Activities of this type involve a break from the usual routine and are memorably different.

The students will go home and tell their female baboons were indeed the mothers of the infants they most associated with, but they couldn't work out who the fathers were. None of them seemed to fit. Why?

At first, I couldn't understand the difficulty. Once you realise that all the bands from a baby must match bands in either the mother or father, and that you have to account for all

CELEBRATING STEM

bands present, it's just a simple logic problem – isn't it? But, no, they remained baffled. Why the mental block?

And then one of them had a flash of insight. 'Hang on', she said, 'are baboons different to humans? Can one father have several 'wives?"

It was a brilliant lightbulb moment, one you want to capture, bottle and share with the world. They'd been trying to match up mothers and fathers with their offspring as discrete family units. This hadn't worked, and they were consequently getting frustrated and confused. Yet suddenly, with this new way of looking at the world, they could make sense of it all. They rapidly worked out that the alpha male was not only the father of four of the six offspring, but had – shock horror! – sired them with *four different females...* 

#### Overturning preconceptions

This was quite sweet – such innocence! Such well brought-up students! – but I love anything that startles students out of preconceived views of the universe. They had framed baboon society as being essentially the same as conventional middle class, western human society, and subconsciously made certain assumptions. Which didn't match the evidence. So something had to give. It was wonderful to see – partly because their preconceptions of the world had been overturned, but mainly because they had made a discovery for themselves. You know, like *science*.

The notion that students should be able to learn through discovery runs throughout all of my teaching, and I've found that role play can open up a multitude of possibilities. I like giving A Level students original data and getting them to work out metabolic pathways for themselves, but it's equally possible to retool standard practical work for the same ends.

My Y9 introduction to enzymes provides virtually no theoretical background whatsoever. The students certainly don't hear anything about 'enzymes' - I simply give them a brief description of hydrogen peroxide and how, over time, it degrades to water and oxygen. They then carry out a simple series of experiments with hydrogen peroxide, yeast, potato and liver. They love the excitement of the bubbles and the mess, but the key learning point comes when they've boiled the yeast/ potatoes/liver.

They're expecting more of the same - heat speeds things up, right? - but suddenly the reaction that was previously so much fun isn't happening. That's *funny* (the most exciting phrase in science, according to Isaac Asimov), and needs explaining. Voila – you've just created the learning framework for enzyme theory, which will now gently plop into the receptive gaps that have formed in your students' brains.

I'll end with one final, compelling reason why I like this approach. Never mind that it's fun, motivating, different and memorable – it *works*. It works not just by enthusing students about science and the scientific method, but actually enhances learning in a way that copying notes from a PowerPoint presentation can never hope to achieve.

After the baboon lesson I always ask the class what they've learned, and the resulting list is invariably long. Dominance hierarchies, stress hormones, grooming behaviour, DNA profiles and how to interpret them, baboon society, field biology, how to communicate without speaking – not bad for a Year 7 class, eh?

And best of all – they hadn't written a single thing down...



ABOUT THE AUTHOR Paul Weeks is a biology teacher; for more information, visit biologicalburblings.wordpress.com or follow @BioBurbler

teachwire.net

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CONTINENT



Trevor Cain explains how the Dremel 3D45 3D printer has helped breathe new life into his school's design and technology lessons

#### **ABOUT ME:**

NAME: TREVOR CAIN

**JOB ROLE:** Head of design and technology

SCHOOL: The FitzWimarc School

**FAVOURITE FEATURE:** "It's extremely easy to use, with a clear and intuitive display that makes it straightforward to follow exactly what's happening"

**TALKING ABOUT:** DREMEL DIGILAB 3D PRINTER 3D45

#### How are you using the device to engage your pupils?

Since we introduced the Dremel printers we've seen big increases in the number of pupils choosing to take design and technology at GCSE and A Level. I put that down to two things - the power the printers give pupils to turn their ideas into reality, and the excitement of working with cutting-edge technology.

The Dremel 3D45 has a real 'wow factor' with our pupils, which makes my job easier, since the pupils are engaged before we even start printing. We have other 3D printers, but the great design of the Dremel means my pupils always choose it over the others.

#### What have been your most successful projects?

The Dremel comes into its own as a problem solving tool. Recent projects developed by our A Level students included a humidity level monitor for a lizard's terrarium, and a buoyancy floating aid that monitors PH levels near coral reefs. Our students were able to make multiple prototypes of their designs, in a way that they would never have been able to in the past. This process of designing, prototyping and improving a product is a critical part of how design is done in the real world, enabling our pupils to solve problems and create designs that really work.



Contact: Find out what Dremel's printing solutions can do for your school by visiting dremel.com/gb/en

#### What skills does it help to develop?

The most important aspect of 3D printing in the classroom is the opportunity it affords for rapid prototyping. This process helps students get better at using CAD software, by allowing them to see whether their computer designs work as printed objects. More often than not, their first model won't work perfectly, prompting students to draw on their problem solving skills in order to improve their designs.

The Dremel printers also encourage independent working. The enclosed design ensures the printer is safe to use, allowing pupils to use the printers in their own time to improve and develop their designs themselves.

Would you recommend it? The Dremel 3D45 is ideal for use in a school. It's extremely easy to use, with a clear and intuitive display that makes it straightforward to adjust your print and follow exactly what's happening and how long the print will take.

One aspect of 3D printers that's sometimes overlooked are their power as a teaching aid. The printer can be used to make a whole host of classroom tools and teaching aids. For example, we'd previously use videos to teach our engineering students about pulleys; however, we soon realised that we could print some classroom equipment ourselves, allowing us to provide practical live demonstrations.

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# Let's close the data skills gap

As data analysis become an ever-more important employment skill, we must ensure that today's students can meet the challenges they'll encounter in tomorrow's workplaces, says **Dan Pell...** 

t's no secret that the pandemic and school rules regarding isolation have severely impacted the education of many students in the UK. The long-term effects of this are hard to predict, though one Royal Society report released during the first lockdown (see bit.ly/ ti8-data1) suggested that the school time lost could harm the UK economy for the next 65 years, due to the negative impact on the future skills of the workforce.

Keen to understand how these missed learning opportunities will disrupt employability into the future, we at Tableau embarked on some independent nationwide research of our own. We looked at how digital skills now considered critical for many roles - such as data analysis and computer science - have been affected by remote learning and lockdowns. This is important to understand, since demand for digital skills has spread far beyond traditional IT roles, to the extent that they're now seen as an essential requirement for 68% of occupations (see bit.ly/ti8-data2).

Our research found that school leavers feel less prepared for the job market than they did pre-pandemic, with more than half (54%) of UK pupils aged 16-18 believing that the pandemic has caused greater disruption to their skillsbased learning – essential for work – than to their academic learning. Fewer than half of pupils (47%) agreed that their school education had prepared them for the world of work.

We found that pupils also feel far more confident in their communication (73%) and teamwork (78%) skills, than they do with digital skills such as data analysis (49%) and computer programming (47%). A further 47% of pupils went on to admit that they found the concept of data analysis itself a bit scary – which is unsurprising, given that 46% hadn't spent time developing such skills at school. pupils felt confident in their programming skills, 55% in data analysis and 75% in foundational skills.

It became clear to us just how concerned students currently are about their employability. 44% of those students we heard from were planning to pursue apprenticeships or employment after school, feeling that they lacked sufficient skills to help them stand out. Fewer than half (46%) knew how to obtain such skills, and a further 46% claimed to be unaware of how important digital skills are.

Of course, the pandemic has clearly also impacted other important learning

#### "We can introduce students to the concept of data analysis skills with datasets that are already familiar to them"

#### Employability concerns

Our research additionally revealed a worrying gender gap in pupils' digital skills confidence. Just 36% of female pupils saw themselves as feeling confident in their programming skills, 44% in their data analysis skills and 66% in foundational digital skills (such as use of PowerPoint, Word, email clients, etc.). By comparison, 58% of male opportunities that can help boost employability, with only 51% of those pupils surveyed stating that they had completed some form of work experience.

#### A long-term problem

That said, the relative lack of data skills among school leavers is an issue that predates the pandemic. Lockdown may have seriously disrupted what skills learning was available, but the general lack of data analysis education has long been a problem. According to the Department for Digital, Culture, Media and Sport (see https://bit.ly/ti8-data3), 46% of UK businesses have struggled over the past two years to recruit for roles requiring data skills. This could have potentially severe consequences for the UK economy that could cost as much as £2 billion annually (see bit.ly/ ti8-data4) and a serious impact on career opportunities for young people across the UK.

Clearly, much more needs to be done to equip pupils with the digital skills they need in the workplace if the UK is to avoid a huge data skills gap. From an early age, pupils should be introduced to the basic concepts of data analysis and computer science, so as to ensure these aren't considered 'intimidating' or 'scary' subjects when encountered later on in education or in the workplace. These skills aren't just important for roles within the tech industry, but increasingly for the daily tasks encountered in jobs of all kinds.

Giving pupils the confidence and tools to take data sets and analyse them to find answers should therefore be a priority for schools and regulators when considering how we can empower the future workforce to build back better.

The responsibility for that doesn't just lie with them, however. All businesses should be looking at how they can work closely with schools to build appropriate curriculums and offer work experience and activity days that drive pupils' engagement with how data analysis skills are used across different industries. Indeed, pupils are calling for this themselves - our study found that 80% of pupils would like schools to work more closely with businesses, in making their education more relevant to employers.

#### **Digital skills champions**

Curriculum reform remains one of the ultimate ways of ensuring that frameworks for learning data skills can be embedded at each Key Stage, with age-dependent expectations. However, there are also some other steps that can be taken more quickly.

First, schools can appoint a digital skills champion, or champions, whose role will be to support other teachers by pooling resources and helping devise real-world examples for lesson content. Reducing the stigma and fear that can exist around data analysis is the first hurdle in encouraging both teaching and learning.

Introducing extra activities and

informal learning opportunities outside of usual classes, providing careers guidance for pupils and connecting with external organisations are all ways in which digital skills champions can address skills gaps in their learning communities and build confidence.

Next, we should acknowledge that computer science isn't just about coding. We can do more to show the links between data, AI and machine learning, and how students will encounter these daily (e.g. though social media algorithms). Lessons could include building understanding of key definitions, introducing statistical interpretation across all subjects, and identifying how biased data sets can skew results to improve understanding of the ethical element. Showing the myriad ways in which data sets can be visualised through images and videos could lend a uniquely interactive and visual dimension to teaching around data science.

There's also the need for better guidance aimed at schools and teachers on what free and paid online resources are already available, thus ensuring that school budgets aren't wasted, and that students can be more easily signposted to appropriate extracurricular learning opportunities. Glossaries of terms and banks of accessible resources could be created by individual schools, ITT providers, businesses and regulators. Cross-curriculum working groups could be formed to ensure consistency.

Finally, many businesses, including ours, already volunteer with schools. We can introduce students to the concept of data analysis skills with datasets that are already familiar and fun to them. For example, we recently used the IMDb's online database of film and TV information, and the insights the pupils found were brilliant – including the fact that longer films have poorer viewer ratings. Introducing data skills by stealth in this way can tackle fears pupils might have around numbers and statistics.

l statistics. The data skills

#### DATA LITERACY FOR ALL

Tableau has launched a free e-learning course called 'Data Literacy for All', aimed at helping pupils and teachers alike learn the foundational data skills they need to prepare for the world of work. The course provides an introduction to the basics of developing, analysing, and making decisions with data and goes on to cover a number of key topics, including understanding data types, basic statistics concepts, and interpreting visualisations.

The course can be taken at your own pace, is accessible from any device with an internet connection and can be added to college, university, and job applications. To find out more, visit

elearning-samples.tableau. com/page/data-literacy.

gap may have widened over the past year, but as schools return to normal, they're in a unique position to implement positive, longterm change. It's critical that they be properly supported in these efforts by

> businesses, government and other
> organisations, so that they can ensure pupils are suitably
> equipped to hit the ground running when
> embarking on their future careers.



ABOUT THE AUTHOR Dan Pell is the senior VP of the data analysis specialist Tableau EMEA; for more details, visit tableau.com

## Drive forward your students' COMPUTING SKILLS

**Paul Thornton** sets out out the case for why schools can't afford to leave computing off the KS4 curriculum...

very child in every school in England to have a worldleading computing education."

That's the vision being pursued the National Centre for Computing Education. It's an aspiration that simply won't be feasible until every child has at least the opportunity to access computing or computer science across all Key Stages - yet just under half of all secondary schools have barely any provision for post-KS3 computer science at all, in a country that needs 240,000 pupils to leave school with a computing qualification if the demands of industry over the coming years are to be met.

With technology evolving at such a rapid rate, the jobs we're equipping our students to be ready for probably don't exist yet. Under the old ICT curriculum we'd simply teach basic lessons about the contemporary technology of the time. We need now to be giving students a solid understanding of the how the technology that surrounds them actually works, and more importantly, give them the ability to adapt to the persistent technological changes that will inevitably occur during their lifetimes.

In 2014, a new curriculum was introduced that attempted to remodel computing as a foundational subject that would be taught alongside English, maths and science from primary school onwards. The upshot of this meant that from as young as 4, a child could be learning computational thinking and problem solving skills as part of their school's daily curriculum.

#### "Computing amounts to far more than just coding – it's a fundamental life skill"

This has largely continued into KS3 to an extent, but problems tend to arise at KS4, with students often abruptly cut off of from learning opportunities with respect to computing. Only 61.3% of schools offered a GCSE computer science qualification in 2018, with The Roehampton Annual Computing Education Report report (see bit.ly/ts-racer) highlighting how "There is hardly any timetabled computing in KS4 for nonexam classes." If around 75% of all students study no computing or computer science past the age of 14, we're failing to equip our students for life in the modern world.

#### A life skill

It's vital that we do so. This may involve ensuring that GCSE computer science remains an option, or failing that, embedding computing within the wider KS4 curriculum. In either case, the curriculum content needs to be there.

There are many who believe that 'computing' and 'coding' are one and the same; that only certain 'types' of students have facility to learn how to code, and that the subject is therefore a niche one we needn't concern ourselves with making more widely available.

This is a fundamental misconception that needs to be addressed. Computing amounts to far more than just coding – it's a fundamental life skill that enables students to solve problems through the application of logic, decomposition, abstraction and pattern identification. When teachers are equipped with the appropriate skills, computing can ably complement most other subjects. Primary schools have understood this for a while. As the years have gone by, I've seen for myself how the Y7s passing through my classroom door became progressively more confident in their problem solving, displayed an aptitude for creating algorithms and successfully developed simple applications using graphical programming languages that ran on physical hardware.

For me, the question is whether secondary schools are ready to continue challenging these pupils, keeping them engaged and encouraging them to take any interest they may have in computing science with them into KS4, with the same enthusiasm we see from them aged 11. Or should we simply resign ourselves to the fact that their interest and ability in computing will wane over the course of their secondary journey? It's something we've seen so often before, especially when it comes to take-up of the subject among girls at KS4.

#### **Upskilled specialists**

Some readers may feel there are simply too many barriers to good KS4 computing provision, be it poor prior exam results, lack of specialist staff, an inability to recruit or inadequate technical infrastructure. Yet we'll need to overcome these if we're to offer the broad and balanced curriculum our students really need to get ahead in our increasingly technological world.

Not having a computing specialist in your team, or being unable to recruit one, isn't sufficient reason on its own to not offer GCSE computer science. Only a third of teachers currently teaching the subject are themselves computing specialists (I myself possess a post-A level qualification in a computing related degree). According to the 2016 DfE report, 'Analysis of 'specialist' and 'nonspecialist' teaching in England' (see bit. ly/dfe-specialist), 38% of computing lessons are delivered by business studies teachers. Maths teachers will, at a bare minimum, have studied to KS5. We expect biology teachers to have studied natural sciences. PE teachers to have studied sports science or similar, and so on. The likelihood of a computing teacher having been able to study computing even at school is low, to say the least. It's far

more likely that a practising computer science teacher will have been upskilled at some point during their career. The point to bear in mind here is that the process is one that any school can help their staff undergo. You don't need to take on a 'computer teacher' when a teacher already in your school can be suitably upskilled to deliver computer science lessons.

Indeed, a number of teachers are already starting to see how priorities within the curriculum are shifting and taking the step of upskilling themselves, thus allowing them to make the switch if and when their current subject specialism begins to get squeezed in the timetable. Others are simply taking the step of getting trained in a second subject to improve their professional knowledge and career prospects.

#### No excuse

Schools which believe that offering a computing GCSE is still a step too far must at least ensure their KS3 curriculum covers all required areas and have some form of KS4 computing study in place. One option could be to embed key elements of computing into other areas of your curriculum, similar to what's happening at primary level, and start utilising the many cross-curricular links that can be made. You can also explore non-GCSE course options, such as BTEC Tech Awards.

It falls to all of us to offer computing at all Key Stages, including KS4, so that students are able to learn from a broad and balanced curriculum. It's also necessary for us as a country, if we're to produce enough students with a skill set suited to the requirements of the modern working world.

Ultimately, there's no excuse for computing to be absent from a school's KS4 curriculum. The National Centre for Computing Education can provide plenty of assistance to help you get started, from upskilling programmes for teaching colleagues, to courses in pedagogy and a substantial resource repository containing schemes of work for different year groups, ready-made assessments and expert advice. With a generous bursary available to help facilitate the process, there's never been a better time to make the jump. The future is here – is vour school ready?



ABOUT THE AUTHOR Paul Thornton is network education lead at STEM Learning UK

# "We're shutting the door on students"

**Aare Reitnam** explains why the current neglect cyber of education in schools will prove detrimental to young peoples' future career prospects

he children of today are the first generation to have been introduced to information technology from infancy. As the tech revolution has taken hold, we've all become better at adapting to the latest and greatest devices, but Generation Z are developing such skills far more rapidly than their parents and grandparents.

However, given the almost unlimited access to personal devices, computers and other forms of technology in schools, it's become essential for all education institutions to reflect on the world we're now living in - and its associated risks. From July to August 2020, Microsoft's Global Threat Activity Tracker detected over 8 million malware incidents, with education being the most affected sector. In the recent rush to adopt e-learning, the field has been exposed to a marked increase in cyberattacks. Cybercriminals are finding opportunities to defraud schools, steal sensitive information or deploy ransomware schemes to extort money.

#### Cybersecurity

Since most home networks don't provide the same increased firewalls or protections offered by institutions, teachers and students become more susceptible to hacking attempts when outside the classroom. Educators therefore have a pivotal role to play in preparing young people to adequately manage their personal online security challenges, and are critical in preparing students to enter a job market where cyber skills are becoming increasingly sought after.

According to a 2020 report from (ISC)<sup>2</sup> (see bit.ly/ ti8-cyber1), despite a significant decrease from over 4 million unfilled cyber jobs in 2019, there remains a staggering 3.12 million global shortage of skilled cyber workers. Almost all industries require cyber professionals - from government to the legal profession, to operations and beyond. There are a multiplicity of jobs existing under the 'cybersecurity' umbrella, including digital forensics, software development, risk assessment, security analysis

and malware/ransomware research.

In an industry that's so vast and rapidly evolving, it's difficult to say exactly how lucrative a career in cybersecurity might be, but CWjobs puts the average UK salary at around £62,500 (see bit.ly/ti8cyber2). That's far above the national average, which begs the question – why aren't schools positioning cybersecurity as a viable career path for students?

The failure to incorporate cybersecurity into the curriculum shuts doors on students and limits their future career prospects, but some steps can be taken to help tackle this. There's an array of introductory content on cybersecurity that can be covered in the classroom. A good theoretical understanding of cyberspace challenges can link well with ICT studies, as well as horizontally across other subjects, such as history and politics.

#### **Positive change**

Explaining that cyberattacks are carried out by a range of actors is important for contextualising cyber security studies, and framing

the subject in a way that can be easily understood. Examining the motives behind such attacks and resulting consequences – be it financial data theft or physical impacts on infrastructure – can be taught with fairly minimal resources.

Takeaways from general ICT studies are already proving useful, but a larger pool of resources, such as CLARK (clark.center/home) and Cyber Security Challenge UK (cybersecurity challenge.org.uk), need to be made more widely available to teachers interested in integrating cyber security theory into their lessons.

Once a framework for introducing this theoretical knowledge is established, it should be partnered with practical activities. Cyber Range Technologies is one possible avenue that institutions could explore. The tech enables users - inthis case, teachers - to generate realistic and credible virtual environments that task students with responding to cyber-attack simulations in real time, and is a great way to engage students and get them excited about cyberspace.

With more backing from education leaders, students could be given opportunities to understand the tech challenges confronted by the cyber security industry. This could in turn set them up for rewarding, well-paid jobs – and careers that have the potential to enact real, positive change across a range of different sectors.



ABOUT THE AUTHOR Aare Reitnam is chief technology officer at CybExer Technologies; for more information, visit **cybexer.** com or follow @cybexertech

## Ditch the stereotype

The 'nerd scientist' cliché isn't just tired – it's actively stopping students with an aptitude for science for realising their career ambitions, says **Caitlin Brown** 

he myth of the 'nerdy scientist in a lab coat' has persisted for decades. Many will see this as a funny and harmless thing, but for young people in KS3 considering their future careers, it's a damaging, unrepresentative and unappealing stereotype that can negatively affect their view of careers within science and wider STEM education. Dispelling such a well-established narrative won't be easy, of course, but there are some steps that can be taken in the classroom to at least lessen the likelihood of young people allowing negative stereotypes to affect their career decisions.

Mixing up the ways in which science lessons are delivered is one way of challenging such narratives. Project-based learning (PBL) is ideal for this, because of how it can show the depth and breadth of what careers in science actually look like. A well-organised PBL activity can help young people appreciate both the excitement that sciencerelated careers can offer, and the sheer variety of ways in which science can play a role in many different sectors.

#### **Getting started**

PBL is a method of teaching that encourages students to identify real-world problems and create solutions for them, emphasising a handson approach to learning.

The projects students end up tackling might range from an art restoration exercise, to monitoring water pollution and anything in between. The multidisciplinary nature of PBL lets students who wouldn't necessarily describe themselves as having a natural interest in science to see its applications across an array of other subjects and sectors, be it the arts, sport

or even fashion.

The 'nerdy scientist' stereotype is further damaging because it usually denotes an older white man with crazy hair, and often paints science careers as being only for the highest achieving students - hardly an accessible image for teenagers thinking about their future careers. For undecided students and those who who have already dismissed the idea of pursuing a career in STEM, these misconceptions could make the idea of studying STEM subjects seem altogether pointless.

However, if students can be taught to apply their science learning and existing skills to everyday challenges, perhaps in combination with other subjects they're drawn to, we could break the stereotype's damaging influence.

#### Science in action

Putting this into action could also involve highlighting role models in the field of science, or discussing the many exciting roles available in the science sector. There are plenty of positive approaches we can take, but PBL in particular can provide students with firsthand experience of what being a scientist is truly like, and the variety of careers science can lead to. It's not just future scientists who should be encouraged to take an interest in science but everyone, since it's relevant to all aspects of our lives.

Opportunities to get voung people involved with PBL science activities can take the form of independent home learning and classroom projects, as well as national programmes such as the **CREST** Awards (crestawards.org) and The Mayor's London Scientist Programme. Participating in such projects can tackles students' preconceptions about science being only for select few, by dint of how collaborative and inclusive they are.

However we choose to do it, it's important that outdated views of science and scientists be critically examined and eventually overturned, especially seeing as we're now living in an age that depends heavily on science and science-based skills. PBL and similar approaches can help young people better comprehend just how wide-ranging the applications of science really are, and the multitude of career paths and ways of understanding our world that will open up to them as a result.



ABOUT THE AUTHOR Caitlin Brown is education manager at the British Science Association; for more information, visit britishscienceassociation.org or follow @BritSciAssoc

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# What will you do with yours? What will you do with yours? Wit

## "What's a kilometre?"

When your pupils tackle questions that involve conversions, do they know what's actually being asked of them? **Richard Coles** isn't so sure...

he purpose of this article is to consider the way we, as maths teachers, deliver content to our students and why we do what we do. Questions will be posed throughout, alongside examples to highlight my thinking when planning and delivering the topic of conversions, though the points could easily be applied to other topics that suffer from similar misconceptions.

In recent years there has been a decline in pupils' conceptual understanding of conversions. Across all exam boards in 2019, it emerged that pupils at both Foundation and Higher level answered questions about conversions poorly. Defined as 'A change in the form of a measurement, different units, without a change in the size or amount,' the etymology of the word derives from the Latin conversionem ('A turning round, revolving; alteration, change'); a noun of action from the pastparticiple stem

*convertere* (To turn around; to transform,'); from the assimilated *com* ('with, together'); and *vertere* ('to turn').

Why might students find conversions difficult? We live at a time where we're plagued by a combination of imperial and metric units. We measure our speed when driving in miles per hour, but compete in 5km park runs on Saturday mornings. We measure our height in feet and inches, but weigh ourselves in kilograms. Children barely know if they're coming or going with regards to knowing what any given unit is, let alone how to convert it.

#### **Complex vocabulary**

It's sometimes easy to assume that students don't answer questions correctly because they don't understand the methods required, or the content, yet the language of the question also requires decoding. Do we spend enough time breaking down question phrasing and vocabulary?

The work of Beck and McKeown refers to different tiers of vocabulary that increase in complexity, but are all essential for students if they are to understand exam questions. In essence, tier 1 vocabulary is everyday language that will be familiar to all students (e.g. 'unit'). Tier 2 vocabulary is more complex, perhaps not part of everyday speech, but likely to be found in academic text across different subjects (e.g. 'equivalent'). Tier 3 vocabulary is subject-specific and specialist (e.g. 'algebra').

We can generally ignore tier 1 words and assume understanding, and will naturally tend to focus on our own subject's tier 3 key terms. However, we also need to spend time developing confidence with tier 2 words, as these are powerful for helping to decode exam questions.

#### Concepts and formulas

Let's look at three examples from AO1-3 and consider how to deliver them, beginning with this AQA AO1 question:

What metric unit should be used when giving the distance from London to Liverpool? + Kilometres + Miles

+ Meters

What Tier 3 words are needed to understand this question? Do the students know what is meant by a kilometre, mile and metre?

We should then consider the students' understanding of those Tier 2 words. I've seen many experienced teachers, including myself, assume that students know these already - but do they? Take 'distance', for example. Do we explicitly tell pupils the meaning, or simply assume they know it? What metric do pupils use for distance themselves in their daily lives? Did they make the link between 'metric' and 'metre' in the guestion? Do they even have any knowledge of where London and Liverpool are in relation to each other?

In many trials of this question pupils selected 'miles', due to them having often been in cars and knowing that signposts display distances in miles. Let's examine a second example.

A car travels 192.5 km in 3 hours and 45 minutes. What is the average speed of the car?

Key items to consider here include the way formulas can differ between maths and science departments. How

8 STEPS TO IMPROVED ATTAINMENT

1 Consider the phrasing and vocabulary used within questions

2 Ensure pupils fully understand all tier 2 words, as well as tier 3

**3** Employ an effective delivery that takes into account pupil

#### starting points

4 Don't skip the basics – ensure your starters recap prior knowledge

**5** Use a variety of skilful questioning techniques to ensure pupils understand key concepts prior to attempting questions themselves

6 Present a variety of questions in different contexts, using different phrasing and at different levels of AO1, AO2 and AO3

7 Check that pupils are fluent with all success criteria set out at the start before moving on

8 Build in opportunities for recall and retrieval throughout your curriculum and lesson sequence to ensure overlapping and repetition of the basics
DOWNLOAD a FREE 'Compound Measures' worksheet and presentation to accompany this article at teachwire.net/ compoundmeasure

tw

confident are you that the formulas you use are the same as those taught by your science colleagues? It may be worth investigating this, both to maintain consistency and avoid student confusion between subjects.

I have personally used both methods, and found that students with lower attainment are more successful when using formula triangles. A personal favourite of mine is teaching the acronym 'Don't Squash Turtles' – cheap chuckles from the pupils, but they remember it and get the order correct. I first saw a colleague using this in 2010 and have never looked back since.

Returning to our question, can your pupils convert minutes to decimal form? Have they practised this as an explicit skill prior to being given the AO2-style question? Also, consider again what tier 2 words might need addressing. Do your students understand the concept of 'average speed'? Have you sequenced the learning within your curriculum to ensure that averages were delivered in advance of teaching speed / distance / time? Make the link between the two explicit.

#### Underselling our pupils

Let's look a final example, AO3, taken from the 2019 international exam specification:

You often hear the word 'acre' when farmers are talking about the size of their farms. Farmer Giles likes to think of himself as a modern farmer. He says that his farm occupies an area of 1,011,750m<sup>2</sup> – that's one million, eleven thousand, seven hundred and fifty square meters.

But Farmer Morris is still a bit old-fashioned. He says that his farm, which occupies 250 acres, is larger than Farmer Giles's farm. If one acre is equivalent to an area of 4,047m<sup>2</sup>, whose farm is larger?

How many of your pupils would simply skip this question altogether due to its wording? Can they extract the key information? A task that I've found effective is for pupils to redact the text and then see what information helps. As with AO1 and AO2, it's essential that pupils understand in advance not only the technical vocabulary of tier 3, but also the tier 2 words within the questions.

This specific wording may be unlikely to appear as GCSE question, but we undersell our pupils if we don't cover questions of this type because they don't employ the exact same wording as the specification. Pupils are still being called on to demonstrate the same mathematical skills required for conversion, but with deeper contextual understanding. In my opinion, the development of these overall skills is more important, and certainly more beneficial for later life, than simply satisfying the exam requirements.



ABOUT THE AUTHOR Richard Coles is an assistant director of sixth form at Brockhill Park Performing Arts College and an experienced head of maths; follow him at @richardcoles10

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# **READY** for anything

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#### CASE STUDY – Little London Primary School

ASUS was recently thrilled to supply ASUS C202 Chromebooks to Little London Primary School in Leeds. With many pupils lacking access to suitable devices or reliable internet connections at home, the school set itself the task of supplying all pupils with Chromebooks that they could use both in school and at home. Headteacher Jill Wood explains the impact the Chromebooks have had:

"We are a three-form entry primary school situated in the heart of Leeds. It's a wonderful area to work in, but one with lots of challenges. We have a very diverse student population, with over 82 languages spoken across the school, and wonderful parents who want the best for their children.

"We've been trying to ensure that technology plays a suitable role in our students' education, but have been uncomfortable with them only accessing technology during their timetabled lessons. We wanted their technology use to become a deeper part of their everyday learning, both in school and at home.

"To help us find the right device, we had a long conversation with our IT support provider – a wonderful company called Next Generation IT, which ultimately suggested the ASUS C202 Chromebook. What swayed us was that the device seemed very robust, with a simplified operating system for the students, and sustainable for the next few years.

"The children love the fact that they can take their devices home and continue learning when not at school. Teachers have been really positive too, having seen a massive increase in work from many of our children.

"The implementation of the Chromebooks has been a real positive for our school. Those who would have previously written very little in their books are now writing a lot on their Chromebooks, which is great to see. Everything on the devices is also very secure, minimising the risk of children accessing restricted parts of internet, Above all, the children are now finding learning fun!"

#### **TEACHER VIEW: NICOLA HOWE**

How long have you been at Little London Primary School? I joined two years ago as the upper KS2 phase leader, responsible for Y5 and Y6, and am also a Y6 teacher.

### Have the introduction of the Chromebooks changed the way you teach?

Up until last year, our classroom teaching was mostly based around pen and paper, with occasional use of iPads and computers. The Chromebooks have brought a completely different form of learning to the children. They're so engaged and motivated by using them that there's hardly any class time wasted.

Another big difference is that our teaching and learning is no longer fixed around the school day. If students are struggling in a particular area, they can be set individual activities to work on for 10 minutes outside of school. As we discovered during the pandemic, even when staff can't be in school, the students' learning can continue.

## How long did it take to become comfortable with using the Chromebooks?

New technology can be daunting, but you have to find out what you can do with it. Over time, both the staff and students have picked up on what to do with the Chromebooks and are now confident in using them.

What's great is how few delays there are in class now. Physical resources need to be handed out, and before you know it, you've wasted 10 minutes before the lesson's barely even started. With the Chromebooks, students can literally open them up and get started immediately.

#### **PRODUCT CLOSE-UP: ASUS C214**

The ASUS Chromebook Flip C214 is built to deliver an innovative and inspirational learning experience. As well as a versatile touchscreen display and built-in stylus, there's a 360° hinge and a world-facing camera. The ASUS Chromebook Flip C214 is truly classroom-ready, and durable enough to reassure teachers and students alike with its all-round rubber bumper, spillresistant keyboard and ultra-tough hinge. Boasting a battery life that can easily last a full school day and an easy-to-service, modular construction, the ASUS Chromebook Flip C214 is ready for anything!



#### ASUS | BUSINESS > PARTNER CONTENT

#### Education explorers

#### **Digital learning** made easy

With an ASUS Google Meet hardware kit, setting up a digital classroom is straightforward. The kit includes a high-resolution camera, microphone unit and touchscreen control everything teachers need to deliver lessons to students comfortably, and without interruption.

When attending classes from home, students have found it difficult not being able to perform simple classroom actions, such as raising their hand or working alongside classmates in group activities. Using the power of the Google Meet platform, ASUS Google Meet hardware kits aim to remove as many of these obstacles as possible, creating a digital classroom space that students will love and enjoy as they learn.

With all attendance fully trackable, teachers can instantly tell when students may have missed a class. Teachers can also record lessons in full, thus ensuring that no student misses out on crucial elements of their education.

#### Smooth interactions

Parents' evenings play an important part in students' educational development, allowing teachers and parents to discuss how a student is performing, and how they can be supported to do better if they're struggling.

Cancelling such events can result in drops in student performance, but ASUS Google Meet hardware kits will ensure that they can continue to be held throughout the academic year. Organisers and teaching staff can schedule addresses for specific cohorts, and quickly create breakout rooms for class groups or one-to-ones

#### **THE ASUS GOOGLE MEET HARDWARE KITS** - WHAT'S INCLUDED?

#### ASUS Google Meet **Compute System**

The system that powers everything. Based on ChromeOS and easy to use, it comes supplied with all the cables and adaptors you'll need to get started.

#### Touchscreen Control Panel



No need for wired peripherals here; this standalone control panel lets you control and monitor meetings without needing to reach for a mouse.

#### • 4K Ultra-HD Camera

An ultra-high resolution camera that can give those meetings a more lifelike quality.

#### Google Meet Speakermic

This combined microphone and speaker device features advanced noise and echo cancellation. Easy to use and unobtrusive, it's the perfect companion for those meetings you simply can't miss.



with parents with the aid of Google Calendar.

ASUS Google Meet hardware kits can also unlock ways of enjoying the social interactions so important to school life while observing social distancing. School assemblies and announcements can be broadcast direct to specific classrooms. Faculty meetings can be held digitally, with no loss in efficiency or productivity.

Important notices and messages for parents can meanwhile be received at home - just one more way in which ASUS Google Meet hardware kits can enable educators to deliver content and information to parents, even when face-to-face meetings aren't possible.

#### Morale boosts

A natural byproduct of students socially distancing and learning from home is the loss of extra-curricular activities and pursuits. The ASUS Google Meet hardware kits can help bridge these gaps between students, providing schools with a means of bringing together groups that share common interests. Students might not be able to play sports or perform music together, but Google Meet can at least give them a space to call their own, in which to socialise and maintain their friendships.

Google Meet's Virtual 'hand raising' function lets students, staff and parents notify meeting hosts and teachers of any questions or concerns, without



breaking the flow of the current discussion. The aforementioned breakout rooms can meanwhile be used by teachers to quickly place students into small groups for project work and differentiated lesson activities.

Google's upcoming Polling feature will further allow students to post questions regarding lessons, tasks and activities, with popular questions able to be 'upvoted' - thus allowing teachers to instantly identify what information might need to be expanded upon there and then, or in future lessons.

Finally, there's Jamboard - a Google Meet feature that emulates a whiteboard, allowing teachers to communicate visually throughout their digital lessons and ensure that their lesson content remains stimulating and engaging.

teachwire.net



# LanSchool

A software solution that guides learning, promotes collaboration, and maximizes teaching time



#### AT A GLANCE

- Classroom management software that enables engaging learning experiences in connected classrooms
- Popular features include Screen Monitoring, Push Website, Limit Web, and Messaging
- Available on the cloud or locally hosted
- Compatible across all operating systems
- Designed with educators and learners in mind

#### **REVIEW BY ADAM RICHES**

With technology now playing a larger role in teaching and learning than ever before, effective solutions for managing students' use of devices are in high demand. Lenovo's LanSchool classroom management software is designed to do just that – keep learning current, whilst minimising the strain on teachers.

LanSchool makes teaching with tech easy, both inside the classroom and when overseeing remote learning. It boasts a number of features to help keep the learning process streamlined and safe, beginning with straightforward username / password access and the option to link user accounts to Google accounts. The teacher interfaces on both the 'Air' and 'Classic' versions of the software are highly intuitive, and will take very little getting used to before teachers can fully utilise their functions.

The screen monitoring function lets teachers view all students' screens, thus helping to keep learners on task while making it possible for teachers to monitor and provide feedback on their work in real time. LanSchool also allows teachers to 'blank' students' screens, for when their attention needs to be directed elsewhere. Another nifty feature is the 'push website' function, enabling teachers to send a website to all connected devices at the click of a button, significantly increasing the fluidity of the lesson and reducing lost learning time.

LanSchool can give teachers valuable

insights into what's happening on every device in the classroom, to the extent that they're even warned when the battery is running low on a specific student's device. Hopefully, that should mean no more major lesson disruptions when a laptop packs up half way through...

LanSchool does a great deal to encourage productive collaboration via nicely thought through features, such as the 'raise a hand' notification students can send to get their teacher's attention, and a clear messenger system. The latter is not only helpful for the classroom, but also when learning is taking place at a distance. Such functionality isn't new, of course, but what LanSchool does is allow teachers to efficiently manage all these functions at once via a unified interface, without having to frantically swap between remote calls and various classroom applications. Power is placed completely at their fingertips.

Lenovo has pitched things just right with LanSchool. It's sleek, simple and welcoming, while containing the functionality needed to make teaching and learning easier. All the tools teachers will need can now be found in one place, neatly arranged in accessible pockets.

LanSchool is very much designed with educators and learners in mind. While there are other, similarly-specified packages available, they aren't as closely tailored to the needs of schools, which for me is LanSchool's most readily apparent advantage. Lenovo has done a great job of making this software the perfect fit for teachers' requirements.



### TECHNOLOGY + INNOVATION

#### VERDICT

✓ Functional and intuitive software that be used to improve the pace and flow of lessons

✓ Includes a powerful feature set that's easily accessed through an inviting teacher interface

✓ Puts extensive control of a classroom's various devices at a teacher's fingertips

 Expressly designed with teachers' needs in mind

#### UPGRADE IF...

You're looking for an all in one classroom management system that's easy for teachers to transition to, and actually helpful when it comes to teaching and learning – tailored as it is to education users, rather than business and corporate applications.

# CLASSROOM INSPIRATION

Fresh ideas to take teaching and learning to the next level

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Could we be witnessing a quiet revolution in teacherdriven CPD?

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Why video games can be more useful for learning purposes than you might think...

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Use your school's newly acquired edtech to supercharge your art lessons



# COLLABORATION AND CREATIVITY

Alex More considers how the profound disruptions endured by schools have helped pave the way for more positive attitudes around staff development and educational technology

may be alone in saying it, but from my perspective, the past year and a half has been perhaps the most creative time in education I've encountered over the 19 years I've been teaching.

Before March 2020, most days in school would be relentlessly busy, with barely any time to stop. During the partial school closures, however, on the two days where I'd be teaching from home I suddently had time to spare between lessons.

There was one week, for example, where I spoke to people in Dubai, Finland, New York and Australia. I used the time to connect with educators across the world to discuss the problems we were all having to manage, and found it fascinating to discover the technologies they were they using and the 'hacks' they'd found helpful.

It's certainly been an interesting period for online collaboration and creativity. There's currently lots of content out there, thanks to many educators using their own extra time in creative ways – not all of it great, but some of what's available is genuinely groundbreaking.

## Phenomenal technology

At the same time, some of the technology we've seen emerge to help with online learning has been phenomenal. One

example we ended up using ourselves is a platform called Mosaic 3D, which allows users to render a virtual 3D model on a screen and interact with it. For example, a biology teacher can 'dissect' a heart, zooming of feature-length and short films focusing on the natural world, all shot really well and in high definition.

Around the same time, Google launched a new

### "This has been perhaps the most creative time in education I've ever encountered"

in on the aorta and pulmonary vein. The effect is really 'in your face' – it's a powerful technology that's had a hugely positive impact on students' engagement with the content I've been teaching.

An online service that's perhaps not on many people's radar is WaterBear. This is a streaming video platform that's free for educators, and which hosts a large selection service called Earth Studio, which is essentially Google Earth taken to the next level. I teach a lot of sport, and when I was covering the then upcoming Japan 2021 Olympics, I was able to show my class the process of zooming in from the stratosphere, all the way down to where the events were due to be hosted from a street-level view.



#### **Habitual practice**

When it comes to making use of these and other ideas across the whole school, however, there can often be some resistance. The way in which teaching has been structured for the past decade has, I believe, encouraged teachers to become guite habitual in their practice. They have their classes and their classrooms, and that's just the way things are. It's sometimes difficult to get staff to look beyond that, because they're comfortable with the day-to-day practice of what they're already doing.

We've been able to introduce some new ideas at Shaftesbury School that have been fairly effective over the years – one of which was to organise trios of working groups. We have 60 teaching staff in our school, and around 15 TAs. We placed every member of staff in a group of three, being very careful as to which groups each individual was assigned to.

We would often start with a lead expert – someone with a real passion for an idea like growth mindset or knowledge organisers. We then partnered them with someone a little less enthusiastic about those notions – but in the context of a trio, having added a third person to the group, there are fewer places to hide. The idea is for every member of staff to be exposed to new ideas, whether they agree with



#### What can be some of the main obstacles preventing schools from building effective cultures of collaboration?

Schools will rarely collaborate with other schools, even in the same chain or group, because of a lack of leaders who truly understand how to embrace a more collaborative approach to teaching and learning. Time is a constraint, and the need to constantly deliver lessons, deliver results and climb league tables is one of the reasons why there isn't a greater culture of collaboration. The English curriculum itself is a barrier to developing a culture of collaboration

What are some of the most novel or innovative strategies you've seen teachers and schools use to address the challenges of COVID? We've seen adoption of social tools to promote collaboration, through which teachers can

them or not. For us, it's intended mainly as a nurturing environment for new ideas, rather than an INSET activity where staff are explicitly instructed in the workings of a new initiative.

Another practice we've adopted is to film our teachers teaching, either via Teams or in physical classes.

We'll then produce six-minute snippets of these lessons for distribution across the trust's Sharepoint site, which teachers can dip into at the direction of their line managers.

For example, I may have someone who, in my view, isn't questioning very well in their lessons – it may be that I can signpost



share ideas and have space to support one another. Teachers have gone to websites like Udemy and Coursera to learn more about remote teaching or remote working, while headteachers have taken advantage of platforms like Teacherly and WhatsApp to encourage staff to support each other both online and offline.

#### What do you see as the most encouraging, and most damaging, impacts of the pandemic across the teaching profession?

The most damaging long-term effect of the pandemic on the teaching profession may be the large numbers of teachers choosing to leave the profession because they want more of

them towards a certain video. That can serve as a small nudge for them to rediscover their mojo, because teaching is hard. Teachers have targets to meet and lots of content to get through, so it's natural for them to sometimes silo themselves away from their colleagues.

#### **Bouncing back**

Once the dust finally settles, post-pandemic, I think educational technology will be one of biggest beneficiaries. Teachers have now had to embrace it, and been given little choice in the matter. As a result, they're naturally going to have more confidence in using educational technology in a better, more creative way than they may have done in the past.

I also think we can expect to see a bit more awareness of how difficult teaching is as a a work-life balance. Similarly, some students, particularly those with additional learning needs, may be worse off following the pandemic, because remote learning and teaching platforms aren't necessarily geared towards catering to those needs.

In terms of more encouraging effects, we may start to see schools developing more of a hybrid/blended learning model in future, and doing more to embrace flexible working and learning. There's an opportunity now to reinvent the way we assess pupils and change legacy systems that have been in place for many years.

For more information, visit teacherly.io

profession, and greater awareness around how mental health can affect staff and students. Recovering from what we've been through is going to be an involved process that staff will be at the forefront of. Our students, as actors in the learning, will have to be resilient and bounce back themselves.

I do, however, believe that education will change in some positive ways as a result of this – with more flexibility perhaps being built into the system, and technology ultimately driving forward that positive change.



ABOUT THE AUTHOR Alex More is assistant headteacher at Shaftesbury School; follow him at @Alex\_MoreEd



# JUST LIKE BEING THERE

With school trips more logistically complex than ever thanks to COVID, there's never been a better time for teachers to explore the learning possibilities of virtual reality, says **Simon Luxford-Moore**...

ith schools across the UK finally open again, it's more vital than ever that the learning they provide is engaging, enjoyable and memorable.

That's not necessarily a big ask. After all, we're surrounded by an incredible, complex world, and every subject will have something unique to offer that can engage the relentlessly curious, growing minds of our students.

alone can't provide the type of rich experience that many students will really benefit from. That's why field trips to, say, Roman ruins in Italy will be utilised to make teaching around history much more tangible, and hopefully engender a greater love of the subject among students. Trips like these aren't always practical. though. for various reasons – not least the ongoing COVID-19 pandemic.

Technology has long been able to offer a middle ground between the

pragmatism and prudence of classroom teaching, and the immersion and inspiration that educational experiences can offer. Video technologies, starting with film projectors and later evolving through VCRs and interactive whiteboards, have traditionally given teachers a way of transporting students beyond the classroom walls and closer to the heart of the subject being studied. The emergence of the internet has aided this progression yet further, resulting in experiences that are grander and more varied could have ever dreamed of.

So what's next? I believe the answer is virtual reality. I'm fortunate enough to have been an early adopter of VR technology in the classroom, and remain convinced of its value as a tool for engaging students and enriching their education. Here, I'd like to discuss some of the experiences I've had with the technology, and the lessons I've learned about its applications within a teaching context.

"VR is most effective when it takes up around 15 minutes of a one-hour session, ideally one broken down into bite-sized, five-minute chunks"

#### Getting started

Using VR for the first time can be an exhilarating, but often disorienting experience, which is why it's generally best to begin with simple settings that will allow students to find their feet. That said, VR is extremely intuitive, and you'll likely find within minutes that your students are ready to visit new places and start using the technology to learn in entirely new ways.

VR systems that are specifically designed with classroom use in mind – such as the one we use, ClassVR – will typically allow teachers to create custom lesson plans, launch them on all headsets simultaneously, lock headsets away when they're not in use and dynamically highlight any 'points of interest' within the virtual space students find themselves in. Teachers should invest time in learning about these features before starting out for the first time, as they'll prove invaluable.

#### Integrating VF

For teachers considering making use of VR in their classroom, I'd offer one key piece of advice. Remember that it's just a resource – albeit a fantastic one – and should therefore not be the focus of the lesson. Students should leave your classroom thinking, 'That was a wonderful history / geography / English lesson' – not 'That was a great VR lesson!'

I've found that VR is most effective when it takes up around 15 minutes of a one-hour session, ideally one broken down into bite-sized, five-minute chunks. This will ensure that students can remain focused on the content of the lesson, rather than the hardware. It also gives pupils the chance to incorporate other learning styles and skills.

Students will spend a significant amount of their time in the classroom learning through seeing, hearing, and doing things, often in isolation. VR can help to combine these different experiences and cater to students' preferences for mixed learning styles.

#### Classroom field trips

My experience of using VR for virtual excursions has been phenomenal. Even before the COVID crisis, we had been using VR to overcome barriers of geography, faith and logistics. For example, we were able to virtually visit Culloden Battlefield and The Soldier's Leap at Killiecrankie as part of our P6 Jacobites topic. A field on a bus for most of the day, focused on investigating the sites themselves.

In a similar vein, we also undertook a virtual tour of the island castle on Loch Leven where Mary Queen of Scots was imprisoned. This offered many of the same benefits students would have had from a physical visit – an engaging experience of the location that could provide them with important context – without any of the drawbacks.

Looking further afield, the holy sites within Mecca are not accessible to non-Muslims – yet VR enables students to tour them irrespective of their faith, and follow in the virtual

#### SAFETY FIRST



Staying safe in VR is straightforward, and most students can use it without any ill effects. Some, however, may well experience nausea or symptoms of motion sickness. To minimise would offer the following advice to those trying

 Use the VR headset sitting down, either on the floor or on a chair

- Place both hands on a tabletop or clasp them together in your lap to remain grounded
- Take frequent breaks

I would advise against using video content that involves camera movement, which may make some users feel unwell. It's also important to be aware of any students with epilepsy, and to provide them with suitable and comfortable ways of using the technology – such as using an interactive display to share another user's view of the VR setting in real time.

> When the lesson is over, simply wipe down the headsets with antibacterial wipes, charge them up and you'll be ready to go again.

> > footsteps of the millions of pilgrims who have participated in the traditions and rituals they're currently studying.

#### VR in practice

At ESMS, we've looked to integrate VR across all areas, from Primary 1 upwards. Enhancing empathy, building respect for other cultures, providing access to the otherwise inaccessible, visualising work that students have created themselves – VR has enabled us to do all of this, while offering new experiences, new ways of exploring topics and new forms of learning. Imagine the value there could be in visiting sites such as the CERN laboratory, or the trenches of WWI.

That is why I'm convinced that VR should have a place in almost every classroom.



ABOUT THE AUTHOR Simon Luxford-Moore is head of eLearning at Erskine Stewart's Melville Schools

# Stand and deliver

Teachers and learners might have become used to remote learning since the start of the pandemic, but both groups will get more out of it by observing some specific practices and habits, says **Nik Peachey** 

've worked with schools in a number of countries during COVID, and the one message I have if you want to do distance learning well is this: get on board.

In all the examples I've seen, the schools and teachers who have accepted and embraced technology and this new way of teaching and learning are the ones who have excelled. Schools in Turkey, for example, were open to EdTech's potential and the management were behind it, so they were very well prepared for lockdown learning. India also surprised me with how well adapted they are to teaching with technology, given there are often huge barriers with internet connectivity there.

The way schools have viewed this period has made a huge difference on whether they've succeeded or failed. There are those that see it as a temporary measure, who are waiting to get back to "normal", which often leads to treading water and delivering lackluster content – uploading teacher-created classroom materials and worksheets for students to download, fill in and upload again once completed. This is not a very good approach.

Schools that have adopted a longer-term view, however, are the ones who see this as an opportunity to move into the future. They've looked at developing content that's been *designed* to be delivered online. This, however, often requires training.

If you want online learning that *really* engages students, gets them working together, and isn't just a repository for your worksheets, you need to invest in support for teachers. They need to know how to use the Learning Management System properly, and how to get the best out of it.

While a lot of schools do have, and have had, an LMS of some kind for a in the classroom. That's done through your physical presence, the way you use your voice, the way you use your body, and the way you address students. But those skills are not being used online.

So, that's one of my main tips – stand up. Get a riser for your laptop so that the screen is parallel to your body (this way it's not distorting). Then, stand back from the screen, about a metre, even if you need to

### "One of the most disappointing things I've seen is the number of teachers who are just sitting"

long time, many have been notoriously bad at using them to their full potential, and for what they were built for – online courses and creating interaction.

### How can teachers improve?

When they're teaching via webcam, one of the most disappointing things I've seen is the number of teachers who are just sitting. This isn't only teachers either, this is true of people presenting at online conferences or delivering online training they're sat in a dark room, crouched over their laptop with a pair of poor-quality headphones, giving no thought to the visual impact their personal presentation can have.

Teachers are really, really good at interpersonal skills and building relationships with students use a Bluetooth headset or an extension cable for your headphones.

When you look at yourself on screen, you want to be able to see from just above the top of your head to just below your elbows. That way you can start to use body language – you can use your hands, and you have room to move in towards the camera to emphasise certain things, and step away again.

Plus, standing up can also, contrary to what you might think, stop you from feeling fatigued. A lot of people have said they get tired just sitting in front of the camera, but if you're standing up, you feel more dynamic, alert and energetic.

A lot of teachers have said that they have students who are refusing to even turn their camera on, so give them more of a reason to tune in. They can also learn a lot about visual communication



skills from seeing you do it well.

Some of the training I've been doing with teachers has been exactly that – helping them set up activities that have a visual aspect. So students need to turn their camera on, and *need* to do certain things in front of the camera, in order to fulfil their communication tasks.

#### How can students improve?

It's obviously not all on the teachers though. Students don't always put themselves in the best position to learn online.

Just because they're learning on a mobile phone, some of them think that means they can be anywhere they please, whether it's in a cafe, on a bus or any place that isn't conducive to good learning. And as you probably found out pretty quickly, if you're in a class on Zoom, any kind of background noise can really impact on everyone.

What's been missing in many cases isn't teacher training, it's learner training. Pupils haven't always been prepped on adjusting their learning environment to make it suitable. And there are lots of basic things that can really help them get the most out of their surrounding space. They might seem obvious, but they are things that people don't always naturally understand.

#### **5 STRATEGIES FOR TEACHING ONLINE**

#### 1. Stand up

Get a stand-up desk, and start thinking about your body language, preferably with a bluetooth headset.

#### 2. Make space

Make sure you can move around. Think about your presentation, your body language and how you look in front of the camera.

#### 3. Talk to teachers

Get in touch with other teachers and share experiences share successes and failures and how they are coping. And do it online too, not just with colleagues within your school.

#### 4. Get social

Make sure there's an element of socialisation

within your classes. Students don't just come to school to learn, they come to meet up, make friends and build relationships. So if you can, let your students have some kind of socialisation time, where there isn't a focus on learning, and they can just have a chat together for five minutes.

#### 5. Start a diary

Start reading and writing about what's happening. It's great for teachers to have a blog. Write about your experiences, write about what you're learning, get some feedback on your blog and read what other teachers are writing on their blogs - many face similar issues and have found great solutions.

Things like how you set up a computer, how you set up the room you're working in, ensuring you have good sound equipment (or you at least have a headset) so that you're not creating a lot of echo that disturbs other people in the class, how to get the best from your internet connection. such as making sure there aren't lots of other devices connected to it while you're having your lesson, and that your proximity to the router is giving you the best connection you can get. These are simple things that can make a huge difference.



ABOUT THE AUTHOR Nik Peachey is an educational technology consultant, teacher, trainer and author, who runs Peachey Publications. Find out more at peacheypublications.com



# REASONS TO TRY... Newline Interactive

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### At a glance



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+ Educators require easy to use devices that are compatible with the tools they use in their day-to-day work

+ It's essential that classroom displays be capable of interacting seamlessly with individual student devices
+ Over the past year in particular, the ability to provide

face-to-face or distance education as needed has become a vital feature



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# LEVEL UP YOUR LEARNING

🖬 🗶 3 🔤 LWL 2

With video games playing a major role in the majority of young people's lives, it's time for schools to stop decrying them and start productively engaging with them, argues **Tom Dore**...

ut yourself in the shoes of a teenager in the early 1960s, amid the first stirrings of rock and roll. Think how passionate and enthusiastic you'd be for this new and thrilling phenomenon. Now picture how you'd have felt if the adults around you dismissed it as a complete waste of time, or worse, a *corrupting* influence.

Fast forward to the present day, and our teenagers face a similar situation with respect to their love of video games. In Ofcom's annual 'Children and parents: Media use and attitude report' published in February 2020, it was stated that 81% of 12-15 year olds play video games, on average, for nearly 12 hours per week. Just imagine what that figure climbed to during lockdown.

I maintain that it's time for educators and other stakeholders to recognise

the positives of video games, and the opportunities they can provide to motivate and engage young people. It might be different to the pursuits we had – or indeed, the 80s- and 90-era games we might have played ourselves – when we were young, but that doesn't make the modern video gaming hobby 'wrong'. On the contrary, we should bring video games out of the bedroom and embrace them in schools.

#### **Character building**

As a secondary science teacher with over 15 years' experience across alternative provision, state and independent settings, I've spent much time finding ways of motivating and engaging students. For many young people, an effective 'hook' might take the form of traditional extracurricular activities such as sport, music, art or drama.

However, a few years ago, when I was an assistant principal at one of the first sponsored academies in Reading, I realised we were failing to engage with a significant demographic of students that simply weren't into those kinds of clubs and activities. That's when I turned to video gaming, and in particular.

'esports'. To the uninitiated, esports refers to organised, competitive, human-versushuman video gaming with an accompanying spectator element (and emphatically *not* the solitary 'playing against the computer in your bedroom' activity many might imagine).

Around 40 different games are currently recognised as esports, the majority being team-based. Through playing as part of an esports team, young people get to develop many of the same holistic character skills they might acquire through more traditional team-based activities - leadership, communication, decision making, problem solving, strategic thinking. They also stand to develop strong friendships and a sense of community by participating, all while having great fun doing it.

#### Links to learning

The impact that video games can have in the classroom extends beyond character education. Esports offers explicit links to the computer science and digital skills that will be

> critical to our society moving forwards. Video games can also be used to support one of the

very cornerstones of learning, namely literacy.

The National Literacy Trust recently published the results of a research project that explored the relationship between video games and levels of literacy amongst 4,626 11- to 16-year-olds. Its findings included the statistic that 79% of young people who play video games regularly read materials relating to video games, such as in-game communications, reviews and blogs, and that 63% of the same group frequently write material relating to video games. such as scripts for games and advice to help other players.

There are a growing number of education pathways linked to esports that can support careers across a range of digital, creative and technology industries. For example, the British Esports Association (the UK's not-for-profit national body for esports) has partnered with Pearson to create BTECs in esports - the first such qualifications of their kind anywhere in the world. The L2 and L3 versions are fully funded by the Education and Skills Funding Agency, and began to be taught from September 2020.

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Within higher education, the universities of Chichester, Staffordshire, Nottingham Trent and Birmingham City all offer undergraduate programmes based around esports. There are also a number of other institutions with courses currently in development that will become available in January or September 2021, while in the US, over 200 colleges offer esports scholarships to students, as has previously been the case for traditional sports such American football and basketball.

#### **Competitive spirit**

The global esports industry is growing exponentially,

with top professional esports teams and their players earning six- and seven-figure salaries through competitive leagues and tournaments modelled on traditional sports. For instance, the team of five that won a tournament called 'The International' for the game *DOTA 2* in 2019 pocketed \$15 million in prize money.

Closer to home, some readers may be familiar with Jaden 'Wolfiez' Ashman, who won over \$1 million in the *Fortnite* World Cup last year whilst studying for his GCSEs. He's now signed to one of the UK's top professional esports organisations, Excel Esports, who are based at Twickenham Stadium – the home of England Rugby.

> At a school and college level, the British Esports Association

runs the British Esports Championships. Over the course of the 2019/2020 academic year, almost 300 teams from around 75 different schools and colleges entered the Championships, playing online fixtures against each other during weekly afterschool sessions.

Over the last two years, British Esports has also held tournaments in alternative

provision schools that have had a significant positive impact on the young people taking part. Schools have reported student attendance rising by 15%, and there have been examples of students who have a history of violent behaviour becoming proactive members of a team for the first time alongside staff. Reuters produced a video report on the impact esports have had in AP settings that can be viewed at bit.lv/ts97-esports.

#### Harness the positives

With all that mind, plus the growing importance of online technologies in the

post-coronavirus 'new normal', isn't it about time we meet our students where they are, and start to harness the positives of video gaming and esports in classrooms?

Video game characters and settings, such as those found in the multiplayer game *League of Legends* and the historically-themed *Assassin's Creed* series, lend themselves well to being a



#### **EXTRA LIFE**

• A range of teaching resources and activities aimed at supporting literacy through video games can be downloaded from **literacytrust.org.uk/** videogames

• A good example of how video games can be linked to education can be seen in the 'esports curriculum' for US high schools produced by The North America Scholastic Esports Federation - visit nasef.org/learning/curriculum for more details

• Further information on Pearson's L2 and L3 BTECs in Esports (entry level and L1 versions are currently in development) can be found at **bit.ly/ts97-esport-btec** 

stimulus for creative writing assignments. This can be expanded out to other subjects, too – every *Fortnite* match begins with players skydiving out of a flying 'Battle Bus', presenting a rich scenario with which to explore gravity and aerodynamics in science lessons.

Your school could also enter one or more teams into the British Esports Championships – the next round of registrations is currently open, with further details available at

britishesportschamps.org. And finally, the most straightforward tip of all – why not try playing some video games yourself...?



ABOUT THE AUTHOR Tom Dore is a part-time secondary teacher and head of education for the British Esports Association; for more information, visit britishesports.org or follow @british\_esports

"There are examples a A of students who have a history of violent behaviour becoming proactive members of a team for the first time"





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# **"The choice is now in** educators' hands"

Pearson's Les Hopper chats to us about what lies ahead for online learning

#### **30 SECOND** BRIEFING

Driven by your feedback and the latest innovations. Pearson is on a mission to ensure technology continues to amplify and enhance teaching, learning and assessment whenever, wherever and however they take place.

#### As 'the world's learning company', what has Pearson learned about online learning during COVID-19?

The pandemic-driven shift to online-led education was a learning curve for everyone. That's why we've been working closely with the education community throughout. Our #digitalclassroomsurvey of 6,817 UK educators revealed a digital upskilling of teachers and students (81% and 64% respectively) during the lockdowns. Experiments with technology, and new ways of interacting with students and colleagues, abounded - from navigating the mute button, to creating brand new learning programmes. This openness extended across the school community, with half a million families signing up for free access to The Maths Factor during the first national lockdown.

The survey also highlighted barriers that still need to be addressed. Over half of the respondents recognised a digital divide, with social isolation and lack of motivation presenting major challenges to some students' online learning.

#### What new opportunities will Pearson explore when developing its tools and services in future?

Months on from 'lockdown learning', the choice of where and how to use technology is now in educators' hands.

We're committed to ensuring that technology enhances teaching and learning experiences. It's driving the use of bespoke pedagogies in our



new service, ActiveHub, which allows teachers to leverage tools and content with maximum impact, whatever the mode of delivery. From this foundation, we're also bolstering the personalisation of learning journeys, starting with automatic insights dashboards. These streamline results analysis, so you can focus on what comes next for your students.

For educational resources to have impact, they need to be accessible. We're therefore proud to support initiatives such as Computers for Kids, advocate for the importance of nationwide internet connectivity to assist learning, and create resources that meet accessibility standards.



ABOUT LES: Les Hopper is Director of Digital and Assessment. Pearson School Qualifications, and has over 15 years' experience working with educators, technologists and academics to produce marketleading learning solutions



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# Continuing the conversation

+ Discover more about digital learning and innovation at Pearson by visiting go.pearson.com/OnlineJourney21

- + Explore the findings of the #digitalclassroomsurvey at go.pearson.com/DCS
- + Get to know ActiveHub at go.pearson.com/AH07, and read about the Future of Qualifications and Assessment research project at go.pearson.com/FOA21

#### What about examined assessments? Are there moves towards digital there?

The #digitalclassroomsurvey shows that teachers predict more onscreen assessment in future (59% secondary; 36% primary). It's at an early stage, but we've got an onscreen practical programming exam in our GCSE (9-1) Computer Science qualification, and are exploring the potential of AI-driven marking in trials with Progressay.

It's vital that technology is used when and where it can make assessment more relevant and inclusive, which is what we're currently exploring alongside the education community in our Future of Qualifications and Assessment research project.

#### What can schools look forward to seeing from Pearson?

Schools can expect to see, hear and be involved when it comes to shaping what's next. From free events - such as Digital Live, which explores the future of edtech - to research opportunities and the launch of our new ActiveHub service, there's plenty for schools to look forward to.

# **REIMAGINE YOUR ROUTINES**

**Gordon Cairns** finds out how successful blended learning requires not just the right technology, but a willingness to rethink a school's culture and daily timetable

major obstacle facing educational institutions trying to rapidly implement blended learning comes from the expectations prompted by that word – 'blended'. If schools were trying to introduce 'mixed' or 'combined' learning, the joins between home and school would be clearer. Instead, 'blended' implies a form of high-quality teaching that smoothly transitions between the classroom and online provision accessed from home.

For school leaders, this means not only having to overcome the numerous technical problems that can limit such access, but creating a working relationship between teachers and students that's conducted via screens. The challenge has been to attain a uniformity of instruction almost immediately, and, in many cases, from a standing start during a national crisis.

#### **Heavy lifting**

It would be fair to say that Chris McShane, chief learning officer at Learning 3D, is ahead of the blended learning curve, having spent nearly two decades as a headteacher implementing classroom and remote instruction across a variety of settings, from struggling state to independent schools.

He therefore speaks from experience when he says, "I've felt very sorry for the state education system recently, because they've been asked to do something they have no experience of." As he sees it, the speed with which school leaders had to implement blended learning – without any meaningful reconfiguration of how their schools were managed – hardly helped. "When I put this into schools, it was part of a change management system. When I first did it, it took me about five years; I've probably got it down to about three now."

McShane points out that while ensuring learners can access the correct software via a robust internet connection is a big task in itself, that's not enough. "Technology alone won't make the difference, but you can't make the difference without technology," he says. "We use technology, but it's not *just* the technology – it's the culture and

pedagogy that goes with it. The technology just does some of the heavy lifting."

He goes on to describe a working structure in which teachers remotely plan high quality learning experiences for their students while monitoring, tracking, supporting and challenging them, in a model of pedagogy that resembles coaching and mentoring. It's McShane's belief that success in this area may entail reimagining what were once non-negotiables, such as the need for a fixed timetable, the structure of the school day or the pace of learning.

"Do teachers need to stand for five hours in front of their students every day? If you can say 'No', that can liberate your thinking around what a school looks like. It's amazing how flexible the timetable can become."

#### Making learning personal

McShane's advice is that schools should radically rethink how they run the school day in a blended learning situation. "Schools can forget about trying to run a timetable online – you can't do it. When we went to an online sixth form, the teachers realised you can't teach how you've always taught. So the starting point is, how can we teach?"

One possible approach could be to use an online instructional video that allows students to go offline for half an hour to get on with their tasks, before returning with their completed work. As McShane notes, "You take your hands off because you've done your job – it's all on the video, and then you go back and open the discussion using tools such as Google's Jamboard or Microsoft's Sway, allowing the kids to come back with their ideas.

"If you want to encourage more collaboration, you can keep them online and assign them virtual breakout rooms where they can support and help each other. Those who don't need me can just get on with their work."

McShane believes that blended learning enables schools to eliminate two of the biggest barriers to learning-stress levels in students and lack of teaching time - thus allowing for a more individualised approach to learning, where classmates don't measure themselves against each other or struggle to keep up with the pace of learning: "Because of self-pacing, you don't have the same levels of anxiety in the process. The students are looking at what

they themselves are doing, rather than worrying about getting left behind."

Above all, McShane sees blended learning as not simply a quick fix designed to address a national pandemic, but a positive tool that can change how we educate for the better. "After COVID, schools could return to how it was before but that would be a big mistake," he says. "We've seen that it can actually make learning personal and engage the children much, much more in their education."

#### The online penalty

To achieve that goal, however, there's work that still needs to be done. Data gathered during the first lockdown of English schools in spring and summer 2020 revealed that access to online learning was patchy, with disappointingly large numbers of students disengaged from learning. The most severely affected were those already among the most disadvantaged, in large part due to the 'online penalty' – a concept identified as far back as 2012 by the US academic Ray Kaupp, in a paper examining why Latino students didn't perform as well as their white

> counterparts in the California college system (see https://bit.ly/ ts101-routines). Justin Reich, an

educational researcher and author specialising in networked learning, sums up what he considers to be the biggest obstacle to effective blended learning: "Most people do less well [online], but the people least well served by educational systems typically

experience the largest online penalty. "It seems that the

students who don't have self-regulated learning skills, and don't live in conditions amendable to self-regulated

learning – since in schools, peers IMPROVE YOUR BLENDED LEARNING PRACTICE

**1.** Planning lessons in minutes rather than time periods can 'create' time; a 1,000-minute topic, with 300 assigned to working independently, will expand the available time for the subject.

**2.** The ability of students and teachers to meet any and all deadlines for work set online is key to making progress.

**3.** Some schools have set up hotlines, text lines or video conference rooms – teachers are only required to respond during set hours, with other individuals being available after hours.

**4.** When using external materials, it's important that these are personally introduced by the teacher so that links can be made to the learning area.

**5.** Know your definitions, so that you're aware of where best to place your resources; online, blended, flipped, distance and remote learning are all slightly different.

### "If you just don't care about learning the stuff, you can't call a 24-hour hotline to make you care; that's going to require a human being"

and teachers will help them with that self-regulation – can get stuck when they hit these road bumps. Things that would take a person a minute or two to debug can become fatal to a learner's progress."

Reich believes that online teaching support of the sort offered by the providers partnering with the government's National Tutoring Programme could have a role in helping these disengaged students. "The institutions that seem to be doing the best job of closing this online penalty are those investing in things like coaching and 24-hour hotlines - which generate a real-time human connection.'

Reich furthermore contends that these human connections don't necessarily have to involve class teachers. "If you just don't care about learning the stuff, you can't call a 24-hour hotline to make you care; that's going to require a human being. It might not have to be your physics teacher who makes you care about physics, though – it could be an advisor or coach."

Somewhat ominously, however, Reich predicts that short-term school closures will become a regular occurrence in future, whether caused by disease or climate change, and that schools will have to build systems in order to cope: "If you're a kindergartener, this is probably not the last global pandemic you're going to live through. We're going to have to accept more interrupted schooling."



ABOUT THE AUTHOR

Gordon Cairns is an English and forest school teacher who works in a unit for secondary pupils with ASD; he also writes about education, society, cycling and football for a number of publications

teachwire.net

# BRINGING Art Online

We might feel we know our way around a Zoom call, but when it comes to visual media, we've yet to explore the creative possibilities that technology offers

'm a regular user of tech. though it is mostly standard fare and, for me, COVID-19 led to tweaks rather than leaps in my practice. At Ludlow Sixth Form College, where I am head of Visual Arts, Media and Film, we had to embrace the various image editing programs used by students, and the loss of formal work experience was replaced by Zoom tutorials – all led by academics, past students and creative employers. We even made a link with **Aardman Animations** where students formed a focus group panel and reviewed new animations. Because of our rural setting, these are all new connections that will be maintained and relevant to us beyond the pandemic, but it feels like the tip of the iceberg, and I was interested in to find out what more we could be doing in the digital sphere.

#### The art of noise

Galleries are always a rich source of ideas and so I spoke to Rosny Hayward, learning officer at Nottingham City Museums and Galleries, who has developed projects that blur creative and technologic boundaries.

"We create workshops and lessons that are born out of our exhibitions and collections, so as artists make increasing use of technology, we have looked

to mirror this in our schools' programme," she told me. One key artist is Jason Singh whose practice explores the electrical impulses of plants responses to their environment such as the moving sun or the sudden appearance of a hungry caterpillar. "In response we devised a lesson where pupils learnt about these natural electrical impulses." said Rosny. "We made sculptures of flowers using conductive materials to creating simple circuits and, through a computer, turned these signals into sounds. Students were able to play the sculptures like instruments." By combining

tools from websites such as makeymakey. com and scratch.mit.edu, your students can create similar interactive, musical pieces of art. If you wanted to make this a cross-curricular project, you could team up with the computer science department so students can complete their own coding.

#### How big tech does it

Apple, one of the world's biggest tech companies, opens its website's educational pages with the line "Every child is born full of creativity. Nurturing it is one of the most important things educators do." It offers teaching tools and lessons in areas such as augmented reality, but perhaps its most interesting offering is the *Everyone can create* project guides, which cover music, drawing, video and photography. These offer step-by-step exercises, linked to Apple tech, with accompanying teacher notes. Of course, it does tie you in to Apple, but even if

# Connect with your peers

Drawing on the resource of large organisations can be incredibly useful, but many of us get our best ideas through connecting with fellow experts in the field – other art teachers.

Andy Ash, an artist, researcher and teacher, through his work with InSea (The International Society for Education Through Art), has been central in connecting teachers across the globe.

In a recent recorded live discussion titled Relearning, Re-thinking & Re-framing Art Education, InSea showcased many great examples of remote, tech-supported learning, and great art teaching in general.

I recommend watching the session yourself, but my highlight was Tim Proetle from Wittelbacher Gymnasium, Germany, who presented a range of projects including The Disease Infiltrates Everyday Life, looking at the work of Arcimboldo. In this example, students collected items from around their homes and used these to create three-image stories giving a visual interpretation of COVID-19 and ending with the 'COVID monster' being destroyed. The equipment required was not too advanced – a camera, a computer to lay out a photographic triptych and an internet connection – but the results were varied, considered and exciting.

#### Always learning

Of course, any use of tech is dependent on access and teacher know-how. There have been many reports of children

> ABOUT THE AUTHOR

Hannah Day is head of visual arts, media and film at Herefordshire and Ludlow Sixth Form College where she has responsibility for overseeing the department's teaching and strategic development. unable to access education during lockdown due to a lack of access to laptops and the internet. Compare the UK's patchy provision to Estonia's long-term investment in digital learning and you will see how government priorities deeply affect learning.

Estonia was one of the first countries in the world to classify internet accesses as a human right. With their investment into digital study materials, school management systems and hardware, Estonian children's learning simply moved online when schools closed, with little interruption. One key pre-lockdown idea was to provide online learning during PD days, meaning that when Estonian teachers were in training, so were their students. Within art and design this could be an up-skilling opportunity, with a range of Photoshop exercises to complete, for example. With programmes such as Photoshop, giving students the chance to burrow down the rabbit hole of image editing and come out with results – often not intended by the teacher can do much to develop their digital craftsmanship.

#### Making tech the norm

But schools can't provide all this independently. We need to champion and push for better access and work with outside partners, as Julie Green, CEO of Glasspool, a national charity that awards essential living funds to those in need, knows all too well.

"The days when technology was a luxury for the few has long gone," she reflects. "It is now essential for daily living, to access goods and services and prevent social isolation. At Glasspool Charity Trust, we have seen how COVID-19 has increased digital exclusion, especially for families. Without computers in their homes, they have

#### UPGRADING YOUR ART LESSONS

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• Talk to teachers in other departments. Are there collaborative ways of working which might be straightforward, cost effective and completed in house?

• Get in touch with your local gallery or museum and speak to their learning officer. If they don't currently explore tech in art, can they develop a programme alongside you and your school?

• Expand your knowledge of artists using tech in their work. The website 2020.tecart.nl lists many working in this discipline.

• Students often learn new tech faster than teachers. Can they demonstrate this learning to the group?

• Set up a tech art club. Experiment in a targets and results-free zone as you familiarise yourself with new tech artists and processes.

• Link with outside partners to support tech access at home. See the Learning Foundation and BT's free six-month internet access.

• At the end of the week relax with your own digital arts experience using Creation Theatre's interactive digital shows.

struggled to access services and further their children's education, impacting negatively on their lives"

While in the past grants for items such as bedding or furniture might have been the norm, a recognition that digital support is also a central need is emerging. Tech in creative education is no longer an add-on or a gimmick, it should form a key component of some, if not all, of our projects; tech's value in creative education must be championed, with inclusion for all at its heart.



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connecting learning



#### ASK THE EXPERT

# "Just listening can make a real difference"

Gemma Campbell of Kooth PLC explains what schools can gain by using eduu.school to support their students' mental health

# What role can schools play in supporting students' mental health and wellbeing?

School is often a safe, consistent place in which young people feel listened to and protected. Integrating wellbeing into the curriculum, like **eduu.school** has done, supports early intervention, early detection, and most importantly, awareness around mental health issues, while highlighting ways of coping and sources of support.

#### How does teaching wellbeing as part of the curriculum help to support students in the future?

Good mental wellbeing enables students to do well academically, emotionally and socially. Teaching good mental wellbeing paves the way for students to be successful in all aspects of their lives, and better able to cope when things are difficult.

Exploring good mental wellbeing as part of your curriculum makes future success much more than just academic achievement, and could make a real impact on someone's life during their school years and beyond.

# How can teachers help students open up about their mental health?

By normalising mental health issues. Introducing topics in the classroom with empathy and honesty, and prompting discussion amongst students, may encourage those who want to open up to do just that.

Supporting a child's pathway to be aware, understand and accept that it's okay to talk, or at least seek support with their mental health, is a huge step in their development.

#### What's the best way that a teacher can help a student that's struggling with their mental health?

Supporting someone with their mental health can



#### EXPERT PROFILE

NAME: Gemma Campbell JOB TITLE: Kooth counsellor and content writer BEST PART OF MY JOB: Giving young people a voice, helping them to feel heard and ensuring that their experience is validated be daunting, and it's very normal to feel concerned about saying or doing the wrong thing. In terms of what to do, just listening to somebody can sometimes be enough to make a real difference. Don't underestimate the value of a 10-minute chat after lessons or at breaktime.

Also, be honest. You don't have to have all the answers, but if there's something you're unsure of, it's advisable to seek support. If you have any concerns about a student's safety or wellbeing, they should be passed on to your designated safeguarding lead.

#### How do you view the future of education with regards to wellbeing and mental health discussion in the classroom?

As mental health professionals, we believe that when we take care of young people's emotional health, they are also in a better position to learn and fulfil their potential in other areas.

When young people's emotional needs are not met, this can understandably present barriers to learning. As a partnership, we can work together to facilitate positive wellbeing, and healthy and open discussions about mental health in the classroom and beyond.

### ASK ME ABOUT

TEACHER SUPPORT - eduu.school offers free CPD webinars and training on mental health and wellbeing for students and teachers.

TALKING THERAPY - eduu.school signposts students to Kooth's anonymous service where they can be supported confidentially and anonymously.

SCHOOL INTEGRATION - mental wellbeing should be deeply integrated within education. What eduu.school is doing represents a huge leap forward in recognising just how critical this is to students' school experience.

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# SCHOOL SOLUTIONS

Innovations that reach into every learning space

### **THE AGENDA:**

#### **THE FIRST CUT**

Could edtech render classroom animal dissections

#### a thing of the past?

#### **INVOLVE EVERYONE**

How remote learning tools can be used to drive parental engagement

#### **TO BAN OR NOT TO BAN?**

Why the debate over whether to rid schools of mobile devices is far from settled

#### **6 WAYS TO MAKE EDTECH WORK**

What it takes to successfully implement a new solution or system

#### **BE A BETTER BUYER**

If you've lost your way in the procurement maze, these tips might help



# Are screens really the solution?

**Caroline Aldous-Goodge** asks whether the COVID-19 lockdown's many damaging consequences could include a troubling rise in device dependency among teenagers...

n 2020, students were granted almost complete control of their own learning. With many using their own phones, laptops and other devices to access online learning material set up for them by teachers or which they'd found themselves, it almost felt that we may have been facing the end of the classroom as we knew it.

Schools have since returned, but I can remember thinking at the time whether we should be worrying that the situation had the potential to result

in screen addiction among our yong people. Before lockdown, just out of curiosity, I asked my sixth form class (who are allowed mobiles in school) to look at how much time they were spending on their phones. This is easy to monitor on iPhones, which allow users to access a straightforward 'screen time' indicator. The results from one class surprised me – in fact, I was a little shocked. The average time measured in the class was seven hours a day. One boy even averaged 10 hours a day *that week* – and that was before the pandemic!

These were intelligent A Level students who apparently '*Watch a lot of films.*' This sheer volume of time investment concerned me, however – and when they actually thought about it, I believe it worried them, too. After all, what sort of impact could this amount of time spent on their phones have on their learning, mental health and general engagement with the outside world?

#### Excessive habits

According to Ofcom, "Smartphones have become the hub of our daily lives and are now in the pockets of two thirds (66%) of UK adults, up from 39% in 2016." The vast majority (90%) of 16- to 24-year-olds own a smartphone.

Before lockdown, most of us were already using internet-connected devices throughout the day for a multitude of different purposes – communication, work, entertainment, banking, social networking, gaming. In the age of COVID-19, they're being used even more. Perhaps the question we should be asking is whether the sheer volume of time that people – particularly younger users – spend using these devices will ultimately have a positive or negative impact on their learning, eventual exam results and general mental health.

After asking friends and colleagues to examine how much time they were spending on their phones and other devices, it soon became clear that they were often unaware of just how many hours they were committing to making use of the internet. I'd then use these realisations as prompts for discussion on what impact similar – or more excessive – use habits might have on the students we teach.

One of my colleagues felt that the internet by and large had a net positive effect for their students, in that it was allowing them to stay in touch, inspiring their creativity and connecting them with like-minded individuals and groups. Others felt that certain sites – Instagram, for one – were having a very negative impact on the mental health and self-image of both boys and girls.

#### What are the positives?

With comparatively little non-electronic alternative entertainment available to them during lockdown, many young people started spending increasingly more time gaming on their devices, to the point where such habits had the potential to become addictive – even destructive.

The perceived addictive qualities of phone use and gaming have long been of interest to researchers, yet not all of the resulting findings have been negative. Some studies have found that games can help facilitate a sense of autonomy, by giving players freedom of choice and sometimes, depending on the game, a meaningful narrative framework for the completion of various cognitive tasks. Well-designed games can also inspire feelings of competence in players, by presenting challenges that aren't too hard or too easy, and which feel rewarding to overcome.

The internet, meanwhile, obviously gives our students instant access thousands of photos, videos, songs, texts and games, making it an endless source of information (both good and bad, admittedly) and a powerful tool for learning. The latter notion has even become recognised as a distinct theoretical model of learning – connectivism, as noted by Dr John Goldie of Glasgow University Medical School in the research paper 'Connectivism: a knowledge learning theory for the digital age?' (see bit.ly/ts-connect1)

#### Towards connectivism

Connectivism holds that individuals are now able to acquire learning via a series of network connections in a way that wasn't previously possible. What sets connectivism apart from theories such as depression and anxiety (see bit.ly/ts-connect2), while the prevalence of smartphone ownership among teens and young people has raised questions regarding the possible implications for students' academic performance. That doesn't bode well for my sixth form class!

#### **Digital divides**

Of course, for connectivist learning to even be possible, the students in question will need to have access to the internet, yet a stark

### "Many young people started spending increasingly more time gaming on their devices, to the point where such habits had the potential to become addictive"

constructivism is the idea that learning can take place outside of ourselves, through connections of specialised knowledge that people can choose for themselves and utilise in order to learn more at a faster pace.

Lockdown diminished our freedoms in many ways, but in one sense it at least gave students the time and space to explore their personal approaches to learning. Some teachers embraced this, guiding and inspiring their students to take control of their own learning, and seeing their students flourish as a result of this new freedom.

But when it's not possible to supervise students in a classroom setting, what about all those other things mobile devices can do, which aren't related to learning? In recent years, studies have drawn links between excess smartphone with conditions such as digital divide persists. 1.9 million households in the UK have no internet access, while many other families struggle afford data allowances charged for on a 'pay as you go' basis. With virtually all schools having recently relied on online platforms to deliver their distance learning provision, it's entirely possible that many children are being left behind.

Some schools, like the one where I'm based, tried to provide families with computers so that their children could get online – out of our own budget, I might add – but found that some households were reluctant to take them. In any case, lending out computers only addresses part of the problem – the internet access will still need to be set up and paid for, and some families may lack the computer literacy required to make appropriate use of the supplied hardware.

We have yet to see just how large students' post-COVID learning gaps will become. As ever, the likelihood is that those with the most time and money will come out on top. We know all too well how some students genuinely suffered during lockdown while others thrived.

The intensive use of internet-connected devices by young people poses certain risks and harms, but embracing the possibilities presented by connectivism could help us tackle the learning disruption posed by COVID-19 in a practical and effective way. At the same time, we ought to be mindful that poorer students don't miss out through lack of access to the technology needed for connectivist approaches to even be possible in the first instance.



ABOUT THE AUTHOR Caroline Aldous-Goodge is an art and design teacher, head of year and education researcher

# Where next for edtech?

**Christine Thomas** considers whether the world-changing disruption we've seen of late will forever change how digital learning is used across English and other subjects

ever had the run-up to examinations been so fraught. We have a linear system where everything relies on maximising performance during the summer examinations. Following the introduction of enforced social distancing in 2020, however, traditional methods of teaching had to be suspended, with the result that new forms of longdistance learning needed to be swiftly incorporated to ensure all students received the best support possible at a crucial time.

The solutions to which most turned were technological, leaving many schools and teachers with a whole host of issues to address – a central one being how to support students in maintaining their interest and motivation to study, and how that year's Y10s can be helped to prepare for their GCSEs.

Longer term, could this need to adapt to unprecedented uncertainty help usher in a new and uniquely sustainable form of independence for our students? A new paradigm in which they're better equipped to revise for themselves and develop their own ways of learning? If implemented well, digital technology could well help to bring this about.

#### Students love technology

Many of us have frequently bemoaned the smartphones that have become almost permanently attached to teenagers' hands in the last few years, not to mention the headphones constantly attached to their ears, yet it's entirely possible to channel teens' love of technology into a positive force for good.

Mobile technologies, and social media in

particular, have received a fair amount of bad press, but during lockdown they were able to provide young people with an emotional and educational lifeline. There are digital products on the market that can provide outlets for learning that go far beyond the classroom, allowing young people to approach and develop their own studies in their own time, and at their own pace.

This, after all, is what will

### "Fate has played her hand and forced us to embrace a world of digital learning"

be expected of them in the workplace, so it ought to be encouraged. Through technology, students can establish their own groups of learners, share ideas among themselves and instil positive learning attitudes in each other as part of belonging to a wider digital community.

#### **Revising Successfully**

The key to successful revision has traditionally been to identify what you don't know and concentrate on that. If students are able to develop a greater level of independence for themselves, they can more effectively identify what it is they need to work on and take ownership over what it is they want to study.

After marking a cohort's mocks and completing their assessments, teachers will usually be able to recognise any patterns of underachievement. Personalised targets can be noted down, and students directed to ensure that any gaps in their study are filled. Teachers might opt to set remote learning tasks that involve the use of short videos. For their part, the students can use their phones to access the learning that's been provided for them – which in today's wired-up world, can often be far more straightforward than setting paper-based tasks.

#### Developing at Their Own Pace

Most young people love watching short videos, which is where the digital publisher GCSEPod can help. Its unique Pods in English Literature, for example, provide students with an approachable and meaningful way of focusing on characters, themes and plot. They're a perfect way of reminding students about key elements of texts, either through teachers setting tasks with clear direction, or by having students identify where they believe their own personal weaknesses to be and focusing on those areas that they know they need to work on. Learning through technology allows students to revisit specific digital sources time and time again, giving them the opportunity to learn and digest information at a pace that's comfortable for

them. Some students may need only one attempt at doing this, others may need 10 - but when each video is only a few minutes long, it can be a worthwhile use of time to ensure that there's a thorough understanding of a text.

# Fate and the Digital World

Additional features like Check and Challenge enable students to adopt an efficient quiz-like approach to learning with instant feedback – a great feature that rewards them for getting answers right, and which can provide them with instant reminders of what they need to know if their answers are incorrect.

As the pandemic continues to play out, what can we learn from our experiences so far of enforced social distancing conducted at scale? It may be that we can eventually come to harness strategies derived from what students have found to be the more positive aspects of their isolation. We're presently seeing just how effective the digital world can be in supporting students to learn independently. As serious as the times undoubtedly are, this also presents us with an opportunity to see what works.

Fate has played her hand and forced us to embrace a world of digital learning, faster and more completely than any of us might have wished. Yet by embracing the opportunities this technology affords, the profession can use it to both address the problems we're experiencing in the here and now, and perhaps pave the way for new and uniquely engaging approaches to teaching in future.

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ABOUT THE AUTHOR Christine Thomas has 25 years' experience as an English teacher, school leader and consultant across the primary and secondary phases; she also sits on the management committee of the National Association of Teachers of English as regional activities officer

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# **Radix TeacherView**

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### Need to know

The world is moving towards remote and hybrid learning/working for many reasons. Covid-19 changed our world and accelerated the transformation process. In order to keep safe and open, schools moved to remote learning, transforming the classroom experience. If moving to remote learning wasn't easy for many, teachers also had to work with at least two or three platforms in order to manage the class: classroom management, video conference and learning management systems. Moving between platforms is not ideal, it is time-consuming and teachers are less focused on teaching. Other challenges that teachers are facing in remote or hybrid learning setting are communicating with their students while keeping their digital safety a high priority. Radix TeacherView is an all-in-one classroom management solution, equipped with a built-in video conference system, allowing teachers the "over the shoulder" teaching experience they are used to in a remote or hybrid setting, staying in touch with their students while keeping their digital safety at a high level and also, providing them the best possible learning experience.

Built to scale, Radix TeacherView provides teachers with the tools they need to have a seamless traditional physical classroom experience virtually, monitoring not only the video camera but also the students' desktops in real-time, virtually walk between students and engage either in 1:1 mode or group collaboration, monitor the class attention level and assist students in real-time using Al.

Streamline the learning experience and keep your finger on the classroom pulse.

Remote at home, local at school or hybrid classrooms, the solution can be used during an emergency and routine, move to remote learning in a click of a button.

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Virtually all teachers will not have been trained to teach virtually. But this isn't just a training issue. The technology teachers have been using has massively contributed to their success or failure. Corporate platforms aren't a good fit for education. This is why I am completely sold on TeacherView from Radix. This is a sensational cutting-edge e-learning cloud-based solution that transforms remote/hybrid learning by combining video conferencing and classroom management into a userfriendly platform.

With 57 fabulous features, this trailblazer really does mean everyone can share a virtual space as close to a real physical, classroom-environment, experience.

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- Conduct surveys and quizzes

# THE FIRST CUT

**Rachel Coathup** considers the challenges presented by carrying out scientific dissections in the classroom, and suggests that there may be a practical and effective way of replacing them...

ore than 10 million animals are dissected in schools nationwide every year. At A Level biology in particular, cutting open frogs, rats, fish and rabbits as part of dissection exercises is a required component of the curriculum.

For decades, animal rights groups including the RSPCA and People for the Ethical Treatment of Animals (PETA UK) have called upon schools to cease such learning activities, believing that the traumatising experiences arising from them can be as bad for children as they are for the animals.

With in-class dissections having not been possible during lockdown, could now be the time to move beyond this part of the curriculum? will need a comprehensive understanding of threedimensional anatomy, which pictures in textbooks and plastic models will often fail to provide.

Anatomy is one of the most fundamental and core areas of science within medical education, forming the very basis of physiology and pathophysiology. As with most skills, observation improves with practice and knowledge – the more students learn to observe scientifically, the greater their background knowledge of the subject will become.

While it could be argued that dissection isn't strictly necessary for students at A Level and within higher education, many would maintain that science teaching in school should

#### Counting the cost

Weighed against that, however, are valid arguments concerning the ethics of animal dissection in the classroom, as well as plenty of other reasons to consider alternative ways for children to learn about anatomy.

Organising animal dissections in class involves many challenges – the first being the question of where to source dead animals. Often, they will be purchased through biological suppliers, pet shops or animal dealers, many of which will conceal stories of unnecessary animal cruelty.

Even if a school can source its animals through an ethical supplier, the next challenge involves budgetary restrictions. As school resources go, they aren't cheap! If the argument to retain the practice of dissection within schools is to stand, then each child, or pair of children, will need one animal each to experience the process, and have a clear and direct line of sight to their findings. Assuming numbers of up to 30 students per class, one lesson alone can rapidly become very expensive.

Handling blood products in schools also creates the need for specialist skills training among teaching staff, thus entailing yet more time and money. So, what are the alternatives?

### "Digital technologies can deliver an engaging science curriculum, while ensuring that dissection classes are kept ethical"

# Practice and knowledge

Before we start, I feel it's important to remind ourselves why dissections currently form part of the National Curriculum. Firstly, they can deliver the kind of hands-on science and clinical skills that will go on to inform students' professional preparation and knowledgebased practice, for those with ambitions to one day become confident and competent clinicians. These students be about allowing students to experience and gain understanding of the different sciences, the areas studied within them, and what career opportunities might exist in the relevant fields. Dissections give students insight into the world of numerous scientific specialisms, including nursing, veterinary science and the training required to become a dental technician, to name but a few.

PETA UK has previously recommended that schools use sophisticated computer software and high quality video content aligned to the curriculum, reminding us that "Students at nearly every medical school are now taught using a combination of didactic methods, humanpatient simulators, interactive computer programmes..." Seen from this perspective, it's possible for learning obtained from high quality digital video content to effectively prepare students for their potential future careers.

While a broad range of non-animal methods can be found on YouTube, sources such as ClickView's dissection range of videos are perfect for saving teachers time that might otherwise be spent searching at length for accurate, high quality and curriculumaligned content.

Videos with sufficiently high production values can provide students with a much clearer view of key learning aspects than they might otherwise see during classroom dissections. This content will have likely been filmed strategically and professionally alongside scientists specifically trained for the task. The videos can be paused and replayed if students require clarification or find something particularly interesting, along with the option to zoom

in on the most important areas of learning. Teachers can in turn focus on the educational curiosity and needs of their students, rather than worrying about the practicalities and logistics of the dissection process itself. Video can even be preferable to having the teacher dissect one animal before the rest of the class, where the students will be observing the same dissection, but from differing vantage points.

Conversely, having students view the same content in the same way will help facilitate whole class discussions and debates, and provide a clear foundation for questions. The use of video provides a level of standardisation that ensures all students can view the same important parts of the dissection, without the distractions that may accompany the harming of an animal.

# Engagement and confidence

This video content can be further accompanied by clear, illustrative diagrams that help convey the structural organisation of each organ, together with interactive questions and answers to reinforce the areas being taught.

Video dissections not only overcome the problems associated with in-class dissections, but can also offer more opportunities for students to learn. If they wish, teachers could opt to extend the class' explorations of dissection to an array of other animals and body parts, such as the ovine heart or brain, or porcine kidney.

Replacing animal dissections with videos can additionally provide content for remote learning, including homework tasks or supporting coursework and revision. As the pandemic continues to cause uncertainty for schools' teaching arrangements, remote learning via video looks set to continue being a common feature of students' learning experience for some time.

The sheer variety of video content available means that students can tailor their viewing. The budding curiosity of your aspiring scientists may well take them beyond the curriculum and compel them to explore what can be learnt from the dissection of an eyeball, or what the anatomy of a squid may be. If their interests take them there, they may also be interested in finding out how reproductive systems vary among male and female pigs and cows, plus many other learning opportunities typically not found in classrooms.

Finally, another key benefit of using edtech to bolster dissection lessons is that it can provide teachers with crucial data – how many students watched a particular video in its entirety; where they paused and re-watched; where any knowledge gaps may exist within the class. This information can be used to inform future lessons and help keep students engaged and fulfilled.

Digital technologies can help teachers deliver an engaging science curriculum, while ensuring that their dissection classes are kept as ethical, yet effective as possible. They can also help to inform the approach and content of future classes, and inspire a whole new generation of scientists.



ABOUT THE AUTHOR Rachel Coathup is a learning advisor at ClickView; for more information, visit clickview.co.uk or follow @ClickViewUK

# Involve everyone

The communication tools many schools can now access have the potential to radically reshape and improve their engagement with parents, says **Abdul Chohan** 

he past year has been filled with challenges for everyone across all sectors, but especially for those involved in education. Schools, teachers, students and parents all had to confront problems that seemed insurmountable at first, but to which many were able to quickly adapt. Everyone put in a herculean effort to ensure that young people were supported as much as possible.

Difficult though this was, the rapid large-scale adoption of remote learning led to the emergence of one positive trend in particular – more parents becoming actively involved in their children's education than ever before.

#### **Opening up**

Parental and guardian involvement in children's education plays an incredibly important role in students' attainment and progress. In 2019, the **Education Endowment** Foundation released evidence showing that levels of parental engagement could be directly linked to children's academic achievements, and were even more influential than parents' jobs, education or income levels when it came to their child's development. As such, it's worth asking what can be done to maintain this incredible uptick in parental engagement, now that students are back in classrooms and in need of all the support they can get.

One possible route could involve schools utilising the remote learning technology



that facilitated this increased involvement in the first place, beginning with parent logins. A useful by-product of most schools now using an edtech platform of some kind – typically for submitting work and marking purposes – is that said work is now easily accessible for teachers and students both in class and at home.

These platforms will usually see students given their own unique login, enabling them to access their work at any time, but schools can often overlook the importance of granting similar access to parents. This would enable them to see their child's work and track their progress accordingly, offering praise when they do well and providing support when they seem to be struggling.

There are, of course, certain issues to consider when opening up edtech platforms to parents. Teachers and safeguarding staff should retain control over the granting of access and the amount of data parents can examine. Done appropriately, this will facilitate regular involvement, enabling parents to check in whenever and wherever is most convenient for them, rather than having to wait for parents' evenings or set up appointments with teachers.

# Reinforcing communications

Another way of encouraging parental engagement with effective monitoring and oversight would be to create online portfolios - curated collections of students' work selected by teachers, so that parents and guardians can see how their child is progressing. These portfolios could include include some work the student had particular struggles with, allowing parents to see where they might be able support their child most efficiently - thus helping to ensure that

young people receive the encouragement they'll need outside the classroom to solidify learning, while reinforcing key communications between the teacher, parent and child.

Unfortunately, in-person parents' evenings can be missed or rushed due to external work constraints and other commitments. This is where edtech can play a pivotal role – by offering both in-person and online meetings going forward. Regularly updating parents on their child's progress if they're unable to visit the school may seem like a small thing, but it will ensure that each parent has a certain level of engagement in their child's education, and will be swiftly informed if their child has any apparent gaps in their learning, exhibits behavioural issues or has trouble with reinforcing learning.

Edtech has assumed a new, much more prominent place within classrooms, and seems unlikely to be going anywhere. It therefore makes sense to try and use it to its full potential, so that students, parents, teachers and schools receive all the assistance they can get over these crucial next few years and beyond.



ABOUT THE AUTHOR Abdul Chohan is vice president of learning at Showbie and a former MAT CEO

# Protect your social media presence

Legal expert Kate Hindmarch offers some pointers for keeping your school community and reputation safe from keyboard warriors...

#### Assess the threat

Social media is a powerful way of communicating useful information to parents and pupils, but what happens when a disgruntled parent takes to the keyboard to vent their anger at vou? Whether due to a particular lesson or a lunchtime incident, it can be easy to panic when the post appears. Get a clear understanding of what the post is saying and how much engagement it has. Commenting publicly on posts with low engagement can end up fanning the flames and cause others to get involved. If the post has few or no likes, comments or shares it may be best to let it slide, since it will probably soon drop off people's timelines.

#### Where's your **C** complaints procedure?

When a parent complains on social media, it'll likely be the result of a snap decision fuelled by anger. If you've judged the post as potentially damaging to the school, it's important to address the issue as soon as possible. Speak to the individual in question and point them towards your school's formal complaints procedure and social media policy, both of which should be easily accessible to all parents online. Sometimes

it's a misunderstanding that can be ironed out over a phone call or face-to-face. If their behaviour continues, or you receive further abuse from the parent via social media on two or more occasions, you may wish to contact the police.

**3 Be prepared** While most schools will – and should – have a social media policy in place, it will often only cover staff and pupils, without stretching to parents. Though most schools will stipulate that all parents sign up to the school's Code of Conduct, this will frequently not include social media conduct. That said, by ensuring all teachers observe best practice and adhere to vour school's social media policy, they'll be equipped to deal with any issues as they arise. The policy

should clearly outline the consequences for breaches, and what steps the school can take in the event of a social media issue.

# 4 Contact your solicitor

If an individual is harassing the school or a teacher on social media, vou may have no choice but to contact your solicitor and ask for their advice on the matter. They can help draft letters to the individual, advising them as to what laws they might have broken potentially anything from defamation to breaches of confidentiality. If the post is more serious, your solicitor might advise taking legal action and applying for an injunction.

# 5 Apply for an injunction

This will usually be a means of last resort. They're

an effective way of putting the brakes on parent-driven social media harassment. but can be tricky for schools to manage, not to mention costly. You can't grant an injunction prohibiting a parent from entering or contacting a

school, since they'll still need to attend parents' evenings and access important information about their

child. If, however, a judge sees the parent's behaviour as damaging to the school's reputation, they'll likely grant an injunction to put a stop to their negative social media behaviour. If you go down this route, be sure to act quickly, since any delay in proceedings could stop the courts from granting an injunction at all.

# 6 Advise your staff Advising all staff on

how to protect themselves online is another great preventative method. This could include recommending that their social media profiles are made private, not befriending parents and pupils through social media channels and advising them on what to do if they receive unsolicited messages through social media. It's also worth outlining the differences between professional and personal social media use. Another move can be to make it harder for parents and pupils to find certain individuals, such as asking teachers to flip the first and last letters of their names around or using nicknames.



**ABOUT THE AUTHOR** Kate Hindmarch is partner and head of employment at Langleys Solicitors, a firm responsible for helping to create one of the first UK academies; find out more at langlevs.com







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**REVIEW BY ADAM RICHES** 



Boost is an online platform that combines curriculum and lesson planning with resources and quizzing, making it an incredibly powerful tool for classroom teachers. Throughout its development, Hodder worked with over 400 teachers, tutors and students around the globe to ensure that Boost could provide classroom practitioners what everything they need – and it's worked.

One of the most notable things about Boost is its functionality. The interface is sleek and simple to navigate, when platforms this extensive can often be clumpy in use, making it difficult to find exactly what you want. Boost users will find clear, logical routes to their desired functions, enabling them to quickly access what they need. Hodder has also had the foresight to support full Google and Microsoft integration, so that staff and students can use their existing credentials when logging in to Boost.

Building lessons is one of the cornerstones of the platform, with teachers granted easy access to a wide range of quality resources that include lesson plans, videos and knowledge tests, which can be used to deliver varied and engaging lessons and homework tasks. The resources are easily edited, reordered and can be added to, enabling the platform to become wider in scope over time. Between Boost's ready-made resources, editable Course Plans and lesson builder facility, schools will find themselves with a solution that's increasingly bespoke the more it's used. A particularly nice touch is that schools can prioritise the use of certain elements more than others, depending their curriculum and departmental needs. The platform's real power comes from how its various tools are placed within easy reach, making it easy for teachers to quickly acquaint themselves with how things are laid out and what those tools can do.

Beyond being a great platform for teachers, Boost is also a powerful student learning tool. Teachers can set students quizzes that are easily tracked and analysed, and learners get to receive a bespoke offer, depending on what they're being taught. This helps to keep things streamlined when it comes to revision time, with less of the white noise and overload that can blight rival quizzing platforms.

Perhaps my favourite student-centred function is the access Boost grants to textbooks. Hodder produces some of the best in the business, which can be served up for instant access, online or offline, via the Boost eBooks app, complete with the hugely helpful ability to annotate pages. Consequently, the homework opportunities are endless, while handily saving valuable learning time spent distributing, collecting and chasing after physical textbooks.

In the process of modernising its textbook offer, Hodder has successfully produced a resource for teachers and students that's both formidably fully-featured and impressively easy to use. Boost will have a hugely positive impact on learners.

### TECHNOLOGY + INNOVATION

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# To ban or not to ban?

Online platforms and social media can cause security and content issues within schools – but banning them altogether isn't necessarily the answer, says **Bob Drummond**...

igital solutions and social media have been the 'winners' of the pandemic – exploding in use in schools and among students to help everyone keep in touch and enable remote teaching whilst social distancing. Recent research from The DfE (see bit.lv/ti8-tech1) reveals that the majority of schools have invested in new or upgraded technology in response to COVID-19 to enable remote teaching and learning.

With the UK government currently working through its 'COVID catch-up plan' to help students plug gaps in their education caused by the pandemic, we can expect schools to continue relying on digital, asynchronous learning solutions and social media to support their students for some time yet.

However, implementing such solutions requires far more than simply switching the technology on. Large scale technology use in school settings involves weighing up a series of considerations and implications. For instance, there's a pressing need in every school for digital policies that can help manage students' use of social media. In response to what seems to be a perceived absence of existing policies, the Education Secretary, Gavin Williamson, has said he wants a ban on mobile phones in schools.

This isn't about trying to prevent children and young people from accessing major online platforms and technologies that could be distracting or host harmful content; the real solution



lies in schools and teachers understanding how to ensure that students know how to use these technologies safely and securely, and building protections around that.

#### Clear rules for everyone

When implementing a digital solution within any school, it's crucial to establish clear rules and expectations around its use – not just for students, but also teachers and parents. Settings must prevent pupils from muting each other, for example, removing teachers from meetings or interfering with files stored online.

It's also important to advise pupils and their parents or carers on continuing live lesson etiquette and expectations. Should a responsible adult be nearby to support the child where needed? Should video feeds be turned on or off?

Many school-age children are already incredibly adept

at using technology, but their ability to use it wisely and keep themselves safe online remains very much in development.

At Kami, we're supporters of how the latest PSHE curriculum incorporates digital literacy across all Key Stages. The purpose of this is to educate children in an age-appropriate way about what type of personal information to avoid sharing online, how to ensure their privacy and security settings on social media platforms are sufficient, and understanding that not everyone and everything online is necessarily reliable and trustworthy - all vital in helping young people navigate the digital landscape safely.

#### The disruption factor

Of course, educating teachers and students on best practice with respect to technology use won't mean they'll always be secure, or accessing content that's safe for consumption.

For this, schools must look to technical solutions that can act as a practical defence against malicious material - preventing access to certain sites, or withstanding potential data breaches. Foremost among these are the content filters that help shield students from the kind of sites that can lead to malware being installed onto personal devices, as well as sites showing inappropriate and/or hateful content and social networking sites that may impact upon classroom productivity.

Placing administrator rights firmly in teachers' hands is important – as is giving them full oversight and control of students' devices that are out and being used in the classroom, or connected to the school's WiFi network. They can then use this ability to delete inappropriate comments left on collaborative workspaces, and restrict access to individual users.

To make the most of their technology in the post-COVID world, schools must adopt a digital and holistic approach to managing it. Rather than relying on the devices and content filters themselves, teachers should consider giving students and parents the chance to learn about online etiquette, digital skills and behaviour. This will not only keep their children safe in school, but also help prepare them for a workforce that's becoming ever more digital by the day.

#### ABOUT THE AUTHOR

Bob Drummond is chief privacy officer and co-founder at Kami - visit kamiapp.com or follow @usekamiapp
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# **Before your very eyes**

Dr. Sirisilp Kongsilp hails the hitherto untapped educational potential of augmented reality...

s technology becomes ever more accessible and affordable. the intersection between education and technology is becoming increasingly useful and attainable. Digital solutions, such as Desktop AR and mixed reality, could be the answer to various challenges currently being faced across the educational sphere. Many are starting to acknowledge the huge potential for Desktop AR products to revolutionise the way students are taught.

It's become increasingly unacceptable to simply throw a book or PowerPoint in front of all students and expect them to learn at the same pace and in the same way. Some students have conditions that make typical learning environments challenging; the Desktop AR software can enable this group of students to visualise certain aspects of their syllabus, be it via a virtual reality headset or a desktop reality program, and with appropriate support, even transform their lives for the better.

# **How does Desktop**

Desktop AR is an augmented

reality system that turns an ordinary 2D monitor into a volumetric display, and can bring virtual objects into the real world with the aid of a webcam and anaglyph glasses. It works by tracking the user's head position and rendering images according to the user's viewing angle in stereoscopic images.

The potential application are endless - especially since virtual reproductions of any object can be created by simply capturing multiple photos of a physical item. These photos can then be viewed as holographic images from the comfort of home or during classes at school.

At a time, when those wanting to soak up some culture may understandably want to do so without being in close proximity to a bustling crowd, Desktop AR lets you take in art exhibitions and museum exhibits by getting a 360° view of specific objects.

## How can it help?

This technology is capable of helping students from a multitude of backgrounds learn more effectively. School trips, for example, aren't always available to kids whose families are under financial

constraints - but that should never prevent a child from being exposed to the arts and history. With the launch of Perceptions' free Educational Programme, students can be culturally enriched without having to be present physically, and without having to worry about costs.

The technology can also be extremely beneficial for those with developmental disabilities, such as people with autism. For children needing to tailor their learning experiences in accordance with their distinct needs. AR technology can ensure no child is made to miss out.

This technology can also be a particular help for children with dyslexia, for whom reading and absorbing information about artefacts displayed on adjacent notices in a fast-paced, distracting environment can be difficult. Desktop AR can enable these children to read more easily at their own pace, while helping them understand the origins of different objects and providing them with important contextual information.

# Shared culture

The UK's most well-known museums are predominantly based in central London, making them hard to access for visitors based in rural areas. Our collective history and curated works of art ought to be shared, in order to educate the younger generation and enrich our wider cultural understanding. Desktop AR can bridge the gaps that currently exist between students and their broader educational experiences - irrespective of location, finances or disabilities.

The educational realm is perfectly suited to Desktop AR – both for the numerous creative learning opportunities it can provide for teachers, and because of how it can help schools remain on the technological cutting edge.

Those schools that successfully incorporate such technologies within their teaching are working to educate the next generation about the unlimited potential technology can offer. In this ever-changing society, our understanding of educational practice remains in a constant state of flux. If they're to stay up to speed and continue innovating, educational institutions should give serious consideration to the untapped potential of Desktop AR.



**ABOUT THE AUTHOR** Dr. Sirisilp Kongsilp is the founder and CEO of Perception; for more information, visit holo-sdk.com



# Make the right Cyber Choices

We hear what the National Crime Agency is doing to ensure that teenage tech enthusiasts are channelling their skills towards safe and positive ends...

he National Crime Agency (NCA) estimates that the cost of cyber crime to the UK economy amounts to billions of pounds per year - and is growing. The Agency's national Cyber Choices initiative seeks to raise awareness of the Computer Misuse Act 1990 and the potential consequences of breaking the law, while signposting to resources where cyber skills can be practised and positively and legally.

# Natural curiosity

Many young people are naturally curious and keen to explore how all the technology now so prevalent in our daily lives actually works – how different devices and platforms interact with each other, and what vulnerabilities those different devices and online spaces might have.

This curiosity can sometimes lead younger users into wanting to learn how to code, experimenting with various online tools and applications, and exploring the social interactions to be had on video streaming sites and discussion forums – all of which can lead to the development of useful skills.

However, some young people will make poor choices and opt to use their skills illegally – often while unaware of the law, or the consequences their actions may have.

## Letter of the law

Below are some key provisions within the Computer Misuse Act 1990, along with some examples of real-world activities and actions that would be prohibited under the law.

#### **SECTION 1**

**'Unauthorised access to computer material'** You watch your friend enter their social media username and password. You memorise their login details and without their permission, later use them to access your friend's account and read their messages.

#### **SECTION 2**

'Unauthorised access with intent to commit or facilitate commission of further offences' Your friend leaves their tablet on the sofa. Without their knowledge, you access their gaming account and purchase game credits using the registered credit card.

#### **SECTION 3**

<sup>•</sup>Unauthorised acts with intent to impair, or with recklessness as to impairing, operation of computer, etc.' You're playing an online game with a friend who scores higher than you. You use a 'Booter' tool knowing it will knock them offline, so that you can win the game.

#### SECTION 3ZA 'Unauthorised acts

caused, or creating risk of, serious damage' You hack a phone company in a way that prevents some people from getting through the police in an emergency. You didn't mean for that to happen, but you were reckless.

#### SECTION 3A 'Making, supplying or obtaining articles for use in offence under section 1, 2 or 3ZA'

You download some software that enables you to bypass login credentials, in the hope that you can hack into your friend's laptop - though you've not had a chance to use it yet. Consequences for breaking the Computer Misuse Act 1990 may include receiving a visit and warning from the police or NCA officers. More severe cases may result in arrest, seizure of devices and getting a criminal record. Other punishments can include bans on internet use and possible permanent exclusion from school.

Longer term, those prosecuted under the act may be unable to secure jobs in their preferred career, and even face international travel restrictions.

#### Lessons in cyber

At cyberchoices.uk, schools can find out more about current cybercrime trends, and how they can help young people with a talent for tech use their skills in positive ways. A series of KS3 cyber lesson plans we developed with the PSHE Association, covering cyber laws, online/offline crime comparisons and victim awareness, can be downloaded via bit.ly/ ti8-nca1.

We have previously also partnered with Cyber Security Challenge UK to deliver a series of gamified educational resources for tech enthusiasts, all of which are currently free to use. Further details of these can be found at cybergamesuk.com.

For more information, contact cyberchoices@nca.gov.uk. Any information you provide will be held in confidence, but if details of criminal offences or risks of harm are reported to us, these may be passed on



# edtech actually work

Avoid alienating staff with a new system no one needs or wants by following these pointers from **Ben Antell** 

## 1. Plan carefully, move quickly

Careful planning is essential for the effective implementation of edtech within schools. However, during the first lockdown we were offered the opportunity to introduce a new maths learning platform in our 46 schools. We made the decision to implement this quickly, because it could potentially provide valuable support to our maths teachers at what was a challenging time. This proved to be the right decision, and was instructive in helping us understand what needs to be in place when circumstances require the introduction of new edtech at speed.

## 2. Understand your staff's edtech fluency

Our maths teachers had already been using a different online maths platform (HegartyMaths) and had spent years developing classroom processes to maximise its impact. When we introduced the new maths platform – a sister product called Sparx Maths – our staff already possessed considerable expertise in using online maths tools to support their students. That said, don't expect any form of edtech to just magically 'have an impac't. It needs to be fully integrated into your classroom and homework routines, and staff should have some existing expertise to call upon when using the solution to support their teaching and learning.

## 3. Engage with your staff's support edtech

When we first discussed the idea of introducing the new platform with staff, there was genuine excitement. During lockdown this support quickly became essential, but it's important at any time. We want staff to be proactive in their use of edtech – not just competent bystanders. At the same time, however, be realistic about how positive your staff are likely to be at the prospect of needing learn and take on something new. Should any issues present themselves, be sure to address these first, before the edtech is introduced and rolled out across the school.



Ben Antell is Regional Director (Southern Secondary Team), at United Learning; for more information about Sparx and its evidence-led approach, visit sparx-learning. com/evidence or follow @ SparxLearning

#### 4. Never cut corners on training

We wanted staff to begin using the new maths platform quickly, but knew that appropriate training would be essential. We undertook online training with headteachers, senior leaders and heads of department at each school, who then cascaded this within their own departments. We also distributed a detailed best practice guide regarding use of the platform. Always ensure that there's a foundation of knowledge before teachers start trying out any new edtech solution with students for the first time.

#### 5. Assess your edtech supplier

As a MAT, we needed high quality data to understand the impact of Sparx across the 46 schools using it. This proved to be a straightforward request, and encouragingly, we saw an 89% increase in learning. Sparx was also quick to respond to staff feedback, and keen to examine how certain aspects could be developed and tweaked. We were further encouraged by the impact evidence they showed us. Ask your edtech suppliers about the insight they can provide and the support they offer. Case studies are useful when evidencing impact, but independent research is even better.

## 6. Create robust lines of communication

A positive culture is essential if the edtech you want to adopt is to become a school-wide success. We made sure that we put in place clear lines of communication, so that maths staff across all schools could discuss and share their experiences of using the new platform and learning how it worked. We wanted their feedback to inform any extra training, and where needed, requests to Sparx for changes. Staff are experts in what works with their students, so make sure there's a reliable way of hearing what they think.



Implementing edtech quickly isn't common, but the demands of the pandemic meant that doing so was a sensible, and subsequently successful option for us. The experience gave us a good understanding of what's required for fast and effective edtech implementation, so that we can act quickly again in future when needed.

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Find out how this cloud-based information system can change your learning environment for the better

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The staff at TASC Software are innovators and adept developers of pupil data management solutions, having worked with many schools and LAs over the course of 25 years.

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Contact: 01902 824 281 sales@ tascsoftware. co.uk tascsoftware. co.uk

# At a glance

- + TALAXY enables schools to present and manage their data more efficiently
- + Features a host of game-changing, built-in interventions informed by best practice
- + Great customer service provided by dedicated account managers



# REASONS TO TRY... Bedrock Learning

Transform your school into one where literacy really matters, right across the curriculum

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# At a glance



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+ Statistically-proven teaching technology delivers optimal learning to maximise students' progress

+ Clear impact reporting allows you to track usage and progress via a dashboard on an individual and cohort basis

Bedrock

+ Unlimited support from a dedicated account manager is included in all our schemes

# Harness the power of technology to improve students' literacy and communication skills



# 5 WAYS TO BE A BETTER BUYER

Ed Fairfield presents a checklist of edtech procurement tasks schools should work through before clicking on that 'Buy' button or signing on the dotted line...

echnology isn't a solution. Technology doesn't deliver improved learning. Technology doesn't reduce teacher workload, and it also won't improve outcomes.

It's the same with plastic. Plastic, in itself, can't help children to understand obtuse versus acute angles, or enable them to draw straight lines.

When schools understand and use such items effectively, though, when they become embedded into the day-to-day, and when users actively value how they work – *that's* where the magic happens.

#### **Prone to error**

The good news is that more schools than ever now understand this. If the last decade has taught us anything about edtech, it's that it's all too easy to buy new technology, only for it to end up in the ICT Cupboard of Doom, doing little more than collecting dust as a depreciating asset. These risks will become ever greater as edtech extends further into not just every corner of our schools, but also the computing clouds hovering over us all as individuals. Think software subscriptions, apps, 'Teams vs SeeSaw vs Google Workspace vs Kahoot' (in use concurrently at some schools I work with), teachers' laptops running Windows, sat beside staff iPads.

And yet, even as we've all become increasingly tech-savvy and wise, the actual processes involved in the procurement of edtech are becoming more prone to error than ever before, making it essential that schools are able to fine tune their decision-making.

Edtech is here to stay; it's essential, it's expensive and it's also easy to get wrong.

Here, then, is a set of considerations every school should make each time their mouse cursors are poised above the 'Buy Now' button. Think of it as an edtech checklist schools should tick before they click.

#### Consider your objective(s) An edtech or ICT

Strategy is your 'why / what / how'. A framework of aims and objectives that you'd like edtech to help you achieve, supported by plans on how this will happen. The question you must ask yourself whenever you're considering a purchase is, *Will this help me achieve a*  specific listed objective in my ICT strategy? Can I define how? If the purchase you have in mind doesn't pass the test, think again.

A classic example of this can be when a school purchases a replacement entry-level classroom projector – by doing so, they're perpetuating inadequate provision, rather than moving things forward. Or else they might get excited by a tempting summer term offer for 30 flipcams – in this instance, what's the 'why'?

#### Make a fullyinformed choice

Technology can be complicated, littered with jargon and often present a challenge when trying to compare like with like. Attending the annual Bett show, for example, will often entail having 20+ sales conversations about a given product type. The information you receive will frequently be contradictory and fragmented, leaving you with sore feet and feeling none the wiser.

Regardless, edtech purchasing decisions equating to millions of pounds of are made each year based on precisely this type of 'research'. So next time you think you're ready to make a purchase, ask yourself the following...

• Do I know what I'm talking about? Can I confidently justify my decision compared to alternatives?

- Is there jargon involved that I don't fully understand?
- Have I found agnostic information that will enable me to make a like-for-like comparison?
- Is there evidence of the solution's effectiveness?
- Have I experienced the technology myself and verified that it's fit for purpose?

# Earn the trust of your users

Research I've carried out in my role at Elementary Technology has indicated to me that trust – or rather the lack of it – is a big issue in edtech. There are two main facets to this; trust among users in the technology itself, and trust among schools in the technology's suppliers (see point 4).

An individual that doesn't fully trust someone or something will naturally be more cautious and less willing to engage – both of which are behaviours that can set you off on the wrong foot when it comes to technology.

This can be particularly relevant in the event of siloed decision-making, such as a network manager procuring tech on behalf of their teacher colleagues, or a MAT making choices on behalf of its schools.

Without prior warning, the school is suddenly the recipient of a pallet of shiny new edtech. Said edtech's intended users – usually teachers – will be curious, but also wary of the unknown. They'll likely have some concerns around changes to their workload and the expectations that will henceforth be made of them. Without meaning to, the school has immediately created a barrier to the edtech's wider adoption.

The important takeaway here is to therefore consider your end users. Make sure you consult them, perhaps using a Forms user survey, focus group or simply via face-to-face conversations. By sure to involve them, maybe by sending them updates on how the purchase decision is progressing, and/or inviting them to view a demonstration prior to a decision being made.

Above all, share your plan with them. When a purchasing decision is made, announce it to the school and invite feedback. That way, when the shiny pallet turns up, your colleagues will be more ready to embrace it and you'll see better value as a school.



It's entirely possible for a company representative to sound charming and knowledgeable on the phone, win the trust of a school and succeed in supplying that school with technology solutions.

Due diligence remains essential, though, with several 'credibility clues' that schools can actively watch out for. You could start by searching out previous examples of the company's experience and past successes, or a reference site from a school similar to yours. Ask around – if the company can't point to its prior achievements, you should probably move on and proceed to look elsewhere.

Some companies may display certain 'badges of honour', such as being partnered with a widelyrecognised manufacturer or developer. Look for any wins of education-themed awards and preferred supplier agreements with MATs and public sector organisations. See if the company is included on any procurement frameworks, such as Crown Commercial Service or YPO.

Moreover, do they talk your language? Do they understand your needs as their customer? Does it look as though they've spread themselves thinly, perhaps by supplying businesses operating in spaces other than education? Will that affect the service they can offer you?

Be demanding! Ask for evidence of any claims, insist on training, drill down into the knowledge their representatives possess and ensure you're given options.

# Straining

So, you're clear as to the 'why', the 'what' has been delivered – now it's the 'how'. How will your school get best value from the edtech solution it's chosen and maximise its use?

Before it was abolished, the British Educational Communications and Technology Agency (BECTA) recommended that 20% of ICT spend be dedicated to training. My experience as a supplier is that schools aren't prepared to fund anywhere near that – and having seen some suppliers' provision, to be honest I can see why.

There is, however, good training to be had out there, which schools should insist on receiving. Before ordering, consider the training dimension. What will be included in your purchase? Is it developed with teachers in mind? Will it be formative, or consist of a basic one-off session? Can the provider o<u>ffer</u>

support for training an in-house champion? Will there be separate support for your own ICT team?

Consider also the software and firmware side. Can the solution be updated, and for how long will it be supported? Are there any ongoing costs? Poor edtech training and lack of CPD can present significant barriers to learning.

With all that in mind, perhaps the single biggest question you should ask yourself is this: Do I have a long-term, supported plan to ensure this technology will help me deliver better education?'



ABOUT THE AUTHOR Ed Fairfield is the vice chair of Naace - The Education Technology Association, a senior manager at Elementary Technology and a school governor overseeing ICT; follow him at @mreddtech

# We must pressure the government

Teachers have a vital role to play in pushing for greater online protection for students, says **Charlotte Aynsley** 

s we all know, since lockdown there has been a huge surge in young people's use of social media and the internet more broadly. Being online has acted as a lifeline for many children and young people but, as time spent online has increased, protections have not.

We know the government wants 'the UK to be the safest place in the world to go online' and following the tragic suicide of Molly Russell in 2017, it drafted new legislation in the form of the Online Harms Bill, designed to increase the protection of young people.

However, despite ongoing lobbying by the NSPCC and various other charities and child protection advocates, the Minister of State for Digital and Culture, Caroline Dinenage, has said she could not commit to bringing a draft of the bill to parliament until 2021.

While the shape of the bill continues to develop, the NSPCC has issued six tests that it will use to determine whether it will genuinely protect young people from online harms. A successful Online Harms Bill, the organisation insists, must be predicated on an expansive, principles-based duty of care and set ambitious targets for tackling online child abuse.

The bill must also address legal but harmful content, such as suicide and selfharm, and grant Ofcom investigatory powers and the ability to level criminal and financial sanctions. Finally, to earn NSPCC approval, the bill must include support for a civil advocacy counterpart to the legal repercussions, funded by a levy on the social media industry, to ensure that civil society can stand up to powerful industry actors.

# Uniting teachers behind the bill

I believe teachers can play a crucial role in moving the Online Harms Bill forward. We know safeguarding is a crucial part of a teacher's job and this legislation would make meaningful contributions to that end. The bill will form another layer of safety, reinforcing boundaries that teachers and parents want to enforce and making it harder for young people to access inappropriate or dangerous material – in school, at home and beyond.

There are currently over half a million full-time teachers in the UK, and together they have incredible pester power, influence and leverage and huge potential to apply pressure to the government. A unanimous push could break through the logjam and drive action.

Creating awareness is a prerequisite to creating pressure, and the simplest thing that teachers can do is to learn about the bill and spread the word. Teachers can lead discussions about the bill online and influence campaigns to pressure MPs: this could involve lobbying their unions to push for action on the bill, or simply circulating existing petitions pushing for it to be enacted in law by July next year.

# Legislation for the online era

As the amount of time children spend isolated online increases, so too does the importance of eliminating online harms. At a recent safeguarding roundtable in which I participated, chief constable Simon Bailey, the National Police Chiefs' Council lead for child protection argued that the bill is the bare minimum we should have in place to protect our children and that such a bill should have been in place years ago.

In spite of the coronavirus and parliamentary stagnation, we must redouble our efforts to advance this bill. ensuring that it is fit for purpose as it moves through the legislative process. Behind parents, teachers are the group most invested in protecting children, and I feel a concerted effort to increase the pressure on the government to pass this bill will certainly vield results.



ABOUT THE AUTHOR Charlotte Aynsley is safeguarding advisor at Impero Software.

# Let's close the digital divide

Closing the attainment gaps that have opened up during lockdown will require schools to forge supportive external partnerships, says **Nayeer Afzal** 

he reopening of schools has restored a welcome sense of structure to pupils' learning and daily lives. At the same time, however, the digital divide between disadvantaged children and their peers has become wider and more severe, to the point where the former's future prospects are going to be significantly impacted if steps aren't taken to address it.

The past year's school closures and moves to remote learning have thrown the issue into sharp relief, with many young people now further behind in their studies than ever before.

# Understanding the divide

To close this digital divide, we must embrace a holistic approach that ensures disadvantaged pupils can obtain better access to devices, both in school and at home, while providing them with the personalised support they'll need to catch up.

The government's catch-up funding and National Tutoring Programme both provided some welcome support, but schools, trusts and tuition providers will need to forge partnerships and go the extra mile if the divide is to be tackled in the long term.

More affluent families are generally able to provide their children with sufficiently capable internet-connected devices, which has been



instrumental in helping them access online learning and resources during school closures, and continues to be pivotal in assisting them with homework tasks.

By contrast, disadvantaged children will often live below the poverty line. Their parents may be on low wages, with multiple school-aged children at home, and unable to afford enough devices for everyone.

One recent study found that 40% of children in middle class families were completing five plus hours of online learning, compared to just 26% in working-class households. Another found that in the most deprived schools, 15% of teachers reported more than a third of their students not having adequate access to device for home learning.

# Long-term impact

Without regular access to digital tools, these children will miss out on developing the skills that can otherwise help them become more tech-savvy, acquire a job, move into higher education and attain social mobility. There are, however, some steps we can take to help narrow the divide and build a better future for children of all backgrounds.

Addressing digital poverty will require us to combine easier access to technology with tailored support for those pupils who need it most. The government's efforts at delivering laptops to disadvantaged students were welcome, and went some way towards alleviating the challenges many face. That's something that we at Learning Hive, alongside many other organisations, were also engaged with, in an effort to try and tackle the problem in the short term.

Now, however, further efforts are needed to ensure that the impact of these measures can be maximised. A new laptop or iPad can go a long way towards engaging pupils and firing their imaginations, but true success will only come from being able to deliver a comprehensive programme of support. That includes in-person teaching, as well as fully-funded, afterschool tuition carried out in partnership with teachers and schools - Barnardo's 'See, Hear, Respond Parnership' service has been an excellent example of this. Such schemes should undoubtedly be focused on core subjects, but it's also important that enriching disciplines, such as drama, STEM and health and wellbeing, are covered too. All young people deserve a high standard of education, and digital poverty should never be a barrier to that. There are many challenges ahead that schools will need to tackle - but simply being back in the school environment itself is a major plus. A coordinated and proactive approach will now be required to help pupils catch up fully.

#### ABOUT THE AUTHOR

Nayeer Afzal is programme director at the after-school learning providier, Learning Hive; for more information, visit learninghive.co.uk or follow @learninghiveuk

# REASONS TO TRY... Loxit Lapbank TL

Keep those all-important laptops safely under lock and key and ready to go with this robust charging trolley

EASY TO USE

The trolley's top-loading design provides easy access to all of your laptops. The trolley sits at the same working height as standard desking, thus requiring no bending down. Nor is there any need search for cables, thanks to its neat internal cable management system.

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The Lapbank TL is designed for daily use. The all-welded steel construction and powder-coated finish makes for a durable solution. Security is an important factor when choosing a laptop trolley - hence the presence of highquality ASSA ABLOY locks and their proven track record for keeping contents secure, for added peace of mind.

# **3** BUILT FOR SAFETY Designed to have a low

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# COMPACT SIZE

Built to be as small as possible without compromising the security of your laptops, The Lapbank TL is deceptively accommodating, able to hold up



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# At a glance

+ Over 25 years, Loxit has built an excellent reputation for being able to deliver robust, reliable products to the education sector

+ Our products are designed and manufactured in the UK, and we ensure that we hold good levels of stock

+ We can offer the complete package – world-class products, seamless delivery and excellent support.

# LapbankTL<sup>™</sup> Class leading solutions Securely store and charge up to 32 laptops

















There are 4 things that make the LapbankTL™ a stand out solution...

# Storage

Holds up to 32x Chromebooks or 15.6" laptops

# 2 Top loading

For easier access to your devices, working at the optimum height, no bending down.

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# TECH IN ACTION

Stories from schools with technology at their heart

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# MAKING UP FOR LOST LEARNING

**Chris Vallance** talks us through his school's response to students having to isolate at home – and what lockdown revealed about his colleagues' online teaching skills...

'm strategic director for student experience at Samworth Church Academy – a 1,170-pupil secondary school in Mansfield, Nottinghamshire. Part of my role, which is equivalent to viceprincipal, is to oversee a mix of online and face-toface intervention for pupils designated as needing catch up support.

I manage a team of part-time staff who work exclusively as catch-up tutors. Together, they make up the equivalent of one full-time role for each of the three core subject areas – science, maths and English.

## More demands

We decided to use our catch-up funding to build our own team of part-time teachers, after learning about the effectiveness of one-to-one and small group catch-up teaching in EEF research.

During lockdown, staff supported students exclusively online in one-to-one and small group sessions. From September 2020 this support moved back into the classroom, but as the second spike of the pandemic began to emerge, we shifted to becoming a 'mixed economy', with around 65% of support provided in classrooms and 35% online, though the proportion of online sessions gradually increased thereafter.

We've found that online gave us more flexibility in the way we delivered our catch-up learning. We could fit our support around times that were mutually convenient for staff and pupils, including Saturday mornings or weekday evenings.

Some of our tutors used the Bramble live online teaching platform (bramble. io) to provide online learning support, which places more demands on learners compared to using Teams. There's scope to create interactive and engaging lessons that are more reflective and dynamic, which is largely down to the 'interactive whiteboard' on which it's possible to display lesson content and provide a focus for teacher and

students alike. There's also the facility to write notes and annotate lesson materials, such as science diagrams. This all helps to convey the sense that sessions are taking place in a classroom environment.

Attendance and behaviour in these online sessions were good, and resulted in us seeing fewer cases of students 'being present, but not present'.

A question of attitude The contrast

between online teaching

during the first lockdown and towards the end of the December 2020 was marked. During the first lockdown our online offer was very improvised, but we learned as we went along and improved our skills very quickly. Colleagues who felt they needed support were pointed towards confident online teachers, and we shared online resources that would help them. From the start of the 2020/21 academic year, we ran training sessions that looked at how remote technology could be used effectively, sharing techniques and practice that would help our teaching staff and reinforce the school's expectations of what these catch-up sessions ought to achieve.

What we found from our subsequent experiences was

that effective remote teaching isn't really an issue of skill; our teachers were easily able to transfer their classroom skills to the online world, with just a few tweaks needed to make their approach more suited to one-to-one and small group situations. Instead, it was more a question of attitude, and ensuring that staff were able and willing to embrace the opportunities remote teaching can open up for our students.

Our moves into online teaching did involve some challenges. Teachers were able to confidently adapt their delivery technique to

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live online teaching, but some expressed uncertainty over what to do in the event of any concerns around student welfare or safeguarding. In response, we gave several colleagues support in this area and endeavoured to set out a clear reporting process.

#### **Device availability**

By far the biggest issue with moving our catch-up support online, however, was ensuring that enough pupils had the technological capability to access the sessions. Many pupils in Samworth Church Academy's catchment are from disadvantaged backgrounds, and there's a sizeable minority who don't have access to a device of their own.

At the height of lockdown, we received requests for packs of printed lesson resources from 110 students because they couldn't get online. And yet, broadband connectivity *per se* has never been the issue – in disadvantaged households, the real problem is a lack of devices. Students may not be able to get exclusive use of a family's sole device at the point where they need it, for example.

That 110 figure eventually came down to 85, as we managed to acquire some laptops through the government's scheme and bought some additional units ourselves. At the start of 2021, however, around 70 students were still regularly receiving our printed resource packs.

Since then, we've begun to put in place procedures that will see all of our school lessons streamed, so that students unable to attend don't have to miss out. We've sought to seamlessly integrate the technology we initially began using for catch-up puroposes into all aspects of the school day. We enjoyed our early experiences of Teams, but wanted our next steps to involve making use of other live online learning platforms and seeing what they could provide.

# THE VIEW FROM THE FRONT

Tara Stirland is a science teacher working mainly with Y10 students at Samworth Church Academy. As part of the school's catch-up initiative, she supported approximately 30 pupils identified as needing additional support to help them make sufficient learning progress.

Tara taught the pupils in question in small groups of between two and six. During lockdown, Tara supported the students remotely using Bramble. Following the September 2020 reopening of schools, she returned onsite to deliver face-to-face support, but found herself spending increasingly more time on remote learning as the term progressed, after a growing number of students became unable attend the face-to-face sessions due to self-isolation.

In Tara's view, however, the remote online learning was, in many ways, more effective than the face-to-face sessions. "We had real success with the online learning approach during lockdown," she says. "I found that we could actually engage more with the children, [and] there were fewer distractions, such as room changes. It allowed the students to be much more focused."

Tara believes that the school's move to a combination of remote and face-to-face support following the outbreak of the pandemic proved to be very effective: "Some people still perceive online learning to be not as good as face-to-face, but in many cases it's actually just as good, or even better. I've seen what some of my students have got from it. I can see what they're doing on the screen, and I love the fact that they can listen again to sessions via recordings, and also search for particular topics. Some students really prosper with this type of learning."



# CLASSROOM LIFE

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# The benefit of foresight



Deputy headteacher Mark Deans describes how West Bridgford School was ahead of the curve when it came to building its remote learning provision

est Bridgford School is what you might describe as a classic 'leafy suburb' school. We're a mixed comprehensive in a southern area of Nottingham, with student population of 1,600, and very lucky to have great parents and students.

We're also fortunate to have a headteacher who, early on, bought into the idea of using technology in the classroom and extending the use of technology-assisted learning into the home.

I was appointed as a deputy head around 10 years ago, with a specific remit to develop our home to school communication technology. At the time, I was head of the IT and computing department and a senior IT and computing examiner, having been of the ZX81 generation and developed a love of tech from an early age.



## Marginal gains

Our head is a keen cyclist, and became very taken with Dave Brailsford's 'marginal gains' philosophy, As such, we've always been searching for marginal gains ourselves, looking for the next strategy that will improve our students' access to learning.

We knew back then that homework wasn't being used very effectively, with parents, students, and teachers often feeling that it was being done simply for the sake of 'being done'. If we wanted to make gains in this area, students would need to see learning at home as something worthwhile, tailored to them and easily accessible.

However, it wouldn't have been enough to announce 'Okay, we've now got a new virtual learning system – off you go, teachers.' If we had, the whole project would have been an absolute disaster. We therefore drew up a clear project plan and established our aims, recognising that teachers, parents and students alike would need to understand the project plan over time and where we were going with it.

# Less work, better outcomes

Teachers can sometimes be their own worst enemies, in



MARK DEANS IS A DEPUTY HEADTEACHER AT WEST BRIDGFORD SCHOOL; FOR MORE INFORMATION, VISIT WBS.SCHOOL OR D2L.COM

that they'll do everything in their power to try and improve outcomes for children, working above and beyond the call of duty. Our approach was to explain that instead of taking in 30 essays and writing extensive feedback on each, they could get better outcomes from using interactive quizes. They would need to invest effort upfront in building the quiz and drafting the feedback students saw for correct, close or incorrect answers - but they'd then have a resource that could be used annually to give high quality feedback and provide students with a great learning experience.

Some teachers found the idea of getting good or better outcomes by doing less work a little difficult to get their



heads around, at first, but if you have the right tool and appropriate staff training in place, you can deliver.

We introduced the new provision in years 7 and 10 at first, so that our teachers wouldn't feel overburdened by it. Our thinking was that if we could secure that gain in the first year, our teachers would then feel encouraged by our expansion of the platform to other year groups.

After a year of using Moodle (moodle.org) we came to realise that our next big gain would necessitate moving to a different learning platform, so we went shopping. We came across D2L's Brightspace VLE through Trent University – a university local to us with whom we often partner – which credited Brightspace with much of its recent success at the time, especially its online environment. That was three years ago.

## From the ground up

In early 2020, we were able to spot the coronavirus disruption coming. We commenced training for staff around lockdown planning in late February and liased with Brightspace in early March. When we've used other learning tools, the tool itself is often all there is. By comparison, Brightspace lets us approach individuals there and ask what we need to do to deliver the outcomes we want.

We were told that they could give us rapid access to live online classrooms, so the following week we had live teachers, teaching in their own groups to students with whom they'd already built a productive relationship. Shortly after, we rolled Y10 and Y11 into full-time timetables, the only differences being slightly bigger gaps between lessons to allow for short breaks.

Around the same time, we carried out an extensive survey of the equipment our students had at home and their ability to access our provision. We were initially concerned at how many had migrated from using laptops several years before to phones and tablets. A number of households also connected to the internet through 3G or 4G dongles rather than via broadband, but Brightspace was able to design our provision from the ground up to work with mobile devices, removing that barrier.

## A winter challenge

While the vast majority of students engaged with the work they were set, some did struggle during lockdown. For them, we were able to provide remote learning interventions aimed at helping them catch up, backed by a range of remote learning resources that we've produced over the last three years.

The key focus for us then became planning for the inevitability of localised lockdown and student absences. It was comparatively easier to plan around the general lockdown earlier in the year – with nearly all students learning from home, we could provide a full virtual timetable. Pandemic control measures targeted at specific year groups and bubbles entailed staff juggling timetables that might see them teaching in-school classes for some periods and teaching virtually in others. Putting in place the kind of provision that allowed for that mixed response proved much

more challenging. Indeed, that was essentially the challenge the government faced at a national level – encouraging the use of provision like ours, while utilising economy of scale so that individual children could have their specific needs met teachers to reliably communicate with students and pass assessment materials back and forth with accompanying feedback.

I can see how there might be the temptation for policymakers to conclude, 'Let's roll out a big, centralised

# "We were initially concerned at how many students had migrated from using laptops to phones and tablets"

by a robust deployment of technology. The real lesson we learned from lockdown was that the teachers who thrived in that online environment were those who could continue building on their existing relationships with students. That's made considerably easier if your online environment enables

# **Teacher voice:**

#### MARC ELSTON History Teacher

But that not how you maximise learning. You maximise learning with the help of individual teachers using a tool that's managed properly, while providing a service to children who they know well.

resource from which people

can access some nice videos

and animations - job done.

"As an ageing history teacher, I was a little sceptical about Brightspace at first. I've seen digital platforms come and go, and it seemed like yet another new thing to learn that might disappear as quickly as it had arrived. Yet I quickly established that Brightspace offered lots of potential for sharing historical sources.

"YouTube has become a fantastic repository for history clips that we can now regularly share in classroom discussions. It's possible to take students 'off piste' and broaden their cultural capital by sharing art, literature and music related to the syllabus. I've personally used WWI poetry, art from different historical periods and music by the likes of Bob Dylan and Gil Scott Heron to take students slightly beyond the syllabus in ways that still relate to their historical knowledge.

Brightspace has also helped to provide a 'safe space' for students who often find it difficult to discuss things in class, enabling them to communicate and share their ideas with me via discussion forum threads where I can easily provide feedback and offer guidance."



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Richard Ward tells us about the role GCSEPod has played in easing workload pressures and boosting outcomes at Delta Academies Trust

# **ABOUT ME:**

NAME: **Richard Ward** 

**JOB ROLE:** Director of Science

SCHOOL: Delta Academies Trust

**FAVOURITE FEATURE:** "Check & Challenge - brilliant content, now with self-testing that helps to drive independent learning."

# **TALKING ABOUT:** GCSFPOD

## **Delta Academies Trust first** incorporated GCSEPod into its curriculum in 2017.

We are a MAT operating 46 schools, originally founded in September 2010. At a trust-wide level, we need to carefully research and select the most appropriate platforms for us to use, because one size doesn't fit all. When looking to embed a new digital resource, we'll assign a strategic lead in each academy and provide a forum, in order to facilitate excellent communication between leads, myself and the platform.

Training is crucial not just for staff, but also for students. Communication with parents is critical too. The makers of GCSEPod provide webinars for all. so we'll ensure that parents engage with our regular reminders, letters, celebrations, and student rewards.

## We gained buy-in across the trust primarily through the product itself and our belief in it.

A platform like GCSEPod has everything that students and teachers could ask for, from videos and questions to exam papers and revision tips, but the most important feature is its usability. For students, the platrform's ergonomics are critical. Teachers will meanwhile need its processes to work as quickly and painlessly as possible - especially now, at a time when we know teacher workloads are presenting huge issues.



# CSEDOC ducation on demand

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We use GCSEPod as a homework tool, for revision and for flipped learning, but its real beauty lies in its simplicity and speed of use. Its tracking and monitoring of student performance is impressively efficient.

# We have a phenomenal working relationship with GCSEPod.

When we first adopted the platform I was a 'Pod Lead' at one of our academies. Each week I would email our liaison at GCSEPod and make suggestions as to what could work better for me, as a 'boots on the ground' teacher, and further ways in which the platform could reduce workload. The team were very supportive, and would always give our suggestions serious consideration. They want to provide the best platform for teachers to use, and we ultimately want the best platform for our students.

## GCSEPod has helped us share information more effectively and sped up our decision-making processes.

I can log into each school via a simple drop-down box, and set assignments that can be shared with any student in any academy. I can monitor the usage in each academy, easily compare averages and instantly see the number of diamonds each school has achieved using the platform's Check and Challenge feature. Every piece of data can be filtered by subject, individual students, classes and so forth, all from the same log in.

# WHAT IMPRESSES ME

+ Every month I'm updated with the trust's data. alongside any other data that may be of interest of us.

+ Does a great deal to support students' learning and progress. inside or outside of the classroom - it is real education on demand.

+ The beauty of GCSEPod is how it's been able to seamlessly integrate it's had on our staff with our existing school systems.

+ I genuinely admire the product they have made, and the impact workload and students' level of engagement.

# Computer science – what works for you?

Sal McKeown takes the temperature of computer science and finds out what technology, ideas and projects are currently getting teachers excited...

hile judging the Bett Awards 2020, I came across Twin Science and Robotics (twinscience.com) – a tactile and auditory approach to programming with Braille attachments and audio narration that its inventors trialled with over 1,000 blind and visually impaired children. It went on to win the Special Educational Needs award, prompting the panel to describe it as "A product which opens up STEM and collaborative activities for young people with and without SEND, particularly those who read Braille. There are structured activities that will stimulate more open and creative fun in the classroom. The inclusive aspect is enhanced by the mix of technology, Lego and 'Blue Peter' activities.'

I asked a number of teachers to describe the computer science approaches and ideas they're keen to share with others – here's what they told me...

# "Be creative, test out ideas, solve problems"

Raspberry Pi rocks! We're using it throughout the school to engage students, because it helps them see that a computer isn't just a black box in the corner, but something that lets them code,

design and make things happen. The students can plug in different bits of hardware - lights, buzzers, sensors - making it a wonderful tool for cross-curricular work, especially in D&T and science. It encourages them to be creative, test out ideas and solve problems.

Now they're moving on to programming Sphero robots (sphero.com) and writing code in Python. A great way of getting started is to visit the interactive Raspberry Pi website (raspberrypi.org), which is packed with fun activities, and watch some of the videos available at youtube.com/raspberrypi.

Paul Woodhouse, head of business and computing, **Ysgol Bryn Elian** 

## "Progress is very fast"

My job is to get novice students from abstraction and computational thinking in year 10 - where they may use origami and maps to see the relationship between 2D diagrams and 3D objects - to writing simple programs in Python and learning how to create networks. Because our classes are smaller than in most schools, progress is very fast. I use tasks from the A Level syllabus for some of our GCSE students, which they find hard, but I believe they're a good way of getting them to consolidate and apply their knowledge. It also slows them down!

Claire Carey, computer science lead, Solihull UTC



## "It could sense if a person had fallen"

In 2018, four of our students won in the Internet of Things' category at the Apps for Good Awards with their SafeStep project. The students' research had showed that a common cause of falls



had showed that a common cause of falls was getting up at night to use the bathroom, so they designed a 'smart' bedside mat that would respond to pressure and switch on lights. It could also sense if a person had fallen and automatically contact emergency services or a relative.

For their proof of concept prototype they built a scale model house using dolls' furniture, Barbie dolls and a BBC micro:bit. They group also designed a separate SafeStep bath mat and front doormat to track the comings and goings of people with dementia.

Paul Gallanagh, principal teacher of business and computing, Dunoon Grammar School, Argyll and Bute

#### "Computing is about so much more than coding"

We have a moral responsibility to ensure all students have purposeful engagement with computing during



engagement with computing during their time at school, even if they opt not to study the subject beyond KS3. Computing is about so much more than coding – it's about breeding an intellectual curiosity about the way things work, developing the ability to decompose problems and understanding the algorithms needed to make a system functional. We're arming our children to adapt to emerging technologies which haven't even been dreamed of yet.

James Searle, Specialist SLE for computer science at the Chiltern Learning Trust

#### "Make the students all give the one in the middle their sweet"



Take one bag of sweets and pass it along a line of students – you can all but guarantee that one student will

drop it, and that at least one other (more cheekily) will eat its contents! Repeat the activity, but now make the students stand in a circle with one of their peers in the middle. Make the students all give the person in the middle their sweet, but stop them just in time – if the class were to do this all at once, the student in the middle will most likely start dropping sweets. But if you get the students to swap the sweet they're holding with anyone else's in class all at the same time, there will likely be no sweets dropped at all. There – you've just demonstrated a basic Bus, Star and Mesh network, and the students will love you for giving them sweets!

Helen Brant, head of computer science/ICT & Media, Co-op Academy Priesthorpe, Pudsey

#### "They wanted to make people more aware of the embarrassment girls experience"



Four of our Y8 girls won in the 'Rising Stars' category at the Apps for Good 2019 Awards for an app called Ovary Acting, aimed at removing the taboo surrounding periods. They wanted to make people more aware of the costs, inconvenience and embarrassment that girls experience, and provide information on where to buy eco-friendly pads and tampons.

They had to negotiate a topic, research the competition, identify a USP and develop a prototype using AppShed. Along the way, they learnt project management skills and how to delegate, communicate and collaborate. The project also introduced them to professionals within the computer industry and a range of other experts. Apps for Good enables them to see that computer science isn't 'just' a curriculum area, but a vital aspect of the modern world.

Saphina Siddiq, Teacher of Computer Science and Electronics, Woodford County High School

# "It's Robot Wars with a difference"

Imagine a big arena with crash barriers, bright lights, and an enthusiastic commentator. The audience are clapping, cheering or groaning, and joining in the countdowns at the final of the annual Student Robotics tournament (studentrobotics.org).



It's *Robot Wars* with a difference – the robots don't fight each other, and there are no remote controls. Instead, the robots are fitted with webcams that respond to QR-type codes positioned around the arena. The bouts last two to three minutes and see the robots pick up, move and stack cubes. Some have a special feature, such as a catapult, which lends a certain 'wow factor', while other robots get confused and run amok...

Matt Arnold, computer science and maths teacher, Barton Peveril Sixth Form College

## "Students love problem-solving"

When it comes to teaching more complex STEM topics, such as coding and robotics, practical projects that

enable students to learn through play are key. Students love problem-solving, and resources such as the DFRobot (dfrobot.com) science kit and micro:bit accessories give them vital hands-on experience. Pupils can test the technology themselves, while building up their STEM knowledge and creative skills in the process. It's also great for encouraging independent working and knowledge sharing with peers.

Jennifer Morgan, STEM coordinator, Brentwood County High School

# Tackle those anxieties

**James Akerman** looks at how technology can be utilised to maximise the potential of students with SEND affected by maths anxiety

rbour Vale School is an all-ages special needs school. Our pupils have a wide range of abilities: some have profound and multiple disabilities, while others face challenges with emotions and behaviour.

As in many other schools, our students vary in terms of their needs, skills and knowledge. Some in the secondary phase struggle to add up numbers, while others possess a good grasp of number concepts.

Research from the University of Oxford recently confirmed that studying maths produces a chemical in the brain that supports many crucial skills beyond mathematics, including reasoning, problem solving, memory and learning (bit.ly/ti8send1). Such connections demonstrate the importance of nurturing a good relationship with maths, particularly at secondary - a time when young people will be preparing to take their next steps and set themselves up for a successful future.

## Unique circumstances

Ongoing lockdowns, school closures and uncertainties forced us to adjust our teaching tactics, so that we could support all of our students and effectively tackle maths anxiety. As was the case in schools across the country, this was particularly difficult to do while we transitioned to remote learning and tried to prioritise the wellbeing of our students, especially those with SEND.

Arbour Vale hasn't been alone in having to navigate this terrain. According to the National SENCO Workforce Survey 2020 carried by Bath Spa University and nasen (see bit.ly/ti8-send3), three quarters of SENCos state beyond their time at school.

Maths anxiety can be crippling for many students, and even cause physical and mental distress. It can lead to students underperforming in standardised testing and school exams, due to them acting in accordance with their low expectations.

Research published earlier this year by the

"Students on the autism spectrum respond particularly well to gamification because it draws them in, holds their attention and keeps them engaged"

that their school

experienced challenges with providing virtual support for their students during the first lockdown. To overcome these unique circumstances ourselves, we needed to track our learners' progress, monitor their achievements and identify where they were struggling in tasks remotely.

To achieve this, we worked with Mangahigh, alongside other SEND schools, to make their gamification content accessible to our students. The games we used were able to inspire a greater interest in maths for them, which will in turn deliver myriad benefits to our students that extend far American Psychological Association (see bit.ly/ ti8-send4) shows that maths anxiety can impact a student's ability to learn new mathematical concepts and procedures well into the future, since they're likely to assume that they'll fail before they even begin the process of learning.

## **Boosting confidence**

Our students love computers and technology. Students on the autism spectrum and with ADHD respond particularly well to gamification because it draws them in, holds their attention and keeps them engaged. In a world where so much is constantly changing, and at a time when students are studying at home while surrounded by distractions, getting students to focus is crucial to their learning.

Games can nurture positive engagement with maths at home in a more effective way than may be possible in the classroom. Students can be concerned about the social consequences of answering questions incorrectly in class, and may be reluctant to put their hand up and engage in lessons. In contrast, engaging privately in maths games allows students to explore and develop their maths skills without fear of social consequences or making mistakes.

Many students feel anxious about maths due to this fear of being viewed as a 'failure'. Welldesigned educational maths games can reframe the narrative of failing. If a level is too difficult, the game can automatically adjust to better suit the student's level of understanding, so they never feel left behind. The idea of 'failing' is therefore replaced by a sense of trying, which is central to the process of succeeding, thus boosting the confidence of students

Maths games will tend to progress slowly, in order to consolidate learning and ensure students never feel out of their depth, while still being challenged. Before the students know it, they'll have grappled with various mathematical concepts without feeling frustrated or embarrassed, irrespective of their additional needs. Through this measured progression, the students' abilities can be constantly expanding.

Finally, many games also feature positive

reinforcement features, such as rewards and achievement boards. These will validate a student's progress, boost their confidence and encourage them to learn more. We've found that find this works particularly well among our secondary students at Arbour Vale, who are typically more competitive than their younger peers.

# Problem solving and reasoning

The team carrying out the aforementioned Oxford research was able to distinguish between adolescents who were studying maths and those who weren't, based entirely on how certain brain chemicals support various skills, including decision making, problem solving and reasoning. Of course, adolescence also coincides with a period where secondary students will be going through a series of natural, vet important cognitive changes.

The pandemic has lent a certain urgency and importance to the task of

making maths fun. Professor Roi Cohen Kadosh, who led the Oxford study, has expressed concern over "The reduced access to education in general, and maths in particular, [and how this will] impact the brain and cognitive development of adolescents."

Games help to harness the power of maths, and in particular, these overarching skills. They often require students to use their maths knowledge in solving problems that take the form of puzzles, mazes and more besides. In the process, students will develop skills of planning and prediction, forced as they are to consider what will happen when they make certain moves. This will help students feel more comfortable in predicting the consequences that may arise from their actions, and in turn, support their ability to reason.



# TIME-SAVING TRACKING

Games aren't just helpful for students - they can also save teachers considerable time. Data collected from the games students play can be utilised in numerous ways, such as tracking student progress over time.

Teachers can quickly gain insights into how many students have played the games they've been assigned; how often they were played; the points at which students may have stopped engaging; areas where they might have struggled, and those areas and topics they've found easiest.

Tracking progress in this way can help to identify knowledge gaps amongst students, as well as the types of support individual students might need, and any notable classroom successes that could be celebrated. Using this information to inform future lesson planning and individualise students' learning could help to reduce maths anxiety.

We know that an interest and aptitude in maths can benefit students in many different areas, from problem solving to decision making. Online games can inspire secondary students and boost their maths confidence, while also saving teachers time and ensuring that maths remains an important part of every student's future - irrespective of their individual needs or ability.



ABOUT THE AUTHOR James Akerman is a teacher and ICT lead at Arbour Vale School, Slough

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# 1 IT'S IDEAL FOR REMOTE LEARNING

School leaders dealing with the challenges of COVID-19 and the disruption caused by self-isolation need a proven and effective remote learning platform. Tassomai helps students keep on track with their learning, both in and out of school, and enables teachers to monitor progress and identify any knowledge gaps. It's easy to see instantly who's been active, how much they've done, how well they've been working – and who might need an extra nudge via a phone call home.

# 2 ITS DATA CAN HELP RANK STUDENTS

When exams were cancelled in 2020, teachers were put in the difficult position of having to rank their own students. While we're all hoping for a return to normality by next summer, there's no guarantee that GCSE exams will go ahead in the usual way, with centre-assessed grades potentially forming part of the assessment mix. Tassomai provides detailed and comprehensive data on students' abilities and understanding that can be used to support teacher grades.

# **3** IT CAN SAVE HOURS OF MARKING TIME

Tassomai is a self-setting, selfmarking daily learning exercise that provides correction and feedback while differentiating its provision to every student's individual abilities. The usage data is instantly available to teachers at a granular level, providing them with insight on their students they could otherwise only obtain through hours of marking. The program is so powerful that many schools using Tassomai for science have chosen to make it the only form of homework they set.

## 4 TASSOMAI IS PROVEN TO WORK

Tassomai has gathered a strong evidence base which demonstrates the program's impact on attainment. Research data shows that students of all abilities improve in their academic performance as they use Tassomai, and that the more they use it, the more they improve – and the effect is even stronger for learners with lower initial attainment. The evidence is compelling, with schools reporting significant improvements to GCSE grades, gender attainment gaps and Progress 8 scores.

# 5 YOU CAN TRY IT FOR FREE

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Call or visit the website to learn more about Tassomai's packages for schools and free trial offer

All schools can try Tassomai completely free for five weeks, with no obligation to buy. The Tassomai team will provide basic training and are easy to get hold of if you have any questions. Tassomai's creator, Murray Morrison – himself a former teacher – is passionate about supporting schools, and always keen to talk to teachers and help them get the most from the program. Good implementation is the key to success, so Tassomai will work with you to define the right approach for your school.

Tassomai engages students through frequent quizzing and low-stakes testing with instant feedback an approach that's proven to be effective at embedding knowledge. The program is designed to stimulate metacognition, based on learning science and the incorporation of established techniques such as interleaving and spacing. Parental engagement is encouraged via weekly progress reports and the 'Tree' feature, which lets parents watch their child's knowledge and understanding grow. Schools pay for access to Tassomai on an annual basis. When used across all year groups, the maximum cost works out at £5 per student - that covers all three core subjects!



**KEY POINTS** 



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# In the spotlight

Brilliant ideas for better teaching and learning, for everyone...

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# *The 'natives'* ARE RESTLESS

Complaints that today's tech-savvy youth aren't sufficiently employable are nothing new – but if that's genuinely the case, the fault lies with our current curriculum priorities...

ometimes you read an article that causes you to roll your eyes in disbelief. And then reach for the keyboard. The *FE Week* article

Young people aren't digital natives in the way employers need', by Bev Jones of the Career Colleges Trust is one such example (see bit.ly/ ti8-natives). My complaint isn't that I disagree with what Bev has to say; in fact, I agree with most of her main observations. It's more the "Why are employers struggling to find young people with adequate levels of digital *literacy?*" question it provokes. Are memories in education really so short?

First, a couple of caveats. Employers always state that education is 'failing to prepare students for the world of work'. I can't remember a time – even as far back as my own school days – when the director-general of the

CBI, or someone of that ilk, wasn't moaning that pupils are arriving in the workplace ill-equipped. If we had time machines, we'd probably witness tribal chiefs at the dawn of civilisation complaining that everyone wants to be hunters amid a dire shortage of those with gathering skills.

We also know that the 'digital native' trope writer and speaker Marc Prensky gave the world has often proved less than helpful. In her article, however, Bev carefully lays out the reverse 'digital native' variant, making it clear that students' familiarity with SnapChat filters doesn't make them all employable tech whizzes.

#### 'Toxic' ICT

The main reason for my ocular rotation was Bev's query as to why today's students lack digital literacy. The simple answer is that it's no longer sufficiently valued in the curriculum, nor in the assessments for which schools carefully prepare their students.

In 2011, then Google CEO Eric Schmidt gave the MacTaggart Lecture at that year's Edinburgh TV festival, at a time when reports from NextGen, Ofsted and the Royal Society were highlighting flaws in the digital education of the day and capturing the attention of politicians.

When it was subsequently decreed that ICT in its existing state was now 'toxic', a number of educators and industry professionals proceeded to build consensus over the development of a new computing draft curriculum. The end result comprised a carefully-balanced mix of computer science, IT and digital literacy - helpfully described by computer science academic Miles Berry, one of those involved, as the 'foundations', 'applications' and 'implications' of the discipline respectively (see bit.ly/ti8-natives2). So what went wrong?

## **Relentless focus**

Some suggest the consensus was betrayed when certain vested interests stepped in. Whatever the truth of that, what ultimately emerged from the process wasn't a tripartite, balanced curriculum, but one relentlessly focused on computer science. Digital literacy and information technology took a back seat at KS3, and barely had a seat at all at GCSE, with only computer science on offer.

The digital literacy that survived now has a huge focus on e-safety and cyberbullying. Both are important, yes – but in isolation, hardly conducive to awakening cohorts of pupils to the rich wonders of the digital world.

All is not lost, of course. There are some great teachers delivering a more balanced computing curriculum, particularly at early Key Stages, but the current accountability system ensures that the secondary assessment tail wags the dog.

If we want to see cohorts of truly digitally literate pupils enter the world of work, then we need to have some true GCSE computing assessment at the end of KS4, not just computer science. Ideally alongside a set of vocational exams that offer opportunities spanning the full spectrum of potential digital employment.

Who knows – this may even do something to address the dire gender imbalance that's still all too evident in the field...



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