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Welcome...



...to latest, and first digital-only edition of *Technology* & *Innovation* magazine. Readers who have been with us before will notice a few other changes round these parts, including a new editor, and a remit that now includes edtech commentary, advice and insights relating to not just the secondary phase, but to primary too.

There was a time, not so long ago, when edtech was commonly seen as a way of augmenting and elevating good teaching practice. It was important, certainly, but often something to factor in, rather than a central consideration at all times when teaching.

Needless to say, that's not the case any more. With the coming of the coronavirus, schools across the country – and throughout the world, of course – received a crash course in remote learning, whether they were ready for it or not. As such, there's inevitably a COVID angle to much of this issue's reading.

Every reader will have their own story to tell about the uncertainties and frantic planning of spring 2020. Maybe your school occupied a similarly fortunate position to that of West Bridgford School (p44) by being ahead of the curve and having a robust remote learning provision already in place and ready to go. Or perhaps your school was among those rather caught on the hop, and has since been looking at ways of improving its network infrastructure (p38).

Whatever your own lockdown memories might consist of, there's no denying that what we've experienced this year has radically transformed schools' expectations with regards to edtech. It's suddenly become the only thing keeping the learning show on the road in the event of pupils or staff needing to selfisolate or regional lockdown orders keeping the school gates closed.

Moreover, it's changed *us*. As Alka Sehgal Cuthbert observes on p26, recent events have the potential to prompt some serious reflection concerning classroom-based learning, while Gordon Cairns considers whether the growth of artificial intelligence technologies within the teaching profession may now take a radically different direction (p36).

For all that, though, the learning itself continues, as it must – preferably in the form of imaginative lessons (p22) and free from digital distractions (p46). I trust you'll find something to intrigue or inspire you this issue, and from all of us here, *thank you* for your amazing work in schools over this past year. May the months ahead be kinder to us all.

ON BOARD THIS ISSUE



Adam Parkhouse is a Y5 teacher at Little Plumstead C of E Primary, Norwich



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 $Best \ wishes$

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Just the job

Even in the era of COVID-19, it's still possible for schools to deliver transformative careers experiences themed around STEM, says **Dr Hilary Leevers**...

hink back to your time at primary school – what are your standout memories? For many, they would include those days when normal routine went out of the window and we left the classroom for local museums; when real life scientists wowed us with colourful experiments, or when the travelling theatre took over assembly.

School trips and other enrichment experiences are a hugely formative part of school life, making memories, shaping ambitions and allowing us to dream big. The sad reality, however, is that the prospect of such external experiences being able to go ahead in the coming weeks, or even months, remains low. Government guidance in late summer seemed to suggest that schools could undertake COVID-secure day trips, but the guidance continues to change and in any case, a number of your teachers and parents are likely to have concerns regarding the possibility of children undertaking trips outside school. Yet we must make sure that children don't miss out.

At EngineeringUK, our mission is to inspire and grow the next generation of engineers. Our work spans the entirety of STEM, and one of the most important things we do is support teachers in delivering extraordinary STEM experiences, both inside and outside the classroom. Our focus on this has in no way lessened since lockdown.

Creativity

The coronavirus crisis has

shone a spotlight on the great work of engineers. The Royal Academy of Engineering's Special Awards for Pandemic Service has highlighted some exceptional examples of engineering across essential services and infrastructure, from the design and delivery of thousands of ventilators to the building of NHS Nightingale field hospitals.

Hopefully, this increased

"I am keen to stress the huge role primary schools have to play in sowing the seeds of engineering inspiration"

visibility of the creativity and problem-solving regularly demonstrated by engineers will serve to broaden society's understanding of engineering, and provide inspiration for a new generation of engineers. With so much discussion and debate surrounding the STEM skills gap, now is the time to capitalise on this interest.

Educators currently have an opportunity to highlight engineering as the relevant, pervasive and exciting sector it really is. It will be hugely important in future responses to national and global challenges, whether those be related to pandemics or climate change, and will therefore continue to receive government support and offer valuable careers. Now is a great time for building children's engineering aspirations, helping them look positively towards the

The good news was that half of 7- to 11-year-olds reported having a positive view of engineering, but we must work harder to inform and inspire the other half. Positive views of engineering were notably lower than those of science, technology and maths. Students aged 7- to 19 were less likely to understand what those working in the engineering industry do, and less likely to see it as a desirable career.

Crucially, research shows that children's experience of engineering during the primary years plays a pivotal role in shaping positive perceptions. A 2008 study into the attitudes of Y5 children showed that their perceptions had already developed into narrow understandings of what STEM subjects mean. Science is seen as investigative, technology as creative and engineering as repairing. Our research

suggests there have been improvements since then, but that misconceptions still persist.

Perceptions

Gender differences in perceptions of engineering start young. Boys have more positive views of engineering than girls, even in primary school. As they grow, these perceptions solidify into girls being less likely than boys to know about engineering, view it positively or consider a career in the sector. Girls are also less likely to believe they could become an engineer if they wanted to, even though they perform as well as boys in the subjects that typically lead into engineering pathways.

We must work against societal norms and ensure that children from all backgrounds can see themselves as future engineers. What is encouraging is that research shows how children who take part in engineering experiences have vastly more positive outlooks. Such experiences have the power to change perceptions, for both boys and girls, but what does this mean at a time when school trips and external activities are effectively curtailed? We must do what engineers do best - be creative and innovate!

Online alternatives

The engineering community's desire to ensure children retain access to high quality experiences means that more and more organisations and institutions are moving

nic ghted Inspiration examples I am keen to stress the huge role primary schools have to play in sowing the seeds of engineering inspiration.

sector.

Earlier this year we <u>published research</u> into students' perceptions of engineering and its attractiveness as a career.

future and encouraging

them to see a possible role

for themselves within the

6



experiences online. From the Royal Commission for the Exhibition of 1851 **'Great Exhibition at**

Home' to Bring It On there continue to be opportunities for primary schools to engage in STEM and engineering experiences digitally. We are currently working alongside many other organisations and employers to increase the number of digital experiences available. Importantly, these experiences will join other COVID-secure 'real life' experiences on our brandnew, free online Neon platform, which recently launched to support teachers seeking impactful STEM and engineering activities.

Neon helps teachers quickly find quality-assured STEM and engineering outreach activities in their local area and inspiring careers resources, all in one place. It has been developed with support from a huge range of leading organisations. Crucially, it's teachertested to ensure that it meets their needs. Neon lists the latest online experiences that allow for remote access, alongside local experiences designed with current safety concerns in mind. Neon also provides inspiration and opportunities for teachers so that they can plan longerterm experiences when the current need for digital-first experiences lessens.

It's worth saying that when it comes to online versus face-to-face experiences, online activities shouldn't be viewed as 'second best' to 'real life' trips. Online alternatives can provide schools with different opportunities and greater accessibility, breaking down geographical boundaries and providing access to experiences and engineers from around the world. The reduced costs and admin make such experiences attractive and suitable for engaging large numbers of students, including those who, for a range of reasons, may not

engage as well in face-toface events.

When individuals working in STEM visit a school, it may be that only students already engaged by STEM, or those with the confidence will speak up. Online environments can encourage less forthcoming pupils to engage.

The <u>**T'm an Engineer, Get**</u> <u>**Me Out of Here**</u> project, which connects engineers with classes via online Q&As, reports that typically 90% of students actively engage in the activity,

asking multiple questions via the portal. Being online democratises the experience.

Powerful

We know that the next year will continue to present challenges for school leaders and teachers, who will be rightly focused on ensuring children are safely closing any vital gaps in their knowledge that might have opened up due to lockdown. There will be many competing priorities, including the need to bring students together through exciting shared experiences and motivate them through building their aspirations for the future.

We should be more determined than ever to ensure that students have powerful experiences that result in positive perceptions for all. No matter the logistical challenges our

PUT ON AMAZING EXPERIENCES

• Seek out social and interactive options. Digital needn't mean watching videos and passively listening - encourage online activities that support group working and discussion.

• Connect engineering to real-world role models your students can relate to. Look for activities that promote engagement with real engineers

- online experiences provide opportunities for accessing engineers around the world.

• Share ideas, encourage discussion and allocate time that teachers can use to think creatively about how to bring STEM activities into the classroom.

• Bookmark <u>Neon</u> – it's an online hub where teachers can easily find a fantastic range of inspirational STEM and engineering experiences and content.

current world presents us with, my plea to school leaders is to join us in supporting teachers to continue delivering transformative experiences in creative ways.

2020 will be a year to remember. I hope that the work the STEM and engineering community is doing to support schools helps them give students an array of inspirational memories.



ABOUT THE AUTHOR Dr Hilary Leevers is chief executive officer of EngineeringUK; for more information, visit <u>engineeringuk.com</u> or follow <u>@_EngineeringUK</u> 7

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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.

IT CAN SAVE HOURS OF

Tassomai is a self-setting, self-marking 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.

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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.

YOU CAN TRY IT

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!



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KEY POINTS

The meaning of STEM

Today's learners often aren't aware of the extent to which engineering, maths and science can overlap, says **Derek Newport** – is it any wonder we have a shortfall of engineers?

ducation shouldn't exist solely to feed the national labour force. School education should whet children's appetite for *life*, of which only a part will normally be spent undertaking paid work. However, we do all need to eat and have somewhere to live, so a good portion of education should, and does, help students identify those types of work that appeal to them.

In over 20 years of making regular visits to secondary schools – initially under the Young Enterprise Initiative, and for the last decade as a <u>STEM</u> <u>Ambassador</u> – I've encouraged students to find work that's satisfying, rather than seek the highest salary possible. Don't get me wrong, money is important, but we probably spend more waking hours at work than with our loved ones at home.

The first job I had after leaving school wasn't satisfying, but National Service came to my rescue. An uncle recommended I serve as a regular for three years, the advantages of which were that I could choose which of the three services to enter (I chose the RAF) and which job to do (I chose air radar), and got to complete an eight-week training course.

Upon leaving the Air Force, that training led to a job at English Electric – producer of one of Britain's earliest commercial computers, the Digital Electronic Universal Computing Engine (DEUCE). We had to walk inside it to assemble the electronics trays. From that point on, I can't remember ever not wanting to go to work on a Monday morning!

Engineering shortfall

The acronym STEM -Science, Technology, Engineering and Mathematics - was originally coined by administrators at the US National Science Foundation nearly 20 years ago. Since then, there's been general agreement that incorporating STEM within the secondary school curriculum has led to many more young people pursuing careers in engineering. Indeed, each year sees a growing number of STEM ambassadors helping teachers to engage their

students in STEM activities. However, successive editions of EngineeringUK's 'State of Engineering' review continue to highlight huge shortfalls in the number of new graduate engineers. The latest edition cites an annual deficit of 30,000. The 2018 report – because not all engineers and technicians hold professional qualifications – forecast a shortfall of up to 59,000 people meeting the demand for 124,000 core engineering roles requiring level 3, 4 and 4+ qualifications.

So why is it that those huge efforts on the part of the wider STEM movement haven't led to more students aspiring to careers as engineering professionals? One possible reason can be gleaned from looking at the PISA rankings, derived from the Programme for International Student Assessment tests run by the OECD. The latest figures indicate a slight overall improvement in maths, science and reading, yet the UK education system still isn't educating nearly enough young people to the levels of 3, 4 and 4+ needed to become a graduate engineer. It seems unfair to blame the STEM movement for these shortfalls.

In recent years, there's been something of a shift in emphasis from trying to increase the numbers of students attaining levels 3, 4, and 4+ towards raising the standards of less able students - which is, of course, a worthy objective. We can only hope that this extra teaching effort will enable some of these students to attain at least a level 3 and help increase the number of students progressing to A Level maths and physics.

Mixed messages

There is, however, another avenue that might be worth pursuing. How many of those students currently attaining levels 3 and 4 aren't interested in becoming graduate





engineers? Could this be due to not understanding how maths and physics 'collaborate' in engineering design?

When visiting schools, the two questions I invariably ask young people are: 'What do you think about maths?" and 'What is the difference between an engineer and a *technician?* While a few say they like maths, the vast majority reply that they either don't like it, or can't see the point of it. Not liking maths is a choice. Not everyone likes Mozart, Schubert or Rutter - or Elton John, for that matter. But not seeing the *point* of maths? That should be a cause for great concern.

Meanwhile, I could count the number of pupils and teachers able to offer a credible answer to that 'engineer/technician' question on one hand. The answers I hear invariably follow the same theme - 'Technicians work with computers and technology, but engineers mend things and operate machines.'

This 'engineer or technician' conundrum isn't helped by the industry itself giving out mixed messages, especially in recruitment adverts. I'd suggest that it's more helpful to outline the education required for each category of engineering career (see 'Engineer or technician?' panel). If more students were made aware of this, I believe it would go some way towards reducing the shortfalls in new graduate engineers.

Beyond colour and patterns

A further point concerns language. Take 'design' – what do you think of when hearing that word? Do thoughts of colour, shapes or patterns immediately spring to mind? When engineers talk about design, our use of the word covers much, much more than simply colour and patterns.

Consider the design of a passenger aeroplane. The design process will start with a specification from the customer or drawn from market research, specifying number of passengers, luggage capacity, top speed, distance before refuelling and so forth. The design process will then include calculating the stresses on each component of the aircraft when in flight, in order to calculate whether it can fly at the required speed and what minimum turning radius can be used. Decisions will also be needed on which material to use for each part and the methods for joining the different parts together.

The various electrical and electronic systems will require designing too, entailing decisions on the types of cables and integrated circuits - for communications between the aircraft and the ground, but also between the pilot controls and various moving parts, such as the undercarriage and ailerons. The seating also needs to be designed, drawing on statistical analysis of average passenger heights and weights.

Not being an aeronautical engineer, I'm sure this barely scratches the surface in terms of the engineering design that goes into producing a modern aircraft. In the recently published second edition of my book Savour the Fruits of Mathematics, I examine many further examples of how maths is used by engineers in the design of different products and systems - which I hope show that there very much is a point to learning maths, and that careers in engineering tend to be much more varied and multifaceted than is often perceived.

Engineer or technician?

(CEng), Incorporated Engineer (IEng) and Engineering Technician (EngTech) are all professional qualifications as specified in the UK Standard for Professional Engineering Competence (abbreviated as UK-SPEC).

• Chartered engineers typically specialise in the development and design of products and systems that incorporate emerging technologies.

• Incorporated engineers will usually be engaged in the design of products or systems based on existing technologies.

• Engineering technicians typically support the work of engineers by building and testing prototypes, testing products and systems in quantity manufacture, or operating and maintaining equipment used in manufacture or non-manufacture, such as hospitals.



ABOUT THE AUTHOR

Derek J Newport CEng FIET studied engineering at evening college for nine years, becoming a chartered engineer, while working in industry. His career highlights have included helping to draft the first global specification for digital television and 21 years spent working as a technical translator, working in German and Japanese. Savour the Fruits of Mathematics 2nd Ed. is priced at £14 and available by contacting <u>dereknewport@aol.com</u>



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WHY I LOVE...

D&T teacher Megan Dixon explains why the openness and experimental possibilities of LEGO® Education SPIKE[™] Prime are the key to its appeal

ABOUT ME:

NAME: Megan Dixon

JOB ROLE: Teacher of Design Technology

SCHOOL: Ulverston Victoria High School

FAVOURITE FEATURE:

"The flexibility it allows to experiment with different mechanisms and motors"

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Not only does it help improve their creativity and problem-solving abilities, but the experimentation element of the resource allows students to build resilience. This is something that students can sometimes find difficult; often they are desperate to know the right answer, but this kit allows them to discover that there isn't just *one* right answer. They learn not to fear being wrong, and instead build knowledge and determination by making mistakes and learning how to rectify and find new solutions.

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Arguably its most important benefits are how it can build students' skills in problem-solving and experimentation, and build confidence. Lack of confidence can often slow students' progress, with fear of failure leading to reduced participation in questioning and engagement with lessons. The kit's suitability of experimentation and the flexibility of its open-ended tasks allows students to explore, build, work together, re-build, and come up with weird and wonderful solutions, helping them gain confidence in their skills and knowledge.





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6 LEGO[®] Education SPIKETM Prime allows students to use their imagination and creativity, and come up with their own interpretations and answers.

The ability to think outside the box and apply this form of thinking to other areas of learning is invaluable – a transferable skill that can be use throughout their educational journey and beyond. The use of hands-on resources encourages creativity, providing students with the freedom to explore and create, without the material wastage or sense of being confined that they might be used to with more traditional projects.

LEGO® Education SPIKE[™] Prime is incredibly easy for teaching staff to use. The programming software is intuitive, straightforward to understand and colour-coded for simplicity. Even before they attempt the programming, your students can spend time getting to grips with, for instance, the kit's motors. It's worth completing the accompanying training to start with, 'Raising Robots' being a good example. This helps teachers to develop their coding knowledge, understanding and confidence, giving them the skills they'll need to use the kits in class, while showing how to develop work that incorporates robots and programming into the wider curriculum.

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+ LEGO[®] Education SPIKE[™] Prime is the go-to STEAM learning tool for students in Y7 -Y9 + Hands-on, playful activities engage students and encourage critical thinking + Real-world projects spanning entry to advanced level that can build 21st century skills + Accompanying teacher training to help develop confidence and STEAM knowledge

Stretch your school's tech budget

Winston Poyton shares his top tips on how to get a good deal when investing in new tech

he benefits that technology can bring to schools – from improved parental engagement to better management of school meals – are usually abundently clear. What's less obvious is how you can realise those benefits wihout extending your tech budget.

Before investing in anything, it's essential to review your overall strategy. You may have a member of staff who has discovered a great tool that they're keen to use, but will it be useful for the rest of your team? Consider the challenges that are holding your school back - is technology going to provide a possible solution and have the biggest impact on your colleagues? Do they need better pupil tracking, a reliable payment system or an easier way to communicate with parents?

Knowing what your biggest challenges are will make it much easier to prioritise where to invest your money. And once you know this, there are a few ways in which you can make savings before parting with your cash.

Understand the full project cost

Actually buying the technology is only the first phase. It's important to ensure your supplier is completely transparent when it comes to user licences and how easy it will be to get your staff up and running with the new technology.

If implementing it is going to require your staff spending time getting up to speed with new attendance software and processes, that's a further cost to you. The best suppliers will offer you ways to train as many staff as possible and give you a clear view of what the long-term costs will involve.

It's good to talk

Having a limited budget to spend on technology can make the notion of cutting corners to save money seem attractive. However, the old adage 'If it's too good to be true, then it probably is' very much applies when buying software and hardware. What seems like a good deal can sometimes cause a host of issues later on, such as when trying to integrate

"Another smart way to get a discount is to partner with another school"

newer technology solutions with a school's existing systems. Make sure your supplier has a clear plan for integration with legacy systems, and check what will happen should any problems arise.

There's also no reason why your supplier relationship should cease after purchase. To get the best value out of your investment, find out what other services and support is on offer. At IRIS Software Group, for example, we provide a health check service for schools which means we can help our customers spot or iron out any initial problems. It can also help us predict complications that might arise in the future.

Perhaps that parental engagement app was working fine, but now some parents have started reporting problems with accessing it. Highlighting these niggles as soon as possible can save you both money and frustration.

Saving together

Another smart way to get a discount is to partner with another school – and you don't necessarily need to be part of a MAT to do so. While your LA can secure volume discounts, there's nothing to stop you from asking a supplier directly for a deal on a larger order. You could also investigate whether the supplier might be willing to consider a referral scheme. Technology providers are always more open to discussing price reductions if you can recommend them to other schools who may be interested in purchasing their products.

If you are part of a trust, you may be able to secure an early discount on a growth basis. For example, they might offer reduced rates on technology for five schools, assuming that this will grow in a few years.

Freebies for feedback

Your knowledge and time is valuable to a supplier. When new technology is being developed, providers will be keen to hear the views and experiences of the type of people who will be using it in future. Offering to become a beta tester – a school that trials a product before it's released – can potentially secure you some very attractive discounts.

This generally works better for software than hardware, but it can be a good way for your school to access cutting edge tech tools in exchange for letting the supplier know

of any bugs or

improvements that can be made. That said, this will require a willingness on the part of the school to try out a system that's still being developed, and some setting aside of time for the communications you'll need to have with the supplier.

Investigate pricing strategies

Generally, there are two different types of payment – subscription or perpetual

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licensing. If your school is more cash rich you may prefer perpetual licensing, which typically includes an upfront software cost followed by an annual maintenance fee. However, subscriptions are rapidly becoming more popular, since government funding is often distributed throughout the year. This allows schools to spread their technology costs, making them easier to budget for.

At a time when demand for technology in education

has never been greater, it's important to have an open relationship with suppliers and see if they can help you make a tight budget go that little bit further.



ABOUT THE AUTHOR Winston Poyton is senior product director at IRIS Software Group; for more information, visit <u>iris.co.uk</u> or follow @IRISSoftwareGrp

5 TIPS FOR INVESTING IN TECH

 Define what your school needs from the new technology - this will guide your strategy and ensure you get the maximum benefit for more of your staff.
 Partner with your supplier - find out what additional or ongoing services and support they can offer.

• Share the benefits - get better deals by collaborating with other schools to secure volume discounts or negotiate referral deals with your supplier.

• Put a value on your time and expertise – cost savings can be had if you test new technology.

Secure the best pricing strategy for you – do you want to pay for the tech upfront and be able to use it indefinitely, or would a subscriptionbased license suit you better?





Brush up on your STEM

Online CPD has rocketed in popularity since lockdown
– Anna Blewett looks at how primary teachers can get involved...

year been, professionally speaking? As teachers grapple with unprecedented disruption in and out of the classroom, it's tempting to write 2020 off as a bad lot. And yet, while everyone works through the challenges, grappling with our own personal circumstances and handling massively diverse workloads, those who do find themselves with a little more time have a golden

"Science hasn't really had a profile at primary for a great number of years,' she explains. "It's only since the new Ofsted framework, with its greater emphasis on a broad and balanced curriculum, that schools are really beginning to pay attention to this. And I don't think schools put science at the top of their budget spend, but we see a lot more primary teachers recognising they need to support how they deliver science in the classroom."

"We've always found that online courses give teachers that safe step into developing their subject knowledge"

opportunity to develop areas of CPD neglected during the frenetic pace of a normal academic year.

In fact, STEM Learning, a not-for-profit organisation that provides educational support in STEM subjects, saw demand for its online CPD courses skyrocket amid the lockdown. "My gut feeling is that teachers who weren't as busy with work as they would normally be were self-selecting," says Tanya Shields, primary STEM lead at STEM Leaning and the National STEM learning centre in York. If your CV could do with a strengthening in STEM subjects without a conventional course, here's how...

Grab a MOOC

That's 'massive open online courses' or, to most of us, the free CPD courses you can find by googling a certain subject. "The MOOCs that we run on Future Learn have step-bystep tasks so teachers can run though at their own pace," says Tanya. "When it comes to an area they are familiar with they can skip on, whereas if it's new to them it can be taken slowly. And the courses are mentored, so as facilitators we can jump in and respond to comments."

STEM Learning has also developed new remote CPD material; hour-long sessions delivered via AdobeConnect that consist of a 45-minute PowerPoint presentation ("Research shows us that's the maximum length of engagement online") and 15 minutes of interaction between the facilitator and participant. There are even virtual 'break-out rooms' so smaller groups can discuss the content.

Tanya is clear that there are limitations to what can be delivered online – she feels there will always be a place for face-to-face – but that a joined up programme that includes both is the way forward. "We know primary school teachers might not always be as forthcoming to get involved in STEM CPD as they would in local English or maths CPD. Quite often with STEM subjects, primary teachers can feel nervous about stepping back into a facility where there's a science expert who might expose their insecurities or lack of knowledge.

"We've always found online courses give teachers that safe step into developing their subject knowledge and what they'll be doing in the classroom."

Participate in citizen science

Expanding your knowledge of the vocabulary, latest debates and real-world applications of different branches of science can feel like a daunting (and, ahem, boring) task, but there is a way to immerse yourself in field work without leaving your classroom.

"Citizen science allows primary teachers to engage with real research in an accessible way, which they can then pass down to their students." So says Molly Simon, planetary scientist and education lead at Zoomiverse, the world's largest volunteer research platform.

"The tasks for a majority of the projects can be completed by primary school students, so teachers can bring citizen science directly into their STEM classrooms to help students apply what they are learning to active science research. If pupils and teachers know that they are making a difference by helping real scientists with their research. that definitely contributes to a higher level of enthusiasm about the subjects being taught."



There is no shortage of current research to dip into, from hunting for and classifying extra-solar stars to spotting protected wildlife in raw footage from safari camera traps. Meanwhile, the Zooniverse blog has suggestions for projects that might be easily worked into KS1 and KS2 lesson plans.

Memorise core facts

Whether you've lost your grip on the terminology of plant parts, want to understand the basics of computer science to keep one step ahead of a keen pupil or have an embarrassing hole in your own arithmetic skills, platforms informed by machine learning can be a godsend.

"Edtech in general has been doing quite well, but this recent period has escalated things to significant levels," says Rahim Hirji, UK manager of Quizlet. Why? Because we've been looking at remote learning afresh not just for students, but for ourselves too. "Let's say you're trying to upskill in the basics of human biology to support your students," says

Rahim. "On the platform there are 400 million sets [of revision questions], so you might search 'parts of the body'. And what makes it really easy and useful is others have created the sets for you. A teacher can skill up quickly on certain topics; there's a plethora of content available." It's free to access too, making it a great tool to slot in with other learning methods.

Raid scientific institutions

If time and access allow, a visit to a bombastic science show, engineering exhibit or tech event is a fantastic way to kickstart your enthusiasm for – and understanding of – explorations in the field of STEM. But even once our national museums and archives are fully accessible once again, there is a cost- and time-effective alternative to paying a visit in person.

"We have a huge number of STEM resources for teachers, which are currently being used more than ever before," says Susan Raikes, director of learning at the Science Museum Group, which has institutions in London, Manchester, York, County Durham and Bradford. "Specifically for teacher training, we have the Academy, plus other learning and teaching resources. Our Transforming Practice blog reflects on how best to engage people of all ages and backgrounds with science subjects – an increasingly pressing issue in current times."

Call in the experts

A visit from a STEM-based expert is a great way to ensure you and colleagues cam share training sessions. You'll find a directory of providers here and also – thanks to the legacy of lockdown – plenty of new virtual assistance from organisations that have expanded their resources for teachers.

"My programme usually involves going into schools and libraries to offer our workshops", says Daryl Stenvoll-Wells of the

"It's looking likely that this won't be possible in the medium term, so I've been creating a series of video tutorials on how to keep a nature journal, in conjunction with several experts in botany education, biology education, and nature-inspired art and illustration. I'm also holding individual consultations to help teachers plan projects around the existing resources they have available."

EVEN MORE CPD

• Find virtual workshops plus webinars and informal 'teachmeets' hosted by the Association for Science Education at <u>ase.org.uk</u>

• The Royal School of Chemistry offers a number of free professional development courses for teachers, further details of which can be found <u>here</u>.



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SCAFFOLDED SUPPORT

Students are supported throughout with hints, multiple choice options and feedback statements to aid learning and retention. Incorrect answers generate statements explaining why; correct answers prompt further information to help cement the knowledge.

VARIABLE CHALLENGE

Different question difficulties can be selected, giving teachers valuable insights into students' strengths and weaknesses. The reward system works by awarding two diamonds for each correct answer and one if any hints are used, motivating students to work on their scores.

TEACHER REPORTING

Most reports simply show right and wrong answers expressed as a percentage; Check & Challenge gives teachers a glimpse of students' thought processes and journeys to the answer. How many hints did they need? How long did it take them to answer? What was their diamond score?

TRACKED ACHIEVEMENTS

The system works especially well with our foundation English and maths content intended for resits and GCSE learners working below level 5. Check & Challenge lets students monitor their knowledge independently, in a way that will help to improve their self-confidence.

Reignite their passion for LEARNING

Joslyn Adcock of LEGO[®] Education considers the importance of building curiosity, creativity, and confidence when getting students' learning back on track, post-COVID...

o say that teachers, students, and parents have been faced with numerous challenges this year would be an understatement. The partial school closures that have caused parents to become substitute teachers and imposed technological limitations on schools' daily routines have been hugely problematic and disruptive for the profession. The question now is what challenges will the new academic year bring?

Whilst teachers are doing their utmost to provide the best subject support they can, they're also in the position of having to boost students' morale and reignite their passion for learning. Knowledge and attainment are important, of course, but there's also the need to inject some fun and creativity into proceedings in order to capture students' attention and re-engage them in their education. And key to this is playful learning.

Curiosity

As Albert Einstein once said, "The important thing is not to stop questioning. Curiosity has its own reason for existing." This is arguably even more relevant in the current landscape; with children at home, many parents have had to think outside the box in an effort to keep their children engaged with learning. Harnessing children's curiosity – especially in relation to things they're interested in or passionate about – is key to grabbing their attention, getting them to ask questions and challenging them to dig a little deeper in order to find or create solutions of their own.

Curiosity has long been recognised as helping to motivate learning, but studies have also found it to be linked with improved outcomes more broadly. When children have a natural interest, or are sceptical over whether an answer's right or wrong, they're more likely to probe further and seek out new information. This will not only help develop their critical thinking, but also deepen their understanding of a topic and enhance their engagement with learning.

Many teachers advocate starting lessons with a 'why', rather than simply presenting facts. This encourages students' curiosity from the get-go, and emphasises the value of analysing and critiquing information.

Going further, using playful and hands-on resources for activities based around experimentation will encourage students to use their imaginations. Many such resources will come supplied with activity



guides and instructions, but assigning open-ended tasks can teach the valuable lesson that there is often no one right answer, thus encouraging students to experiment with different design and build solutions.

Curious students should have the freedom and means to invent and control their learning journey. We need to provide environments that allow them to fully explore this, whether they be maker spaces, work-based experiences or even spaces that exist within virtual reality. Only then will they be able to come up with uniquely amazing and unexpected solutions. Combining these types of environments with interactive, hands-on

learning opportunities will enable us to develop well-rounded, critical thinkers who possess a determination to succeed.

Creativity

Education expert Sir Ken Robinson once stated, "My contention is that creativity now is as important in education as literacy, and we should treat it with the same status." Speaking to those in education, right now teachers simply want to bring fun and engagement back into lessons. When thinking about the best way to do this, the answer lies in creativity.

Everyone can be creative, yet it's often something the education system doesn't focus on enough. Giving students the freedom to 'let loose' when they're back in the classroom, and license to use their imaginations to devise solutions, will help reignite students' passion for learning post-COVID-19. Doing this is also important in aiding cognitive development, and for allowing students to understand the purpose of what they're learning and its real-world applications.

It's been proven time and again that students learn best when interacting with resources and experiencing things first-hand. As well as leading to more enjoyable lessons, this can help students' rates of knowledge retention - especially when their discoveries lead to ideas and solutions that lie beyond the parameters they're given to work within. It's an approach that encourages students to assess and refine what they're doing, taking on board feedback from peers and teachers in the process, and rework their projects and prototypes until they're satisfied that they've reached the best solution.



believe in themselves and their ideas.

This is even more the case when preparing students for careers in in-demand sectors, including science, technology, engineering, the arts and maths – i.e. STEAM. Yet a global survey recently conducted by LEGO® Education found that fewer than a fifth of students said they were

"Curious students should have the freedom and means to invent and control their learning journey"

Confidence

Confidence is a mindset; we need to look forward positively, and inspire members of the future generation to reach their full potential.

Restoring confidence among students, reassuring them and helping them believe in their abilities following their prolonged absence from the classroom will be important tasks for teachers in the months ahead. Confidence enables students to try new things, strive to achieve more and 'very confident' when it came to learning STEAM subjects, suggesting that more needs to be done to provide students with appropriate tools, opportunities for building confidence and better forms of support.

Elsewhere in the same study, no fewer than 96% of teachers expressed the belief that hands-on learning helped to build students' confidence. We also found that 89% of students agreed that learning in a hands-on way helped them learn new things, suggesting that schools ought to have the provision and resources in place to help students develop at their own pace. Once this is combined with learning through play, it's possible to see just how much impact supporting creativity and curiosity can have.

Acquiring confidence might be a lifelong process, but right now students across all levels of schooling and beyond could benefit greatly benefit from a distinct confidence boost – something that can be achieved through a form of playful learning intended to enhance students' morale, while at the same time helping teachers transition to a 'new normal' approach to classroom instruction.

Looking ahead

It's hard to predict what the classrooms of the future will look like. Schools will need sufficient resources and robust technology if they're to reignite their students' passion for learning, and will have to evolve their teaching to match the new reality – but this needn't make for an insular experience.

By implementing playful, hands-on methods of

THE BEST WAYS TO REIGNITE:

Curiosity

Start lessons with a 'why'. Encourage students to challenge theories and concepts, and give them the freedom and flexibility to consider and discover alternative solutions.

Creativity

Set open-ended activities related to real-world challenges, and ask students to think outside the box. Doing this in a learning environment that features a range of stimuli and materials will help them experiment, allow them to get hands-on and devise innovative ideas.

Confidence

Encourage students to take risks. Give them space to learn from their failings and try repeatedly, until they eventually succeed. This way, they will learn how to believe in themselves and their ideas.

learning, teachers can become facilitators rather than instructors. Through this, they can encourage students to think independently and become more adaptive, and give them confidence to flourish in the classroom and beyond.



ABOUT THE AUTHOR Joslvn Adcock is a senior marketer with upwards of 20 years international marketing experience. Meeting, understanding and collaborating with teachers, and seeing their dedication in classrooms across the globe. inspires her own work at LEGO® Education. She believes that whatever challenges education systems face, the unending motivation and passion of all teachers for shaping minds should form the foundation of each student's educational experience. For more information, visit legoeducation.co.uk

Computing



WHAT THEY'LL LEARN

 Key phrases of HTML code

 How websites are structured

 How easy it is to make 'fake news'

• The choices journalists need to make when producing web content

Hack Hack the NEWS

Adam Parkhouse shows how, by playing around around with code, your pupils can insert themselves into the day's headlines...

f you were going to make the headlines, wouldn't you want to be in control of your own story? This lesson allows pupils to do just that. With a few simple lines of code and the right image, you can bring children's newspaper article writing to life.

Before the lesson you'll need to install the 'X-Ray Goggles' bookmark onto your web browser (see below for more information) to allow you to edit the BBC Newsround website. The changes disappear once you refresh the page, so don't worry about any lasting damage!

START HERE

Before you begin creating your own headlines, start with a discussion about the impact of the news. Ask your class if anyone has been in the newspaper before. Can they remember the



headline? How would it feel if you appeared on the front page with a positive headline? What if a different newspaper showed a different image of the same event with a negative headline?

Having a discussion about the ethics of an editor's role and the impact of the language and images chosen will encourage children to take more care over their own choices later in the lesson.

MAIN LESSON

PREPARING THE WEBSITE

Prior to the lesson, install the X-Ray Googles bookmark onto your web browser (follow the simple instructions at <u>x-ray-</u> <u>goggles.mouse.org</u>). Next, visit the <u>BBC Newsround</u> <u>website</u>.

Click on the bookmark you have just installed and select one of the boxes. You can now change the image and headline. Take screenshots of the process outlined below and turn it into a step-by-step guide – this will be useful for the pupils later on.



Search online for an image of your own school. Right click on the image you've chosen and and select 'copy image address' – now paste this URL into the code that appears when you click one of the Newround images.

Next, change the headline to something that will grab the pupils' attention. Once you're happy with it, take a screenshot of your creation.

Use a program like <u>Irfanview</u> to crop it, then before pupils enter the classroom, open the image in your preferred web browser for added authenticity.

Once pupils enter the classroom, act casually and don't mention the fact that your school is on the Newsround website. Hopefully there will be a ripple of excitement when the children notice that something is up. Now it's time to show them how it's done...

teachwire.net

"Once pupils enter the classroom, act casually and don't mention the fact that your school is on the Newsround website"



This lesson works on the assumption that the children have little knowledge of HTML code (as may you!). The key elements to show them are the tags that say '' and '', which requires whole-class modelling. Give pupils the step-by-step guide you created earlier, so that they can refer to the process during the lesson.

Hover your mouse over a piece of text on the Newsround website and show the children how it is highlighted. Clicking on the box reveals a strip of code. Get the children to find the original headline in the code.

Using the backspace key, remove the text and replace it with a sensible suggestion from the class. When you hit 'update', the class will instantly see the change very clearly. It's worth repeating this before letting pupils attempt any changes of their own.



CHANGING IMAGES

If you have a school website (and have secured the right parental permissions) you may be able to attach photos of pupils to the headlines. If not, explain to the children that all images have their own web address that can be accessed by right clicking on it and selecting the 'copy image address' option. This is also a useful opportunity to introduce children to abbreviations such as '.jpeg/. jpg' and the idea that web addresses start with 'http'.

In the same way that you replaced the headline text, show how to delete the existing image address and paste in a new one. This should replace the image on the screen in front of you. Check for understanding, then let the children create their own 'fake news'. Make sure pupils take screenshots of their creations.

Save the images in a shared folder so that

EXTENDING THE LESSON

• How could pupils use this new skill in other ways or on other websites? Why is this potentially dangerous? What are the benefits of it? Is someone who doesn't use the internet going to know something is wrong?

• Ask pupils to make their own tutorial using screengrabs for another child to use. Consider using screen recording technology if you have it available. If not, PowerPoint or similar works well.

• Investigate the webpage for other codes aside from '' and ''. Make a list of them. Click on them, read the code and see if you can change anything else. Find out how to change font colours by looking at HEX numbers

children can see each other's work. End the lesson by selecting some of the best images to share at the front of the class.



• What do the bracketed phrases '' and '' stand for (image, paragraph)? Which one changes the image?

• How do you find the web address of an image?

• How can you make your changes look believable?



ABOUT THE AUTHOR Adam Parkhouse was a silver winner at the <u>Pearson Teaching Awards</u> and is a Y5 teacher at Little Plumstead C of E Primary, Norwich

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Activ Absence

How one school in Essex used software to reduce its staff absences, save money and cut down on administration time

HOW IT STARTED

Annie O'Kane, school business manager at Chadwell Primary School, was finding it challenging to keep timely and accurate absence records. The school recorded staff absences in Excel spreadsheets, which made it difficult to analyse the absence data.

What made this particularly challenging was that the school has over 80 staff, which meant tracking many different reasons for absences. Recording everything in Excel further meant that human error could creep in, or produce a lack of consistency in reporting.

The school also found it challenging to deal with unplanned sickness absences, and like many schools, lacked the budget to pay for supply cover when such situations arose. The school's goal was to better manage absence so that its pupils, staff and

financial position did not suffer. When an opportunity arose to introduce a new absence management system, the school didn't hesitate.

HOW WAS IT IMPLEMENTED?

The school had recently introduced a new HR and payroll service system, but the provider had been unable to include the absence tracking and analysis the school wanted.

After researching the options available, Annie came across Activ Absence – a cloud-based absence management solution accessible via any device, which could provide absence tracking, staff holiday planning, tailored reports and analysis, plus a return to work process.

The software was duly introduced to help streamline the school's absence management process and give the SLT greater visibility of absence across different teams. Management needed to fulfil their line management duties quickly and easily, but the school also needed to extend access to the system to other staff so that they could take responsibility for managing their own absence.

The system will be especially helpful in managing absences throughout the current term, following the COVID-19 lockdown.

WHAT WAS THE OUTCOME?

Annie now spends less time chasing staff to complete the necessary documentation and management of unnotified absences, and less time on administration, since the workload is shared between the SLT. Other benefits include the new system's analysis functions, which enable the school to track absence patterns per individual, team and department, and provide detailed cost scrutiny where extra cover has been necessary.

"We are also seeing a reduction in the small and repetitive absences, because staff are able to see the impact of their absence," Annie says. "The system is visible to everyone, and staff are more conscious that they will be 'managed' under the school's sickness policy. Management can see the trends, triggers and levels of absence for every employee with just a few clicks."

Did we mention?

Activ Absence is cloud-based, making it accessible from any online-enabled device. It is very simple to use, and accessed via a 'software-as-a-service' contract. There is no need to change any existing hardware or software, allowing schools to be up and running quickly. Administrator training and technical support is included as standard, and all data is saved securely in UK data centres. This software is trusted by some of the UK's top schools, academies, colleges and universities.



Contact: 0845 643 5066 info@activabsence.co.uk activabsence.co.uk



THE PLACE: The school has over 80 staff members, including teaching staff, learning support assistants, admin, IT and midday meal assistants. They have used Activ Absence software since 2018.



THE CHALLENGE:

The school faced challenges managing staff absence, including leave requests, sickness absence and return to work procedures, especially since they have a lot of staff.

"Let's have a better post-COVID conversation"

Alka Sehgal Cuthbert calls for a return to educational basics, and a more nuanced critique of the optimistic dreams concerning our gleaming, edtech-powered future...

any both inside and outside the teaching profession have long harboured high hopes for the potential of educational technology. The closure of educational institutions to the majority of students during lockdown has further fuelled the idea that some form of online education - perhaps one 'blended' with an hour or two of face-to-face contact time – is an acceptable proxy for, or perhaps even an improvement on, traditional classroom settings.

Back in 2008, the linguist and semiotician Gunter Kress suggested, in a somewhat resigned tone, that education should embrace the idea of multimodality in the face of

> 'The technological forces of late capitalism.' Countering that was the decidedly

more upbeat view of the late Sir Ken Robinson, expressed in a promotional video produced by Microsoft circa 2010 entitled, Technology in Education Around the World' which showed how technology could provide great educational opportunities for disadvantaged people across the world. As Robinson observes in the video, however, ultimately "It is the people in the schools who do the work."

Showing that you care

He wasn't wrong. In education, those who do the actual hard work of education – as opposed to the host of ancillary work that enables and supports it – are the teachers and pupils. Technology can certainly

bring useful things to

education, but there's nothing intrinsically educational about technology itself *per se*. As a young person in the aforementioned video points out, the same technology can be used to play games, pursue hobbies and conduct everyday communications, as well as for educational purposes.

It follows, then, that for any technology to be of actual use in the classroom, the 'education' side of the equation has to be firmly in place first, so that the technology's use is distinctively educational.

And there's the rub – too few politicians, policymakers and academics (and sadly, many teachers) possess a strong enough conception of what education is and what it needs to flourish. Using Skype as a teacher or lecturer to ensure students know you care is, as professor of higher education Steven Jones <u>recently wrote</u>, simply that – showing that you care.

In the context of a national lockdown and a dramatic reduction in social contact, that may have been understandable. But education isn't reducible to simply caring; not when lots of people are involved in caring for the younger generation. Many parents have come to know only too well the difference between 'caring' and 'educating' first-hand, as they've tried to balance their own professional and domestic work with the need to ensure their children continue to receive some form of education.

Positive discoveries

As a teacher at a supplementary school for primary-aged children, I've enjoyed the advantages of small class sizes, the freedom to teach my own curriculum and a very supportive management team, who ensured we were reasonably up to speed with the technology needed to teach online lessons throughout most of last term.

Some teachers found it easier to plan lessons during lockdown, away from the intensity of being physically present in the school environment, while many used the process of adapting their materials to constructively re-engage with the content of their subject.

Another unexpected, but welcome development has been that some pupils, for whom classrooms are places filled with distractions or anxieties, have been able to focus and participate more effectively during online lessons. Following schools' return to 'real-world' teaching, staff should perhaps consider whether some of these positive discoveries might be worth incorporating into their standard practice.

Tacit approval

That said, I'd venture that the collective experience of online teaching throughout 2020 has been less positive overall. I remember watching as the digital faces spread across my screen went from being perky, curious and relatively upright, to slumped and listless as the months wore on.

The flexibility of time and place that technology affords is certainly nice, but again, not something that's intrinsically educational. At the heart of education is a triangular relationship between teacher, pupils and knowledge, both in its disciplinary form as academic knowledge, and in its recontextualisation as school subjects.

Education is the product of a person-to-persons relationship, where attention is focused on the subject knowledge of the lesson. It's also about learning to place and conduct yourself, literally and metaphorically, in a bigger context. The processes of engaging with knowledge, thinking, questioning and taking intellectual risks are all best encouraged through collective, as well as individual work. There's an obvious pleasure that pupils get from achieving full marks in online test material, but it's qualitatively different to the deeper pleasure and sense of achievement that's earned by working hard at a particular problem.

Teachers can furthermore praise or criticise online, but there's no room for a teacher and pupil to catch each other's eye in a tacit acknowledgement of approval or thanks. It's much harder to read informal body language, in the way teachers do constantly, when all you can see are pupils' heads. And those stern, authoritative looks that can instantly silence a class are difficult to pull off digitally.

A very human practice

Central to good teaching is an agility that enables teachers to move between conceptual and imaginative modes of thought and knowledge, while simultaneously attending to pupils' tacit indications and explicit responses. Teaching is a distinctly human practice and education a very human good. By their nature, neither are all that technological at all, though technology can play a constructive secondary role in delivering both, if implemented well.

Yet the fact remains that a real-world classroom contains a collective entity confronted with all manner of potentialities that aren't replicable in the virtual equivalent. While explaining the meaning of the word 'receding', for instance, the noise of an overhead aeroplane can be used as a sensory demonstration of the concept. The physical presence of others can encourage acts of disruption, yes, but also solidarity.

Unfortunately, the depredations caused by decades of chasing data, imposing endless 'quick fixes' and setting instrumental goals won't be undone by flipped classrooms, online tutorials or any other technological solution, counter to what Jones seems to hope. But what if we devised an education system and approach to teacher education that values intellectual work in all its forms, from the abstraction of maths to the aesthetics

of art? That might just have a chance.

Think bigger

It would be a tragedy if, now that schools have re-opened (albeit allowing for local restrictions), pupils will face a curriculum dominated by agenda-driven wellbeing, social justice, and intense, exam-based catch-up classes. Instead, schools should be encouraged to reflect on their lockdown experiences.

There are more important and constructive things the government can be doing than funding a hastily compiled national bank of resources. Some teachers will have likely found it helpful, but can't we take the opportunity to think bigger? Why not change the structure of the school week? We could have three days in school, plus one day where teachers plan their work and another day where they assess and mark work.

Personal flights of fancy those may be, but I still think they make for a more interesting post-COVID conversation about education than fixating on the negativity inherent in talk of damage limitation exercises and instances of exam failure.



ABOUT THE AUTHOR Alka Sehgal Cuthbert is a teacher, independent academic and writer, and co- editor of What Should Schools Teach? Disciplines, subjects and the pursuit of truth, 2nd Ed., due to be published in the New Year by UCL IOE Press; follow her at @ASCphiled

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Protect against cybercrime

Sonia Blizzard explains why cyber security should be treated as a key safeguarding responsibility

hanging government policies, panicked parents, general misinformation – when those are combined, it puts schools working through COVID-19 not just between a rock and hard place, but under the microscope too.

As children's daily education suddenly moved into the home, parents and guardians quickly got to grips with the importance of internet and online learning for their children's learning. But alongside access to online resources, the importance of good cybersecurity practices also became a prominent talking point.

With schools having now opened back up, it'll be easier for teachers to deliver access to online learning while ensuring that appropriate e-safety measures are observed – but all educational institutions must stay alert to potential cyber threats, and be willing to put in place practices that will prevent the loss of vital resources or exposure of sensitive student data.

Where are the threats?

Just like any other institution, schools face countless cyber security attacks each year. In the <u>latest report on cyber</u> <u>threats</u> to UK organisations published by the internet service provider Beaming, 51% of educators surveyed reported falling victim to a cyber attack within the last year. With the nature of cyber threats constantly shifting, it's important to understand what you're up against and how to tackle the problems these can cause – by training teachers, educating students and ensuring the technology you use to defend yourself is working at its best.

In 2019 there were two leading forms of cyber

granting access to malware or divulging sensitive information. Personal data can then be stolen, exposed and even put up for sale on the Dark Web.

Under new GDPR rules, organisations can be fined if they fail to take adequate steps to secure their systems against this. The Information Commissioner has warned that unauthorised access to personal information would be particularly harmful to

"While putting restrictive measures in place is good, schools must also educate kids on the dangers of poor cyber security practices."

attack against schools. One in five suffered a successful phishing attack, while just under a fifth were exposed to malware designed to disrupt or damage a computer system with viruses. It's crucial to understand the consequences of these forms of attack - particularly in terms of where your responsibility as an educator lies, in accordance with the latest government regulations.

In one form of phishing attack, criminals will send fraudulent emails that look like they're from a reputable source to dupe victims into pupils, parents and staff - all of whom will have a right to seek compensation if the loss of their personal data causes them damage.

No silver bullet

There are also financial risks involved. As well as the responsibility to protect 'special category' data under GDPR regulation (including students' religious beliefs and medical history), schools receiving money from parents for fees or additional services, such as after-school care, must secure the financial details of parents and guardians.

Action Fraud, the UK

cybercrime and fraud reporting centre, has warned schools to be wary of cybercriminals claiming to be from the 'Department of Education'. This followed a series of incidents in which bogus emails were used to infect school computer systems with malicious software that prevented legitimate users from accessing them.

Malware can also take the form of Trojans - seemingly innocuous programs that are downloaded with the virus hidden inside. Ransomware is a particular form of malware that can punish schools heavily, as once downloaded, it will block access to computer systems or software until a ransom is paid. With schools making greater use of online technologies than ever before, any successful attempts at blocking their internet access will have a real and immediate impact on students' learning.

Teachers and students will be exposed to threats like these in different ways. In the absence of a 'silver bullet' for addressing such problems, schools instead have to carefully balance their policy and education priorities with appropriate investment in suitable hardware and software solutions.

Protect and educate

Government guidelines already require that a

member of SLT be made responsible for safeguarding in their school. Cybersecurity and online safety should be seen as a serious part of this, with appropriate policies implemented and enforced by the SLT itself.

While putting restrictive measures in place is good, schools must also educate kids on the dangers of poor cyber security practices. The DfE states that schools should "Ensure that children are taught about safeguarding, including online safety. Schools should consider this as part of providing a broad and balanced curriculum.'

This education ought to extend to personal devices like mobile phones. While less of an issue at KS1/2, primary schools should still have clear policies in place around mobile technologies and how they can be used. Students should be taught about acceptable use of personal devices, how people should interact and communicate with each other online, and where they should turn to for help.

Taking steps to improve your standards of cybersecurity doesn't always mean having to invest in expensive technologies, however. Even something as simple as regularly updating the hardware and software used on your school's network can help. Implementing updates and patches as soon as they're released by manufacturers will help you avoid falling victim to old insecurities.

A degree of physical security can also be a safeguard against loss of data or access. Keeping separate backups of the information stored on a school's network can offer

some protection against ransomware, but it's crucial that any physical data storage devices you use for this purpose are encrypted to protect the information they hold from being accessed in the event of loss or theft.

It's as important as ever that we remain serious about cyber security. After all, the end goal is the same as it is for any other safeguarding policy - to keep school a safe place for kids to learn and grow.



ABOUT THE AUTHOR Sonia Blizzard, managing director of **Beaming**, an independent Internet Service Provider offering highperformance connectivity and managed services to thousands of organisations

across the UK.

WHAT YOU CAN DO

Four measures schools can put in place to improve their cyber safeguarding:

Regular monitoring Monitor your systems continuously and regularly analyse them for any unusual activity that could indicate an attack. Criminal incidents should be reported to the police and other relevant authorities.

2 Due diligence Check any third-party software and hardware providers thoroughly for not just their business legitimacy, but also their commitment to cybersecurity. Vulnerabilities can travel along supply chains, so ensure that any external organisations you work with are as committed to security as you are.

3 User management Establish effective processes for controlling and managing user privileges, so as to minimise the risk of accidental data loss and your potential exposure to deliberate attacks.

Record keeping

Provide all users with the minimum level of access they'll need to do their jobs. When staff members leave, their network access should be promptly revoked. Keep your user records up to date to prevent the exploitation of old accounts.



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ome teachers and learners Personalise what you can, And keep your minds open If you're not a tech fan. If we lose the time now We may be too late to win, For the timetables – they are a-changin'...

According to a recent survey of 600 SLTs, department heads and teachers reported in *Educational Technology*, 75% thought 'digital delivery' would continue to play a significant role in their schools post-lockdown. But what does this mean? What sort of digital delivery? How, where and why should delivery change?

Let's start with the why. Our formal education system is built on three key pillars – surrogate parenting (to facilitate a larger potential workforce); individual development (to supply the economy with qualified and skilled employees) and civic development (to maintain social cohesion by passing down beliefs, values and expectations from one generation to the next).

We have seen during lockdown the importance and impact of disruptions to the first of these, but what about the other two? Individual development does indeed increasingly provide the qualified. Civic development definitely passes on specific beliefs, values and expectations. But are these appropriate in such a rapidly changing global environment, and what changes can and should be made?

THE TIMETABLES are A-CHANGIN'

If we want to properly prepare students for life in the 21st century, we'll need to place greater emphasis on personalised learning, says **Professor Rupert Ward**...

SCHOOL SOLUTIONS

In my books Personalised Learning for the Learning Person and Getting Personal: How we learn and why we don't, I tackle these very issues. There are many educationalists, not least Andreas Schleicher of the OECD, who have highlighted where there needs to be a fundamental shift in education.

Schleicher emphasises the importance of our capacity to live in a multifaceted world as active and engaged citizens. We need to better develop what are broadly termed 21st century skills, with a reduced focus on received wisdom and a greater focus on usergenerated wisdom.

One particular area of concern, for example, is group problem solving educational model. And the way do we do that is by using technology to enable learners to learn better.

Social learning

In recent years we've seen a huge increase in the number of people getting fit. Why is that? Social trends? Fashion? Influencers? Yes, definitely – but also technology, and through this, improved fitness processes. The tracking of progress enables individuals to gain instant feedback, analyse their performance and exert agency over their exercising.

There has also been an increasing focus on fun activities and sports psychology, accompanied by the growing popularity of social exercising, such as park runs. In short, we're

"We need to better develop what are broadly termed 21st century skills"

capabilities – less than 10% of 15-year-olds could demonstrate such skills in the 2015 PISA results. As well as individual development, we are also seeing increasingly concerning evidence of civic fissures, with decreasing levels of trust in information, expertise and, indeed, each other.

A much greater level of both personalised and social learning is therefore required, to ensure education can deliver the individual and civic development our rapidly changing environment requires. So how do we make these changes? How do we develop usergenerated wisdom? How do we create time in an already busy timetable for more social learning? How can we even cope with yet more changes?

The answer is that we need to gradually wean ourselves off our outdated getting physically fitter because the barriers to fitness are being reduced, and the clarity of how to make progress with getting fit is increasing.

I propose is that we can, and should, do the same within our educational systems. Individual learning should contain more choice, more bite-sized elements of learning and more interactive, engaging and fun content. More of this should be available online and freely accessible to all, anytime, anywhere.

Teachers will clearly need to monitor the progress of learners using such material and verify their learning in the classroom, but shifting to a more extensive use of individual online learning will help free up classroom time so that we can address the key gap in our current education system – more effective social learning.

Social learning is important not just for

society, but for all of us individually. Our physical and mental health are inextricably linked to our social environment and how we individually interact and process environmental input. We have to provide students with better capabilities of self-regulation, both as people and as learners. If we want to foster lifelong learning, then we need an educational system which supports, rather than stigmatises; which enables and expects differential progress, without seeing this as failure.

The big iDEA

The Inspiring Digital **Enterprise Award (AKA** iDEA) is one of the world's most successful free educational technologies, providing a personalised learning approach that's used in over a hundred countries worldwide, and which makes learning as engaging as possible. It is highly adaptable for use within schools and can be used to support extracurricular lunch or after-school clubs. It employs a system of digital 'badges' that can be employed in various ways - to set homework, expand in-class conversations and empower students to share their thinking. iDEA badges can also help to introduce a topic before teaching a lesson on it, and serve as topic research prompts for students. iDEA itself can form part of teachers' CPD with the aid of the iDEA Record of Achievement to provide evidence.

iDEA recognises both individual and social learning, and has proved to be phenomenally successful because it's fun. It shows quite clearly how digital delivery can run alongside traditional education, and in some cases even replace parts of it. It further highlights how we can make such a change by introducing similar shared content developed by teachers and others, and by gradually adopting more of this in the curriculum.

We all share three key foci in life – knowing our place in the world, underpinning which is our self-esteem and selffulfilment. To address all three, we need to feel we are making progress; we need to be effective learners. By developing better technology-enabled learning habits, by having more choice and through better signposting to more opportunities, we can develop greater volumes of user-generated wisdom. We can become learners who learn how to learn - metalearners.

First, though, we need the right tracking systems and the right feedback. We need to focus on fun, socialisation and educational psychology, and incorporate more of this into our educational systems. We need to reduce and remove barriers to learning, and instil in learners a clear and motivating view of how they are making personalised learning progress.

Personalised learning technology will enable those changes to be made, supporting teachers to be better teachers, and prompting a rethink as to how we ought to timetable teaching in order to enable better learning. Above all, it enables all of us to learn differently – because we all do learn differently.



ABOUT THE AUTHOR Professor Rupert Ward is a professor of learning innovation at the University of Huddersfield, former project lead for iDEA and author of two books on personalised learning – <u>Personalised Learning for the Learning Person and Getting Personal: How</u> we learn and why we don't; for more information, follow <u>@rupert ward</u>

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KEY POINTS

Is AI still coming for your job?

Gordon Cairns considers how this year's crash course in edtech has highlighted the limits of the coming 'AI revolution' in schools...

ust a few short years ago, the very notion of a classroom teacher seemed to be under threat from an unlikely source. A legion of automatons were set to parachute in and push the docile incumbents out of the classroom door, thereby improving the educational product for students while simplifying the running of schools. Educational artificial intelligence companies from around the world claimed that their programmes would be more effective than the humble human teacher, while the British educator and author Sir Anthony Seldon predicted that before the end of this decade, classes would be taught by robots with teachers merely on hand to perform administrative duties.

In the intervening period, the COVID-19 crisis has brought about an international stress test showing how AI might work in practice, given us a glimpse of how it might deliver education in a post-pandemic world and highlighted its weaknesses when the human element has been taken out of education.

THE MONEY

The first lesson our recent experiment in mass distance learning has taught us is that the biggest barrier to the widespread implementation of AI will be financial. A survey conducted by UCL's Institute of Education into educational engagement during the partial closures found that 2.3m young people did no schoolwork, or less than an hour's work each day.

While this halt in education could have been caused by a number of factors – being beyond the cajoling reach of their teachers; anxiety stemming from the wider world situation; the temptation to see the shutdown as an extended holiday – there can be no doubt that families' financial situations played a huge part.

Nearly a third of private schools provided four or more online lessons daily, in which teachers would interact virtually with their students - something which only 6% of state schools were able to offer. Yet even if their schools had been able to offer online lessons. a fifth of pupils in receipt of free school meals wouldn't have been able to access them, since they had no available computer equipment at home.

Anecdotally, I heard many stories around this time of young people trying to follow lessons on their smartphones and then using those same, small-screened devices to type out their essays. This raises the question that if a technology gap that wide can occur in a world of what's generally assumed to be relatively affordable ICT equipment, how would less well-off schools and families fare in a future in which AI was considered as 'standard'?

THE GAP

In his 2018 book The Fourth Revolution, Sir Anthony Seldon presciently addressed the issues of social mobility, AI and education that have come to the forefront during this vear's lockdown. His belief is that AI can break down the barriers to an excellent education that exist for some students by removing the burden of large class sizes, and creating access to homogenised but impressive educators.

As schools tentatively return to full timetabling amid concerns regarding a second, third or even fourth wave of coronoavirus, the prospect of AI-powered teaching is gaining ever more currency. After all, it could eliminate the need for physical classrooms, or if we'd rather young people continue attending school, at least remove the people most at risk from contracting deadly viruses

older teachers.

However, as has been vividly illustrated over the

last few months, AI technology will initially be available to those who can afford it, rather than those who need it most. This will further widen the gap between the rich and poor, when the government itself has acknowledged that there's a need for 'levelling up'.

The financial barriers to gaining an automated education are already evident in China, which appears to be leading the field in its adoption of AI in education. Squirrel AI is one of the country's leading proponents, tutoring 2 million students a year in 2,600 learning centres across 700 Chinese cities, having raised \$150m from investors, according to a recent Guardian article.

Unsurprisingly, it isn't cheap. A year of sessions covering four subjects and two holiday semesters costs around £11,000, in a country where the average wage of an urban employee is $\pounds 9,000$. The education it offers would be impossible for a human teacher to replicate – as students work away on their computers, the system records not only their answers but also their pauses, the length of time they take to answer questions, the keystrokes they enter and even cursor movements, before then programming what they need to do to improve.

However, rather than seeing AI as a mechanism for widening the attainment gap, Rose Luckin – Professor of Learner Centred Design at UCL Knowledge Lab in London, and author of *Machine Learning and Human Intelligence* – believes the technology could be used to help students detached from the learning experience by the pandemic.

"The real difficulty is that the vast majority of students will have had really different experiences in lockdown," she says, "so you're going to be faced with a situation where you'll have to very quickly diagnose the issues, get kids back up to speed and see what they've missed on their learning journey. I think that's going to be very challenging."

In her view, "AI could help by offering specific diagnostics to create specific learning to help students catch up. It's a terrific opportunity for AI that would give teachers time to deal with all of their other core duties, such as engaging with young people on an emotional level."

And yet, just like the barriers to engagement in lockdown, Luckin concludes that the stumbling block will be financial: "Unfortunately, I don't think schools will have that level of AI available to them and might not have the money to buy it."

That said, she points to the availability of affordable AI solutions that might prove more practical in the short term. These include

voiceactivated interfaces for pupils

reluctant to use keyboards, and programs that can analyse student data, assess where they are and recommend what actions they can take to boost their cognitive fitness, increase their memory and/or improve their executive function. According to Luckin, "That's what we can do now without spending a fortune."

THE BRIDGE

If schooling were to ever become an activity not centred on the school estate, Professor Luckin envisions AI as offering a bridge between two learning environments: "The potential is huge," she avers. "One thing we must do to make our system more flexible is make the technology set

> up less school-focused. You can have a seamless learning experience between the

that switches between the home and school."

She concedes that there's also an educational aspect involved, in persuading teachers to embrace this new technology rather than fear it. "If we can help people understand more about it, and engage them in how helpful it will be, then there's huge potential. AI should enrich teachers lives and allow them to spend more time doing those things they're experts in: teaching, interacting with and supporting their students."

After last summer's nationwide exam scandal, teachers may feel justified in becoming paranoid androids over the possibility that automated decisions will eventually replace professional human judgements. But Luckin sees it differently: "You only need to look at the exam kerfuffle - and that wasn't even sophisticated AI – to see how much you need the teacher. AI will change the role of teachers, but I hope in a way that actually enriches that role and makes it easier for teachers to all do the things they enjoy doing."

the role of

teachers"

Does your school have a CONNECTION PROBLEM?

COVID-19 has confronted the education sector with a host of challenges, but investment in technical infrastructure could help solve many key issues, says **Tammie Proctor**

irtually every sector and form of work has been impacted in one way or another by COVID-19, but among the hardest hit has been the education profession.

This wasn't just limited to the UK, course. A <u>report</u> in AA showed the extent to which educators across Europe were initially caught off-guard and impacted by subsequent events.

The report found that approximately 94% of all learners across the continent had to contend with school closures and switch to being homeschooled by their parents, many of whom in turn had to juggle the responsibilities of their day jobs. Most parents were ill-equipped to dedicate the time needed to help schools remotely deliver the thorough education their children required particularly those working towards GCSEs, BTECs, A-Levels and other crucial assessment stages.

From static to agile

One of biggest reasons as to why the education sector was so unprepared and hugely disrupted by COVID-19 was the situation regarding schools' technology <u>infrastructure</u>. The impact of this naturally varied according to the size and resources of different schools, but a common thread among those schools and academies that struggled at first was that they had previously given little thought to remote learning, and had therefore never invested in the software and hardware necessary to support it.

The onset of the pandemic instantly forced what could be described as typically static institutions into becoming agile organisations overnight – but without the necessary infrastructure already in place, putting together a robust remote learning provision on the fly within a matter of days will always be very difficult to achieve.

At the time of writing, the longer term issue is that COVID-19 doesn't appear to be going away any time soon. The threat of successive waves means that the education sector remains highly vulnerable, with the prospect of pupils having to learn remotely *en masse* once again becoming very real.

Solving the infrastructure issue would go a long way towards helping the sector deliver a thorough and safe remote learning experience, should it be required. Here, then, are the things schools and academies should be thinking about when it comes to their own technical infrastructure, and what the benefits of investing in it are.

Scalability

While the majority of schools have been able to provide learning solutions, we can expect the pandemic to continue driving demand among educational users over the next few months (and indeed vears) for solid and scaleable infrastructure solutions. Tools that are currently common within schools and elsewhere such as Microsoft Teams and WebEx - have come under strain, but their owners have been quick to introduce extra capacity to deal with the rise in demand.

At this point it's worth highlighting <u>virtual private</u> <u>networks</u> (VPNs), which are used extensively in the business sector but less common in schools. A VPN can create a safe, encrypted connection back to the school's network away from the public network, providing greater privacy than users would have connecting via a secured WiFi hotspot

Having a VPN in place will enable staff,

teachers, and students to remotely and securely log in to the school's systems, while allowing administrators to control who is able to access what files and tools. This helps to establish a great deal of control, particularly in situations where a student or member of staff may have left a school, but still retain access to its network even years later. It can also assist with schools' efforts to protect students from harmful online material. alongside whatever content

filtering and safeguarding systems they might already use to keep students safe online.

Network access control

Network access control has already changed the face of higher education – it's now time to introduce it to schools as well. At its simplest, the term Network Access Control (NAC) refers to a system feature that enables very tight control over who is able to enter a network and what resources they have access to.

Without it, the process of monitoring users' network activities can be strenuous for IT teams that are

Parent voice

Cassie Marvin, marketing manager at Performance Networks, recalls her experience of homeschooling her children during lockdown

"Everything just fell through the cracks. We were fortunate in our house to have all the equipment we needed to transition to an online onboarding process, but I understand that not every family is so lucky. Schools were not running open days because of the pandemic, or sending out anything in the post. Everything just transitioned to online overnight.

"However, those families without computers, laptops or printers – typically lower income families – had no support. What are they supposed to do if the same situation arises again, in order to ensure their children get a proper education? Where is that support going to come from next time?"

already stretched to their limit. NAC-enabled systems streamline this process, and provide those teams with much greater visibility when it comes to monitoring how the network is being used and how secure it is.

Again, however, scalability is something to consider. If your school uses multiple external VPNs, that could potentially cause a firewall to become overloaded – something which few schools are likely to have experienced before.

The million dollar question is whether schools currently have sufficiently high levels of online bandwidth and security protection to educate their students remotely. Digital education will inevitably play a big part within schools' future learning provision, so it's something they need to be prepared for.

Future essentials

Another area to consider is secure access. This can relieve a huge burden from teachers' shoulders by allowing them to remotely and securely access their resources and documents wherever they are. This applies to students too, allowing schools to virtually expand their infrastructure offering into peoples' homes. All it requires is a secure connection - usually established via a software client installed on the remote user's device without the need for any fiddly adjustments on the part of the user.

That said, low income families will need additional support if they're to cope with any further moves towards digital learning. This might involve supplying some families with 4G devices on a temporary break/fix basis, which will allow them to connect securely to the school network.

Given that no one knows what learning provision in schools will even look like in the medium term, the government needs to carefully consider how it can assist these low-income families and children. In any case, the technology is available to help them, and it can be deployed rapidly and at low cost.

Final thoughts

With the vast majority of schools presently fully open, the hope is that both the profession and the country as a whole won't see a repeat of the situation we faced back in April. Yet if this pandemic has taught us anything, it's that we simply don't know what lies around the corner and that it's therefore always best to be prepared.

If schools and academies wish to avoid the worst impacts of COVID-19 next time – whenever that might be – they stand a much better chance of doing so with a robust technical infrastructure in place.

By implementing technology that's scalable, secure and streamlined, the education sector will be better equipped and more able to cope with the complex demands of remote learning – and better positioned to ensure it's never faced with such a predicament again.

ABOUT THE AUTHOR Tammie Proctor is business development manager at the specialist WiFi consultancy Performance Networks; for more information, visit performancenetworks.co.uk or follow @PerformanceN

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At a glance

- Contact: mrosas1@penguin randomhouse.co.uk (Mandy Rosas)
- The first and only children's adventure series officially approved by the Albert Einstein Archives
- Inspires girls to get involved in STEM and encourages children to engage with science
- Perfect fiction companion for fans of Good Night Stories for Rebel Girls

THE NEXT BIG THING

Computer science

Find out how Pearson's new qualification aims to transform established practice around the teaching of computer science

[THE TREND]

Our new GCSE in Computer Science is an exciting addition to Pearson's portfolio of digital qualifications, and showcases our new innovative, practical, future-facing onscreen assessment. We've worked with teachers to provide a qualification that ensures students have the computational skills they need to be ready for a digital future beyond the classroom.

WHAT'S HAPPENING?

The qualification includes innovative, practical onscreen assessment, which provides students with an engaging assessment experience that can be transferred into real world skills. It demystifies the hidden, secret parts of technologies everyone uses by giving students hands-on experience in creating their own coded solutions to a range of problems.

The move from paper- to screen-based assessment more accurately reflects how computer science is practised and taught. Our Subject Advisor, Tim Brady, says that the new approach aims to: "Match the assessment with the learning and make it relevant to how the outside world views computer science."

We're taking a number of measures to ensure the assessments run smoothly and securely. There are a series of procedures in place to ensure simple and secure transfer of files, and we're on hand to help if any issues do arise.

"The move from paper- to screen-based assessment more accurately reflects how computer science is practised"

WHAT'S THE IMPACT?

The engaging new qualification has been carefully crafted to enable a reliable, consistent and accessible foundation in the subject of computer science.

The strong ethos in the way the qualification has been put together ensures students are given the skills and tools to understand the subject of computer science – and we've chosen Python as the vehicle for enabling them to progress into practical application of the theory. Python is growing in industry acceptance, and we wanted a free, open source, accessible and syntax-friendly language everyone could access, so that every student can have the chance to enjoy making progress in the subject.

WHAT'S NEXT?

Our new GCSE in Computer Science develops and refines the skills needed for a digital career, regardless of industry or employer. It encourages students to develop an understanding of emerging trends in computing

technologies, and the impact

Contact:

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of computing on individuals, society and the environment, including ethical, legal and ownership issues.

Pearson offers a range of digital qualifications across GCSE, BTEC and A level to help develop those all-important digital skills your students will need for further education or employment. Whether they're aspiring software developers, digital media producers or just need to develop a broad overview of IT skills, there's a pathway for everyone.

Discover More...

You can get in touch with our Subject Advisor Tim Brady via Twitter (@Pearson_CS) or the <u>short form</u> on our website.

GET INVOLVED

Our new GCSE computer science qualification is available for teaching now. You can find out more <u>online</u> about our portfolio of digital qualifications, including our new GCSE in <u>Computer Science</u>, BTEC Tech Award in <u>Digital Information Technology</u> and BTEC in <u>Creative Media Production</u>, along with details of how we are supporting learners on their journey to employment or further education.

Virtual visits

How amid the pandemic chaos, a daily dose of online storytime helped make reading a habit

ne of the special privileges extended to authors of children's books is to be invited into schools. It's an opportunity to discuss our work, engage (and hopefully inspire) young readers, and give the school a healthy dose of external creative stimulus.

When I was young, I wasn't so lucky to have such a visit, but now, as an author myself, I have witnessed first-hand the impact it can have on students. Meeting the human behind the book is especially impactful for those more reluctant readers who sometimes believe that reading just isn't for them.

I'd spent early March riding the rails, visiting schools up and down the UK as part of this year's World Book Day celebrations, talking to students about everything from neurotic zombies and high school aliens to dinosaur-riding knights and near-future virtual worlds (the latter of which seem strangely prescient these days).

In our post-pandemic reality, those school visits now feel like they belong in a different world. When schools were partially closed, and everyone was engaging in different forms of remote learning, I was in awe of those teachers, librarians, and headteachers who valiantly rose to the occasion and were able to adapt to a whole new way of engaging students, using a dizzying array of new virtual tools.

DAILY DOSE

In the days leading up to the UK's nationwide lockdown, I watched Irish Taoiseach Leo Varadkar's inspiring speech, and wondered what I might be able to do to help. With many working parents pulled between new work-from-home regimes and supervising home schooling, I thought that at the very least, I might be able to offer a daily dose of virtual storytime.

So, without much fanfare, I read the prologue of my middle-grade novel, *Alienated: Grounded At Groom Lake*, from my living room and uploaded it to my <u>YouTube channel</u>, with the promise to keep reading every weekday until the end of the book.

The book tells the story of the only two human kids at a school for aliens located at Area 51. It's a fish-out-ofwater sci-fi comedy – think *Harry Potter* meets *Men in Black*.

I chose to read this particular title for two reasons. First, it is set at a school (albeit one for aliens), and I thought young people might start to miss their schools. And second, it is a hopeful and uplifting story about overcoming adversity through teamwork, getting on with your family in strange circumstances and being your best self despite making (many, many) mistakes.

I filmed each video in different parts of my house (depending on where my kids were doing their homeschooling), often roping in my 10-year-old to serve as camera operator. Each video went up on YouTube, and all of them were archived on my website.

GLOBAL READERS

Since starting, I've heard from teachers and parents all around the world. Michael Curtis, a primary teacher in Victoria, Australia, sent me a message which said: "During this time of uncertainty and physical distancing, teachers have been working hard to motivate all learners, even those who might be reluctant or want to avoid their work. "While normally I would be able to pick up a book and engage the kids with a story, this hasn't been possible lately. Having you read your own novel, from your own house (all the way across the world!) has been an amazing experience for my students. It has helped to 'normalise' our remote learning, establish the idea that we're all in this together, and that they truly do exist as global citizens."

Pam Balistreri, a teacher in Apple Valley, Minnesota, also wrote to me and shared

TECH IN ACTION

the following: "As a teacher, I am inspired by the way you have engaged my class and given them something to look forward to each day. The book is filled with cliffhangers and it continues to make my students want now been video recording himself reading aloud his choice of book. He never liked to read aloud before and now he is reading his book chapter by chapter, inspired by what you are doing!"

"In these strange and uncertain times, reading fiction is a great way to allow the mind to escape reality"

more. The children said that having an author read their own writing adds an element that they wouldn't necessarily get if they were reading it themselves.

"One of the students even told me after the recording was complete that he has In every video, I give a brief shout-out to a student who's reading along at home. Melissa Little, a parent in Powder Springs, Georgia reached out to ask me to mention her son's class. She said, "One of the hardest parts of everything being closed has been not being able to go to the library and finding new books to read. We used to go two or three times a week! Listening to you read has been a bit of joy every day. The book has very likable characters and a great storyline."

I believe that reading is a habit, so doing the daily videos became a way to model that habit. I've been buoyed by how many people have been reading along with me, and how teachers have been using it as part of their remote learning.

In these strange and uncertain times, reading fiction is a great way to allow the mind to escape reality and grapple with emotions through a fictional lens. The world outside your front door might feel scary right now, but just imagine being Sherman Capote, trying to stop a worldending alien invasion!

These are grave times indeed, but I believe we need to find the small wins. I sincerely hope that amid all of the chaos and loss of this pandemic, I may have been able to inspire some students to make reading for fun a daily habit. It's a tiny fraction of what teachers are doing each and every day, but I'm proud to do my bit to help.

ABOUT THE AUTHOR Jeff Norton is an award-winning author of books such as MetaWars, Memoirs Of A Neurotic Zombie and Dino Knights. Find him at jeffnorton. com and follow him on Twitter at @thejeffnorton

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teachwire.net

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 a student population of 1,600, and are 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

"We were initially concerned at how many students had migrated from using laptops to phones and tablets"

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 everyone would need to understand the project plan over time and where we were going with it.

Better outcomes

Teachers can sometimes be their own worst enemies, in 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 quizzes. 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.

We first 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

Earlier this year, we spotted the coronavirus disruption coming. We commenced training for staff around lockdown planning in late February and liased with Brightspace in early March.

With other learning tools, the tool itself is often all there is. By comparison, Brightspace lets us approach individuals there and ask them 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 at home with whom they'd already built a productive relationship. Shortly after, we rolled Y10 and Y11 into full-time home timetables, the only differences being slightly bigger gaps between lessons to allow for short breaks.

It was around then that we carried out an extensive survey of the equipment our students had at home, and we were initially concerned at how many had migrated from using laptops several vears before to phones and tablets. A number of households 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 we've produced over the last three years.

What's key for us now is planning for the inevitable wave of incoming local lockdowns. It was easier to plan around the general lockdown earlier in the year - with the school entirely locked down, we could provide a full virtual timetable. Actions targeted at specific year groups and bubbles will entail staff juggling timetables that might see them teaching in-school classes for some periods and teaching virtually in others.

Providing high quality provision which allows for that kind of mixed response will be much more challenging. We anticipate that during winter we'll inevitably have some year groups in school and some at home, and will need a way to make those mixed teaching environments work.

That's essentially the challenge that government currently faces at a national level – encouraging the use of provision like ours while utilising economy of scale, so that individual children are able to have their specific needs properly met by a robust deployment of technology.

The real lesson we've learnt from lockdown is that the teachers who thrived in that online environment were those who could continue building on their existing relationships with their students. That's made considerably easier if your online environment

TEACHER VOICE

Marc Elston, History Teacher

"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 soon 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."

enables 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 resource from which people can access some nice videos and animations – job done.' 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.

ABOUT THE AUTHOR Mark Deans is a deputy headteacher at West Bridgford School, Nottingham; for more information, visit <u>wbs.school</u>

Getting down AND DIGITAL

Sophie Thomson explains how to avoid the 'distraction factor' in digital learning and harness technology to better support pupils' literacy

e live in a digital age. While this brings a world of advantages, if you're anything like me, you'll think about a task you need to do, grab your iPad or phone and open the relevant app or browser. Then, about 10 minutes later, after a quick browse of eduTwitter, replying to a few messages and glancing at the BBC News app twice (just in case something critical has happened in the minutes since you last checked), you'll realise you haven't done the task in hand.

Children are no different. We're all familiar with the lure of distraction that looms large on digital devices, so how can we engage children with a specific digital task, particularly when we're working with tight timeframes of 20- or 30-minute lessons?

PRACTICALLY SPEAKING

In the most practical sense, there are some things you can try in your classroom to minimise distraction and set a digital lesson up for success.

1 Timetable lessons using digital devices after breaktime or lunchtime, or as the first lesson of the day. This will give you – or if you're lucky enough to have one, your LSA – more time to set up the devices in advance of the children coming into the classroom. Preload the apps or log in ahead of time for the group you know will be using the app or platform to avoid losing time turning on devices, navigating to apps and logging in. If children can get straight into the task in hand, they're less likely to be distracted and more likely to focus their attention on it.

own experiences should be done with person-to-person contact. Within every digital lesson, consider making time for children to talk, either with an adult, or with each other, about their learning. The power of talk for learning is well documented, and opening up dialogue will not only help keep children focused,

"Being presented with 20 books to choose from can be overwhelming for children"

2 Consider employing the features of the tablet device you're using in class to remove temptation at the source. iPads, for example, can be locked down to one app using the 'guided access' feature under the accessibility tools. When this is turned on you can quickly enable it by tripleclicking the home button and starting guided access. Once enabled, no one can leave the app or browser window unless they enter a four-digit passcode - so no matter how much the children in your class want to watch a YouTube video instead, they won't be able to do it.

Don't think of digital tasks solely as independent or individual activities. Often, engagement in learning comes from discussing that learning – with an ebook, for example, thinking about how the characters and the story link to the reader's it'll also help to move their learning forward and aid with retention of the information.

Think carefully about the purpose of the task being conducted digitally. What is the activity trying to achieve and what is the benefit of it being done digitally? How will you assess (in the loosest sense) whether the learning outcome has been achieved? Do the children know the intended outcome? By asking these questions ahead of planning a digitally-oriented task, you will be able to focus children's attention more effectively and put in place any scaffolding needed around the technology to help achieve the aims of the lesson.

DEEPER ENGAGEMENT

Once you've got beyond the distraction factor, there are lots of other subtle ways you

can help children to engage in digital learning, particularly reading, to ensure positive outcomes. One advantage of digital reading is that it can offer a world of choice, but to ensure increased choice leads to increased engagement, there are a few areas that you should be mindful of.

When using a digital library, consider how much choice is appropriate for each child. For some children, being presented with 20 books to choose from can be overwhelming; rather than settle down to read one text, they can spend 20 minutes flicking between texts, unable to make a decision.

Does the digital library you're using allow you to offer a smaller selection of books, or limit the selection the child has to choose from? Consider also whether there is adequate information presented for a child to make an informed selection. For example, has the system been designed so that the child can see the blurb of each digital book? If they must open each book to do a flick test, this will use up precious lesson time in which the child isn't really reading.

Remember that children have differing interests, and that different books will engage each child. Will the child be able to understand, relate and engage effectively with the topics and themes of a given book? Digital

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libraries can help answer this if they provide essential information about each text in an easily digestible format, enabling you to successfully match different texts to different children.

DIGITAL ADVANTAGE

While digital reading can present some challenges, these are easily overcome with careful thought and planning, and digital reading can offer huge advantages both inside and beyond the classroom. Digital libraries and educational apps, when used effectively, present the opportunity to put books and learning into the hands of every child, and allow children to engage with books on a wide range of devices beyond print.

Unlike printed books sent home, digital texts can be reused again and again, don't suffer bent corners and won't get involved in accidents with the family dog (or toddler). When used effectively, digital learning – and reading in particular – has the power to broaden access to text and reading as a pleasurable activity. Just as long as we don't get too distracted in the process...

ABOUT THE AUTHOR Sophie Thomson is head of primary English at Pearson where she has spent the past eight years working with teachers and pupils.

CHOOSING THE RIGHT EBOOK

When using digital content, and especially ebooks, be discerning about quality. While there are many free apps and ebook libraries available, we shouldn't treat them any differently from printed content. Rarely would we choose a book to read without having a good scan of the cover, a skim of the blurb and a flick test, and digital books are no different.

There is nothing more disengaging than being asked to read something (especially if it's 'for pleasure') that is either inaccessible or poorly written, and this applies across all forms of media. When identifying an ebook for a child to read, here are some key questions to ask yourself:

Is the text at the right reading level for the child?
Are the digital features of this book furthering or aiding learning, or serving as a distraction?

• Are the illustrations or photographs in the text appropriate, of a high quality and interacting effectively with the text?

• Is the typeface used dyslexia-friendly and are the letter formations those which children will easily recognise for their age and stage?

Is it written in British English?

Safe, secure and connected

Clare Brokenshire explains the important role that online schooling can play in supporting students with SEND, both in and out of the classroom

amilies and children with SEND have faced a unique set of challenges throughout the coronavirus pandemic. Added to this, a recent study on special education during lockdown and the return to school found that many parents of children with SEND said they were concerned about sending their children back. Due to various factors, including safety concerns, medical vulnerability and assorted specific needs that prevented certain students from adhering to social distancing, special school and college leaders predicted that around 20,000 pupils nationally wouldn't be returning to their classrooms.

Given the significant impact this will have on children's academic progress, not to mention their wellbeing and resilience, more support and alternative provision must be made available for special schools. With education technology having proved invaluable for students, staff and parents throughout lockdown, what can school leaders do to ensure that effective systems and processes are also able to facilitate the ongoing learning of students with SEND – even if they aren't able to return to the classroom?

Continuity of inclusion

Schools have already faced numerous issues at the start

of this academic year, having had to alter their processes and operations to comply with the latest DfE guidance. For many special schools, this has meant reduced and altered contact hours, fewer activities, different routines and lower or alternative methods of therapeutic input, with implications for their staff capacity and one-to-one support provision. remote solution in place – which many don't. Learners can remain on roll locally, with all attendance and progress data integrated and provided to the designated school.

There is also no requirement to make any long-term financial commitments; students can be supported for as little as a few weeks, or on a more permanent basis. This is

"Flexibility is key to meeting the short- to long-term complex needs of children unable to attend school"

As we all know, students have varying needs and learn at differing rates in various ways across the academic year. With COVID-19 now in the mix as well, that means that flexibility is key to meeting the broad range of short- to long-term complex needs of children unable to attend school in person. This is where alternative provision in the form of online schooling can bridge the gap and help students remain engaged with their learning, without disruption to their routines, and ensure continuity of education, fairness and inclusion.

Online alternative provision can be implemented relatively quickly, providing additional support for schools that don't already have a sophisticated online or important given the current landscape, with ongoing restrictions and the prospect of further regional and perhaps even national lockdowns. Whether students are based in the classroom, a PRU or studying from home, alternative provision in the form of online schooling can provide students with vital routine.

Lessons can continue being taught at the same time each day, across core subjects and a broad wider curriculum. This way of learning will not only help to sustain engagement – through interactive content, gamified learning and collaborative learning – but also help to develop students' independent learning skills and confidence.

Taking ownership

More than ever, flexibility will be vital throughout this academic year. The benefit of online learning is that if students are absent for short- or long-term periods (whether that be due to health reasons or difficulties engaging with a traditional environment) they will still be able to access lesson content and recordings even after the lessons have taken place, to help them catch up or simply reinforce their learning. It also allows them learn at their own individual pace, with a personalised timetable and range of tools at their disposal, enabling them to engage with lessons that are tailored to their specific needs, and motivating them to take ownership of their learning.

Live online lessons allow learners to fully interact with their teachers and peers, and engage with lesson content through voice, interactive whiteboard displays shared with their screens, polling tools and quizzes, and via written responses. Virtual breakout rooms can also be used to organise individual and small group activities, practical work and differentiated work when some learners may be making rapid progress or falling behind.

This type of alternative provision, embedded within existing school systems, not only helps provide students with a safe and secure environment, but also allows them to communicate with their mentor, regardless of the environment they're in. For example, mentors can receive regular reporting and feedback – including gradings based on factors such as interaction, understanding and effort – to help them identify any gaps in students' development and tailor their activities accordingly.

A full learning experience

While a multitude of resources and edtech provision have proved their worth in facilitating learning outside the classroom, there is no 'one-size-fits-all' approach. Whether schools are ultimately successful in using them will depend on factors such as infrastructure, budgets, and broadband capabilities. While many of the resources available will be suitable for students in mainstream schools, the range of SEND within any one school or authority is vast. Finding out which potential solutions could support each of those needs is a challenge all teachers face.

When addressing the needs of students with behavioural difficulties, which can include obsessive compulsive disorder, emotional disturbance, lack of academic engagement, fears associated with personal or school problems, autism, as well as children in PRUs, online learning can be highly effective and cost-efficient, providing these students with a full teaching and learning experience without them having to be physically present on-site.

Online schooling can also ensure that students retain access to fully qualified teachers and subject specialists. One thing COVID-19 has taught us, however, is that despite many teachers' best efforts, teaching online is a completely different discipline to classroom teaching. It's therefore important that any absent students can be taught by staff who are both qualified and competent in teaching 'through the screen' – teachers who understand how best to connect with students remotely and can keep their lessons sufficiently compelling to maintain interest and engagement levels.

This is also an important consideration when managing staffing challenges and capacity. Access to these teachers can help provide the muchneeded support that so many vulnerable students require, especially when they aren't attending school in person.

It's fair to say that despite the DfE's best intentions, it's unlikely that we'll see 100% of students returned to classrooms for some time yet. We therefore have to be able to provide reassurance for parents and appropriate support for all students so that their teaching and learning can continue especially in the event of a second wave. The decision you make as to what form of online alternative provision will be most appropriate for your setting and students extends well beyond considerations of the edtech resources you have at your disposal. Get it right, and you'll be able to offer a sustainable means of supporting the most vulnerable families in your learning community, with a potentially huge positive impact on your students' future lives.

ABOUT THE AUTHOR

Clare Brokenshire is deputy headteacher at the online learning provider Academy21, where her work involves developing the curriculum to accommodate diverse needs; find out more by visiting <u>academy21.co.uk</u> or following <u>@Academy21AP</u> **Computer** Five practical ways to cover the computing curriculum in KS1

eveloping STEM skills, including critical and computational thinking, is key from a young age. 2018 research by Richard Sheldrake showed that exposure to, and building confidence in these disciplines can often be a predictor to following a career in STEM fields.

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Imaginative and active hands-on play, combined with problem-solving through play, is essential for providing an engaging experience. Young children's natural curiosity is a magical state of mind that supercharges learning. The key is to connect children's imagination and curiosity to the world they live in with simple challenges where problem-solving, critical thinking, collaboration and creativity are the keys to finding solutions. Here are some simple and practical STEM ideas that develop transferable critical and computational thinking

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skills, and will engage your KS1 pupils. They cover some of the essential KS1 objectives for the computing national curriculum.

COOKING WITH ALGORITHMS

Nothing motivates children more than getting to make their favourite snack – especially when they know they will get to enjoy it at the end. In school, this could involve making a smoothie or popcorn, linked to a restaurant or movie theme.

Algorithms are sequences of steps which need to be followed in a specific order to reach an end result – just like following a recipe.

Try also setting the following challenges: if the smoothies are for group A, use kiwis and carrot juice; if they are for group B, use bananas. If we've run out of butter for the popcorn, what should we use instead? 'If-then-else' statements are conditional sequences of steps which are done only if

the 'if' condition criteria are met. 'Debugging' is a great way for children to determine why their smoothies are suddenly not tasting as planned. They have to use their problemsolving skills to figure out that they have missed adding the bananas.

ABSTRACTION TREASURE MAPS

Plan a pirate treasure hunt quest. The adventure starts with dressing up and making a treasure map (a simplified version of the school environment). Children need to hide their 'treasure', mark it on the map and then give this to the other team. This activity helps children to grasp the idea of focusing on the most important information to reach the end goal, with a strong emphasis on teamwork.

PROGRAMME YOUR ROBOT

One child assumes the role of a 'human robot'. Another pupil gives the robot a set of verbal 'commands' to complete a task. For example, to drink a glass of water the first step is to open your right hand, then grab the glass in front of you and so forth. Vary the challenge

from simply walking to the door to making a sandwich and eating it.
Children will learn the importance of commands (steps) and sequencing, as well as how to debug and try again (reprogramme) when things don't go as planned.

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PATTERNS OF NATURE

Ask children to collect a range of natural objects from outside (leaves, flowers, pinecones, etc). Pupils must then work together in teams to sort through their 'treasures' based on similarities and differences and then place them in different buckets. Next, create patterns using the collected items and ask children to predict which items come next. This helps children identify patterns and predict in a logical way what comes next.

PROBLEM DECOMPOSITION

Ask children to select an object or a construction they can see, such as a house. Ask them to draw what they've selected, then ask them to draw the separate pieces of what they've selected. Set up a competition to draw the object in the most number of pieces. Pupils will have to decompose the object into smaller pieces while keeping in mind the bigger picture.

ABOUT THE AUTHORS Lisa Moss and Dr Thomas Bernard are co-founders of QuestFriendz, which aims to inspire STEM learning through interactive storytelling; for more information, visit <u>questfriendz.com</u> or follow @questfriendz

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