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2024/25

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TECHNOLOGY + INNOVATION

New solutions for outstanding teaching and learning

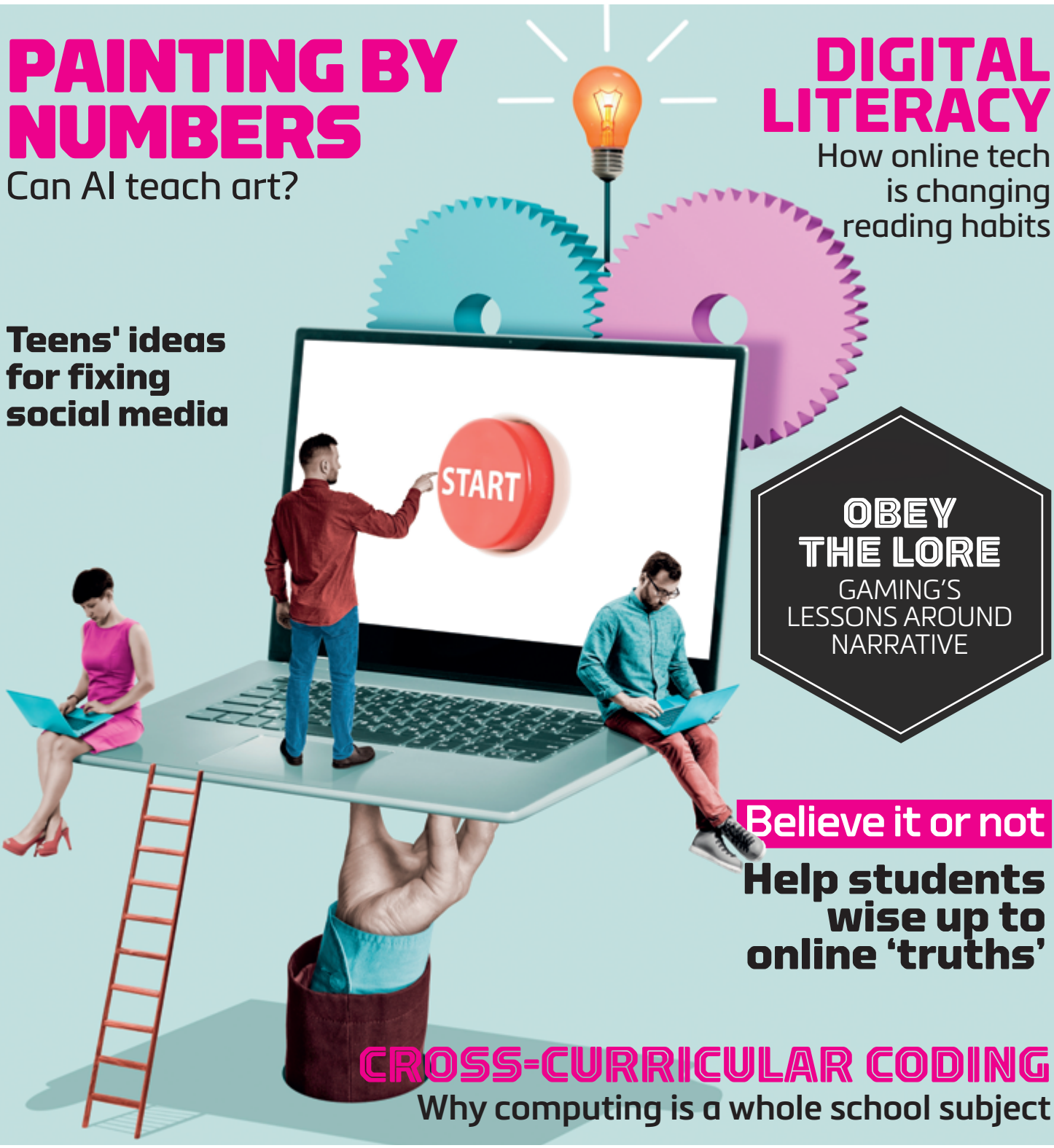
PAINTING BY NUMBERS

Can AI teach art?

DIGITAL LITERACY

How online tech is changing reading habits

Teens' ideas for fixing social media



OBEY THE LORE

GAMING'S LESSONS AROUND NARRATIVE

Believe it or not

Help students wise up to online 'truths'

CROSS-CURRICULAR CODING

Why computing is a whole school subject

(CR1104/CR1204/CZ1104/CZ1204)

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chromebook

1. ASUS Antibacterial Guard antibacterial treatment is registered by the US EPA and authorized under EU BPR.
2. Nano SIM is only for LTE models.
3. The garaged stylus is optional for flip devices only

Welcome...

"*Do we control the technology, or does it control us?*" Yes, it's a trite question that could serve as the tagline to any number of hokey sci-fi films over the decades, but one that schools need to be sincerely asking themselves, now more than ever.

In place of server rooms and complex, on-site data retrieval networks there are now highly sophisticated, easy to use cloud solutions that streamline schools' various administrative tasks in all manner of ways – but which make the issue of cybersecurity one that schools can't afford to ignore (see page 46).

Another development schools are having to grapple with is the growing influence of artificial intelligence over how we operate our devices and interact with online services. There are sound reasons for scepticism with regards to the much talked-up 'AI revolution' – if you want an eye-opening read, try researching the financial arrangements that underpin the (for now) non-profit market leader, OpenAI – but as of right now, the technology's presence in schools has become a fact of life.

That's not necessarily a bad thing, *per se*. With teacher workloads still consistently falling on the wrong side of 'punishing', there are some very real advantages to having a multifunctional, text-based clever clogs at your disposal during a busy school day (see page 60). However, matters quickly become much more thorny when eager students present their teachers with AI-assisted 'work' that's meant to demonstrate their aptitude for creativity and invention (see page 50).

Of course, AI's hardly the first technological innovation to come along with the potential to completely rewire how students behave and think. Video games have been weaving their seductive spell on the nation's youth – and adults – since at least the 1980s, though we perhaps shouldn't be so quick to dismiss the degree to which modern games might have a thing or two teach kids about world-building and crafting stories (see page 32).

And lest we forget, the current Y7 to Y11 cohort have never known a world without a handful of social media companies operating at a global scale. Given how immersed in social media services they've been, it's hardly surprising that they've got some thoughts on how they could be reimagined and improved for everyone (see page 52).

So, *are* we calling shots, or merely dancing to Big Tech's tune? We might not be able to give you a definitive answer to that in this edition of *Technology and Development*, but we can hopefully at least spotlight a few areas worth thinking about, and some helpful insights into modern education practice.

Best wishes

Callum Fauser, editor
callum.fauser@theteachco.com

Visit TEACHWIRE.NET/EDTECH for more information and great ideas

ON BOARD THIS ISSUE

Ben Garside is a senior learning manager at the Raspberry Pi Foundation

Nicky Cox MBE is editor-in-chief of First News

David Voisin is a head of MFL

Hannah Day is a head of art, media and film

Rob Wraith is head of learning technology and digital learning at NCG

Rebecca Westcott is a deputy headteacher and author

Contents

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Publishers:
Joe Carter, Sam Reubin, Richard Stebbing

Editor:
Callum Fauser, callum.fauser@artichokehq.com, 01206 505115

Group Advertising Manager:
Samantha Law, samantha.law@artichokehq.com, 01206 505499

Advertising Manager:
Ria Bentham, ria.bentham@artichokehq.com, 01206 505928

Deputy Advertising Manager:
Hannah Jones, hannah.jones@artichokehq.com, 01206 505924

Art editors:
Sarah Barajas, Richard Allen

Customer services:
secondary@artichokehq.com

Accounts:
artichokemedialtd@integral2.com

Published by:
Artichoke Media, Suites 2 & 4, Global House, Global Park, Eastgates, CO1 2TJ

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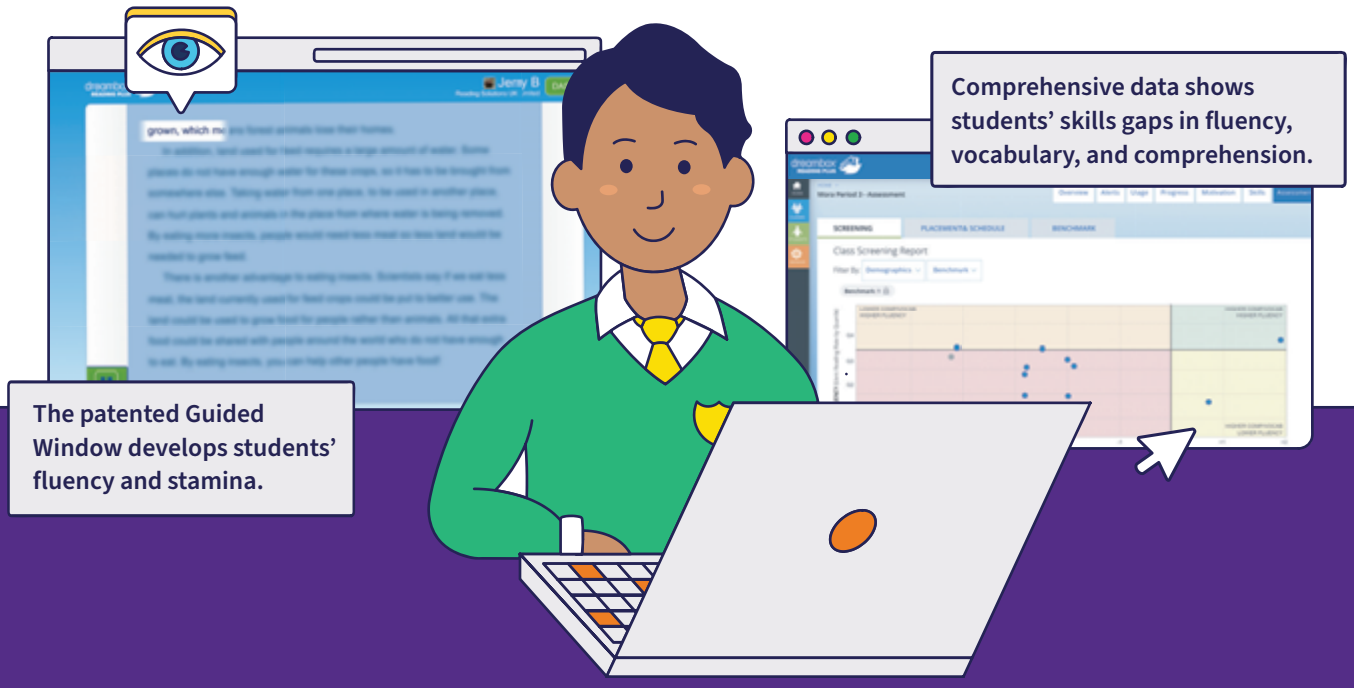
Curriculum Lead of English at Farringdon Community Academy.



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The cashless solution needed to be socially inclusive and parent friendly whilst also making income collection more efficient for school staff. I was convinced that offering parents the ability to pay online, see live balances, and obtain alerts combined with offering cash payments via PayPoint – offered total peace of mind."

Edinburgh Primary School

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5 REASONS TO TRY... ParentPay

Find out what makes this service the ultimate cashless payment solution for schools

30 SECOND BRIEFING

ParentPay is a comprehensive cashless payment system, providing flexible online payment options for everything from trips to meals, and has simplified and improved school payments for over 11,000 schools.

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ParentPay offers a streamlined, all-in-one online payment system for all transactions, including school meals, clubs, trips, uniforms, fundraising and more. Parents enjoy flexible payment options, including card, bank transfer, and PayPoint, making cashless transactions convenient and secure. With ParentPay, managing both large and small school events is effortless. From setting up payment plans and collecting consent for trips – be it a local library visit or an overseas adventure – to handling equipment fees and donations, ParentPay simplifies the process, helping schools stay organised and efficient.

2 EASY MANAGEMENT AND REPORTING

ParentPay makes it easy to track and manage all income, from school-wide payments to individual pupil transactions. With its real-time insights, you can instantly monitor payment requests, income types and reconciliation at every level – from school, down to year, class or pupil. Accept digital payments to multiple bank accounts using various payment methods, with funds settled weekly. ParentPay also lets you split income between central and local banking, ensuring seamless allocation to caterers and other providers.

3 UNRIVALLED CYBER SECURITY

Safeguarding your school's sensitive data is our top priority. In an era of rising cybercrime, schools need robust protection. That's why ParentPay is not just the leading cashless payment provider, but also A-rated for cyber security by the independent experts, Black Kite. Our specialised security team works tirelessly to maintain the highest security standards in the industry. With our secure, cloud-based service, schools can trust ParentPay to protect confidential information while simplifying payments.

ParentPay

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4 LEARNING AND SUPPORT

At ParentPay, we ensure your school has all the resources needed for a smooth experience. To help boost parental engagement, we offer a 'Promoting ParentPay to Parents' pack, filled with ready-to-use assets to increase uptake and help your school get the best of cashless capabilities. For staff training, our e-learning hub, LearnUpon, offers a range of courses and resources, accessible at any time. Plus, our extensive Knowledge Base provides quick access to support articles. For urgent queries, our Customer Support Team are always on hand to assist.

5 SWITCH AND SAVE WITH PARENTPAY

Switching to ParentPay is easier than ever, and we're offering up to 12 months free (T&Cs apply) to help your school transition smoothly. If your current cashless payment system isn't meeting your needs, why settle? Join over 11,000 schools already using ParentPay – the market leader in cashless payments. With features like 24/7 parent access to balances, text and email alerts, and improved debt management, schools like Edinburgh Primary have saved time and money. Switch today to experience seamless payment management and significant savings.

Key Points

Schools like The Diamond Primary School saved an hour per week, per teacher, by going cashless with ParentPay, streamlining their meal management and reducing food wastage.

Schools like Lomond School have found ParentPay's trip management feature invaluable, allowing them to easily track payments, create payment plans and manage events.

Berkeley Primary School enjoys seamless dinner money management with ParentPay, including automatic meal attendance records and smooth UIFSM/FSM recognition.

By preparing parents for the switch, schools like Berkeley Primary have successfully encouraged high ParentPay adoption, making online payments easier for everyone.

TECH IN ACTION

ASUS for Education

Exploring how ASUS laptops address the evolving needs of modern classrooms

HOW LAPTOPS HELP LEARNING

Laptops play a crucial role within the learning environment, making them more than just tools for completing assignments. ASUS laptops are designed for today's classrooms through both their durability and functionality. Featuring ruggedised construction and scratch-resistant glass, they are built to withstand the rigours of daily school life, reducing the time lost to repairs and increasing time spent on learning.

This is vital, when schools can often spend nearly £3,000 annually on classroom repairs. Minimising such disruptions lets teachers focus on teaching.

Beyond their durability, ASUS laptops actively enhance learning. Their versatility supports self-directed, continuous learning, enabling students to explore, collaborate and engage in ways that extend beyond the traditional classroom setup. These laptops are designed to enrich the overall educational experience, making learning more interactive, collaborative and future-ready.

TEACHERS' EXPERIENCES

While no tech is flawless, teachers report that ASUS laptops strike a good balance between robustness and usability. Teachers tell us how much they appreciate features including touchscreen and stylus capabilities, and 'world camera'. They also value the seamless integration with cloud-based resources. As one teacher told us, "*I assign a booklet on Google Classroom, and then they [the students] edit that and resubmit it.*"

Reliability and ease of repair are other benefits. With their modular designs, the laptops' parts can be swapped out quickly, minimising disruption. This will be music to the ears of school IT managers who, research shows, often face repair times of 2-3 weeks for other equipment*. Schools spend an average of £3,000 annually on repairs, so reducing downtime can lead to significant savings. Students are also fans of these laptops' versatility. The 180-degree lay-flat hinge, for instance, opens new possibilities for collaborative learning and group projects. As one student explained, "*You can share... the work that you're doing. And one of your classmates can help you.*"

BENEFITS FOR SCHOOLS

Our laptops could make a real difference in every school. We know that different schools face diverse challenges, but ASUS offers scalable, cost-effective solutions, with all devices designed with long-term value in mind.

ASUS is also keenly aware of technology's environmental impact. That's why we've designed our laptops with sustainability in mind, using recyclable materials where possible and ensuring energy efficiency. This helps schools reduce their carbon footprint and can lead to lower energy bills.

Few would deny the importance of preparing students for a digital future. ASUS laptops help to provide students with essential skills, while also addressing the immediate and longer-term tech needs of schools. And with ASUS, schools can be confident their investment will remain relevant for years to come.

Did we mention?

For more information about ASUS educational solutions, contact our specialists for a consultation tailored to your school's needs.

*500 teachers in UK secondary schools were surveyed online by independent researchers OnePoll for ASUS during August 2024

ASUS EDUCATION

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EXTRA FEATURES:

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- Accessibility features
- Centralised management tools for IT departments

BUILT TO LAST:

ASUS laptops undergo drop and pressure tests, to ensure they can withstand everyday school wear and tear.

DEVELOPMENTS

How the latest technology advances and trends are shaping educational practice

THE AGENDA:

Weighing up THE BENEFITS

Given the disruptions we've seen AI cause already, it's vital that we foster students' ability to think about the technology critically, states **Ben Garside**

Staying current with the latest advancements in technology – particularly AI and generative AI (GenAI) – can be tough, even for tech enthusiasts. I have to admit to sometimes feeling this way myself, but one new development from OpenAI earlier this year really caught my attention.

The company introduced a new version of its ChatGPT chatbot – GPT-4 – with a new female-sounding voice. The accompanying launch video showcased the model's ability to assist users with tasks like solving maths problems and offering presentation tips, all while maintaining a friendly and cheerful tone.

What's the problem?

With big tech companies vying for market share in what's rapidly become a highly competitive space, the addition of voices to these AI models was perhaps always inevitable. It still got me thinking, though – *why* add a voice? And why did we have to see this particular model flirt with the presenter during the launch?

Working in the field of AI, I've always seen AI as a powerful problem-solving tool. With GenAI, however, I've often wondered about what problems its creators are actually trying to solve, and how we can help young people better understand the technology. And the fact is, I'm still really not sure.

That's not to suggest that I don't think GenAI has *any* benefits, because it does. I've seen many great examples in education alone: teachers using large language models (LLMs) to generate ideas for lessons, help differentiate work for students with additional needs, and create example answers to exam questions that their students can then assess against the mark scheme.

Educators are creative people, and whilst it's cool to see so many good uses of these tools, I can't help but wonder if the developers had any specific problem-solving applications in mind when creating them, or whether they simply hoped that society would find good uses for them somewhere further down the line?

So whilst there are some good uses of GenAI, you don't need to dig very deeply before you start unearthing some major problems.

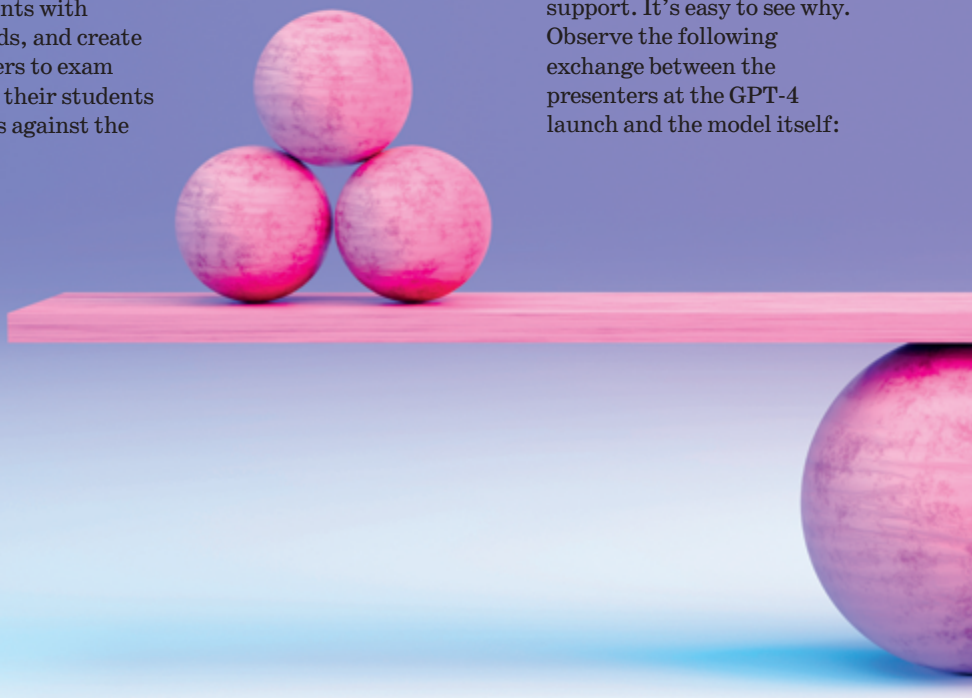
> **"The prospect of teenagers seeking solace and emotional support from a generative AI tool is a concerning development"**

Troubling issues

Anthropomorphism refers to the assigning of human characteristics to things that aren't human – something we all do, all the time, without consequence. When we do the same with AI, however, we soon run into troubling issues.

We'll commonly give names to inanimate objects (I call my vacuum cleaner 'Henry', for example), but the difference with GenAI is that chatbots are deliberately designed to be human-like in their responses, to the point where it's easy for people to forget that they're not actually speaking to a human.

As feared, evidence has now started to emerge that some young people are showing a desire to befriend these chatbots, going to them for advice and emotional support. It's easy to see why. Observe the following exchange between the presenters at the GPT-4 launch and the model itself:



GPT-4: "*It looks like you're feeling pretty happy and cheerful, with a big smile and even maybe a touch of excitement. Whatever is going on? It seems like you're in a great mood. Care to share the source of those good vibes?*"
Presenter: "*The reason I'm in a good mood is we are doing a presentation showcasing how useful and amazing you are.*"
GPT-4: "*Oh stop it, you're making me blush.*"

The Family Online Safety Institute (FOSI) has conducted a study, looking at the emerging hopes and fears that parents and teenagers have around GenAI. According to one teenager, "*Some people just want to talk to somebody. Just because it's not a real person, doesn't mean it can't make a person feel – because words are powerful. At the end of the day, it can always help in an emotional and mental way.*"

The prospect of teenagers seeking solace and emotional support from a generative AI tool is a concerning development. These AI tools can mimic human-like conversations, but their outputs are based on patterns and data – not genuine empathy or understanding.

The ultimate concern is that this exposes vulnerable young people to being manipulated in ways we can't predict. Relying on AI for emotional support could lead to a sense of isolation and detachment, hindering the development of healthy coping mechanisms and interpersonal relationships.

Long-term harms

Another widely publicised use of GenAI is its ability to create 'deepfakes'. Any readers who have watched *Indiana Jones and the Dial of Destiny* will have seen this technology in action for themselves, making Harrison Ford appear as a younger version of himself.

This isn't necessarily a bad use of GenAI technology *per se*, but the use of Deepfake technology can quickly become deeply problematic. Take, for example, the case of one teacher arrested for creating a deepfake audio clip of his school's principal making racist remarks. The recording went viral before anyone realised that AI had been used to generate it.

Easy-to-use Deepfake tools are now freely available and, in common with other visual tools of the past, can be used inappropriately to cause damage or even break the law. The use of deepfakes in pornography is one such example, and a particularly dangerous development for young women, against whom it may be directed for fraudulent, abusive and coercive ends.

This could cause severe, long-lasting emotional distress and harms to the individuals depicted, while at the same time reinforcing damaging stereotypes and perpetuating the objectification of women.

Unforeseen consequences

Technological developments causing unforeseen negative consequences are nothing new, of course. As educators, a significant part of job revolves around helping young people navigate a fast-changing world and preparing them for their futures. In this respect, education has an essential role to play in helping people better understand AI technologies and avoid related dangers.

Our approach at the Raspberry Pi Foundation is to not focus purely on those threats and dangers, but to teach young people how to be critical users of technologies, rather than passive consumers. Possessing an understanding of how those technologies work goes a long way towards achieving the AI literacy skills needed to make informed choices, which is why we developed our free Experience AI programme (see rpf.io/expai2024).

Taking a problem-first approach doesn't, by default, prevent AI systems from causing harm – there's still the chance of them increasing bias and societal inequities, after all. What it *does* do, though, is focus development efforts on end users and the nature of the data used to train the models in question.

My worry is that focusing primarily on market share and potential opportunities, rather than on the problems that AI can be used to solve, is more likely to lead to harm.

First principles

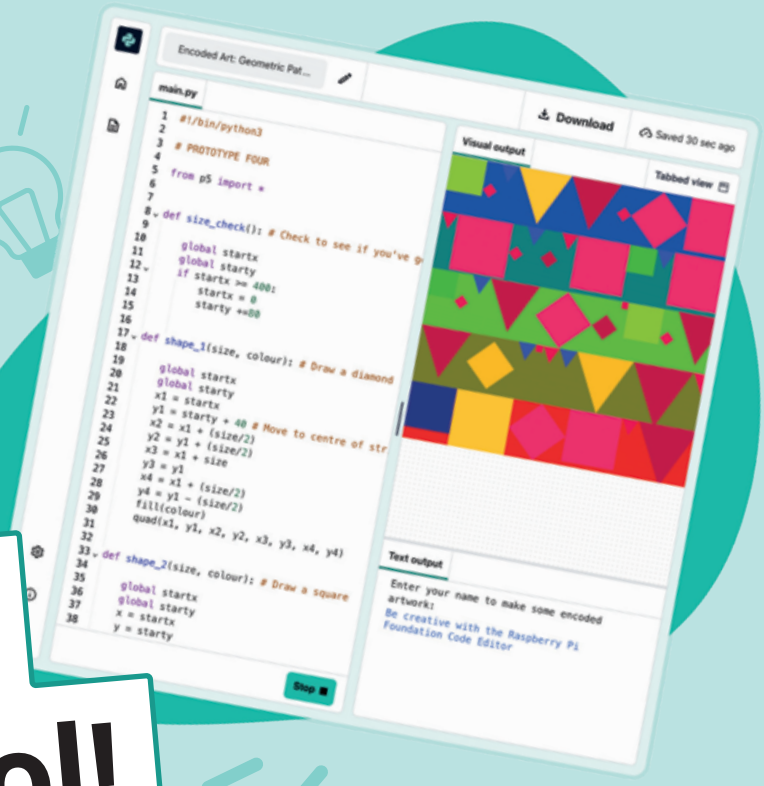
Our resources are also underpinned by teaching around fairness, accountability, transparency, privacy and security in relation to the development of AI systems. These principles are aimed at ensuring that the creators of AI models develop those models as ethically and responsibly as possible.

They also extend to consumers, since we need to get to a place in society where we expect these principles to be adhered to, with consumer power seeing to it that any models which don't, ultimately fail.

Our call for educators, carers and parents would be to start conversations with your young people about GenAI. Get to know their opinions and how they view its role in their lives, and help them to become critical thinkers when interacting with technology.

ABOUT THE AUTHOR
Ben Garside is a senior learning manager at the Raspberry Pi Foundation, having previously been a classroom teacher for 14 years; for more information, visit raspberrypi.org or follow @RaspberryPi_org (X)

Raspberry Pi Foundation



Introduce the Code Editor into your school!

The Code Editor helps make learning text-based programming simple and accessible for children aged 9 and up.

> **"We have used it and love it, the fact that it is both for HTML/CSS and then Python is great as the students have a one-stop shop for IDEs."**
>
> - Lee Willis, Head of ICT and Computing, Newcastle High School for Girls

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Find out more and register your school: **rpf.io/code-editor-teach**

Q&A

Creative coding

Phil Howell explains how the Raspberry Pi Foundation's Code Editor can get your students' programming skills off to a flying start...

30 SECOND BRIEFING

Tailored specifically to young people's needs, the Raspberry Pi Foundation's Code Editor helps make learning text-based programming simple and accessible for children aged 9 and up. It's safe, age-appropriate and suitable for use in the classroom through Code Editor for Education.

What is the Code Editor?

The Raspberry Pi Foundation's Code Editor is a free online tool designed specifically for young people to learn text-based programming. Created with input from educators, the tool is informed by our understanding of pedagogy and computing education. The integrated development environment (IDE) enables learners to get creative with code and design games, art and webpages using Python and HTML, CSS and JavaScript.

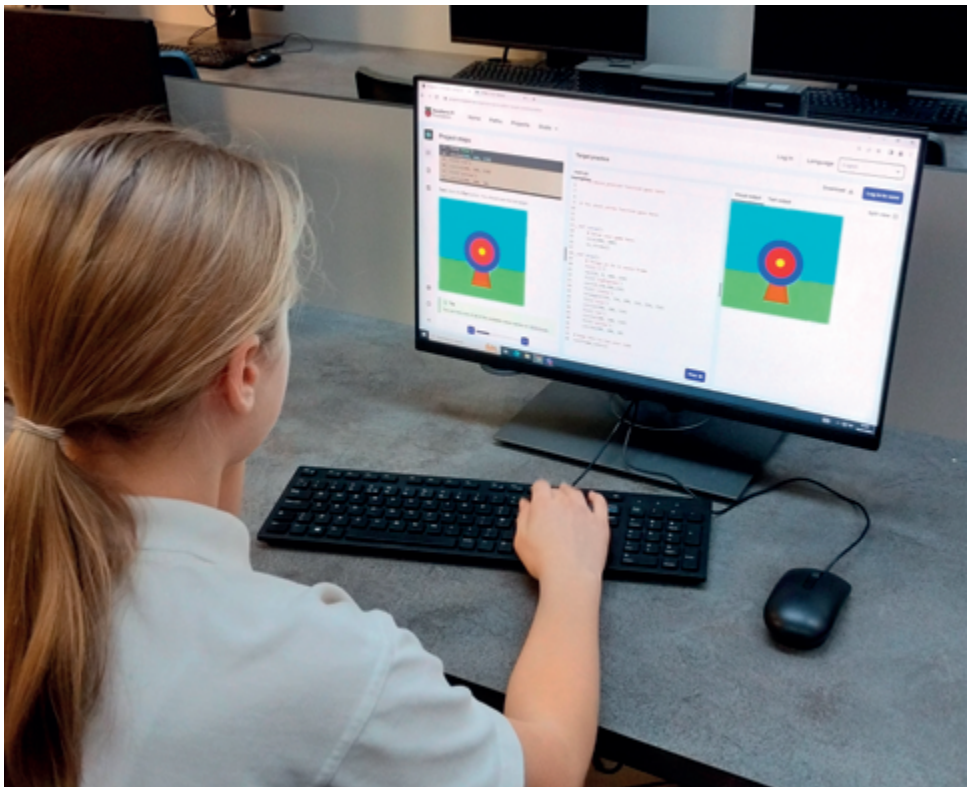
How did you develop the Code Editor for young learners?

We wanted young people to be able to use the Code Editor to write and run code in a web browser, without the need to install any additional software. Safety is also very important to us, so new features are only made available once we have ensured they comply with our safeguarding policies and the Children's code of the UK's Information Commissioner's Office (ICO). Another key consideration is accessibility. We have made it easy to switch settings between light and dark modes, and between small, medium and large text sizes, and we continue to optimise the Editor for mobile and tablet use.

Why did you add classroom management features?

The next step involved thinking about how the Code Editor could be used by educators to teach programming, and how we could build upon our simple and age-appropriate interface to better support learners in the classroom.

We carried out a survey and user testing to help us understand educators' needs when teaching text-based programming. Common requests included an easy-to-use editor with student-friendly error messages and classroom management features. These insights have helped to steer Editor developments.



Raspberry Pi Foundation

Contact:
To find out more and create a free school account, visit **rpf.io/code-editor-teach**

ABOUT PHIL: Phil Howell is chief technology and product officer at the Raspberry Pi Foundation

How can schools use Code Editor for Education?

Schools can sign up for a free school account. Once verified, schools can invite teachers to join, add students and organise them into classes, and create coding projects to share with students. We take safeguarding seriously, providing visibility of student work at all times.

What's next for Code Editor for Education?

Informed by ongoing teacher feedback, we will continue to add new features over the coming months. We will be enabling custom instructions to sit alongside starter code projects. We also want to provide teacher-to-student feedback capabilities.

What's the difference?

+ Create engaging coding lessons and share them with your students
+ Simple and easy classroom management
+ Free now, free forever

Let's hear it for... THE TECHNICIANS

Jamie Sloan looks at how students can be made more aware of the vital differences technicians are making across all areas of society

The vital role that technicians play in society can often be hidden, despite us relying on them every day to keep our modern world working. Technicians often work behind the scenes – behind a camera, in the laboratory or somewhere out in nature.

Power network technicians keep our lights on. Hospital lab technicians test medical samples to aid diagnoses. Arts venue technicians enable artists to stage live shows and gigs – and that's just the tip of the iceberg.

It's estimated that there are over 1.5 million technicians currently working in the UK (see bit.ly/TI24-T1) across many different sectors, in roles that most of us have never even thought about because they're so often unseen.

An urgent challenge

In November 2022, the Science Museum opened *Technicians: The David Sainsbury Gallery* – a free, interactive gallery designed to introduce 11- to 16-year-olds to the vast, varied and often hidden world of technicians.

This STEM careers gallery was made possible by generous funding from the Gatsby Foundation, and was developed in consultation with local young people using the principles of the Science Capital approach, as well as the Gatsby Benchmarks of Good Careers Education.

The result is a gallery bursting with hands-on exhibits, bold displays and stories from people working in technical roles. It's a dynamic and engaging space, which serves to educate young people about technical careers, and inspire them to consider pursuing a technical career themselves.

It's estimated that the UK needs over 800,000 additional technicians and apprentices to meet the needs of the technology economy (see bit.ly/TI24-T2), and yet there's currently a shortage of people working in technical roles. This presents an urgent challenge for the country, but also an incredible opportunity for those young people currently considering their future career options.

Technicians: The David Sainsbury Gallery at the Science Museum aims to shine a light on the work technicians do and celebrate this unseen workforce. It invites young people into the world of technical careers, empowering them to explore job opportunities they might not have previously been aware of, and familiarising them with the skills these roles will require.

Based on prior consultations with young people, the gallery aims to address those topics and issues that young people actually care about. After a visit to gallery, we hope that young people will recognise and value the impact that technicians have had on our world, and see how they too could become a technician, via a number of different career paths.

> **"It inspired me to think you can do anything in life. No matter where you come from, you can do what you want to do – not what people want you to do"**
>
> – Y10 STUDENT

Challenging stereotypes

The *Technicians* gallery highlights technical careers across four key areas – **energy networks**, **advanced manufacturing**, **creative industries** and **healthcare**. Within each area, young people will get to discover a variety of technical jobs, learn about the people performing the roles in question and explore the skills required in such roles, by trying their hand at a range of interactive challenges.

These include learning how to operate a robotic arm, making lifesaving medicine and re-enacting the role of a lighting technician on the set of Marvel's *Black Panther*. Students can also take part in an interactive careers quiz to find out what technical roles their existing skills and interests might lend themselves to. More than a hundred job roles are featured in the quiz, presented alongside useful details such as starting salaries, entry requirements and job availability.

If young people are to successfully imagine themselves working in a technical role, then it's vital that they have opportunities to meet people already doing those jobs. Students can do this at the Science Museum's free, 60-minute *Careers Uncovered* sessions, where they will have the chance to meet and connect directly with professionals working in technical roles.

During *Careers Uncovered* events, the Science Museum partners with organisations working within the STEM sector. Representatives of these organisations are invited into the gallery to deliver hands-on activities that showcase their work, and speak with young people about what it's like working in a technical role.

Meeting Gatsby Benchmark 5, *Careers Uncovered* presents an opportunity for young people to ask questions, discover their own skills and explore how they might be applied in a technical role. So far, the

Science Museum has partnered with organisations such as the Environment Agency and the Fragrance Foundation, which have presented young people with unexpected applications of STEM skills and fascinating glimpses into the world of technicians.

It's well known that many young people struggle with misconceptions around jobs in STEM; that they're solitary, only for the academically gifted or '*important, but not for me*' (see bit.ly/TI24-T3). Through *Technicians: The David Sainsbury Gallery* and *Careers Uncovered* sessions, the Science Museum is challenging these stereotypes.

Inspiring aspirations

Technicians are critical thinkers, and will regularly work together to solve problems creatively. All sorts of people become technicians, and will go on to work in a diverse range of settings – from nuclear power stations and farms, to factories and film sets. The skills they develop and use in their careers are moreover transferable to many other roles.

To encourage young people to aspire to become technicians, they'll need to know about the different routes in. There are many different technical career pathways, and the abundance of choice can be overwhelming. Post-16, there are A Levels, T-levels, and apprenticeships. For 18+, there are an array of university and Higher Technical Qualifications to choose from.

At *Technicians*, students can learn about the different entry routes for multiple roles, while in *Careers Uncovered*, they can find out more by talking to people who have previously travelled those career paths and experienced those roles first-hand.

In our evaluation, young people and teachers at KS3/4 find that the *Technicians* gallery creates an awareness of previously unfamiliar STEM professions. Young people value the opportunity to speak to STEM professionals, and feel inspired to find out more.

By meeting and connecting with technical professionals, and discovering the wealth of diverse roles across many different sectors, we hope that young people can more easily see themselves as technicians in future, and better understand the steps needed to make that happen.

> **"It was an informal environment ... [the students] did not feel intimidated or shy. It was a very inclusive and safe space to get involved"**
>
> – TEACHER

ABOUT THE AUTHOR
Jamie Sloan is Schools and Families Manager at the Science Museum Group

SCIENCE MUSEUM

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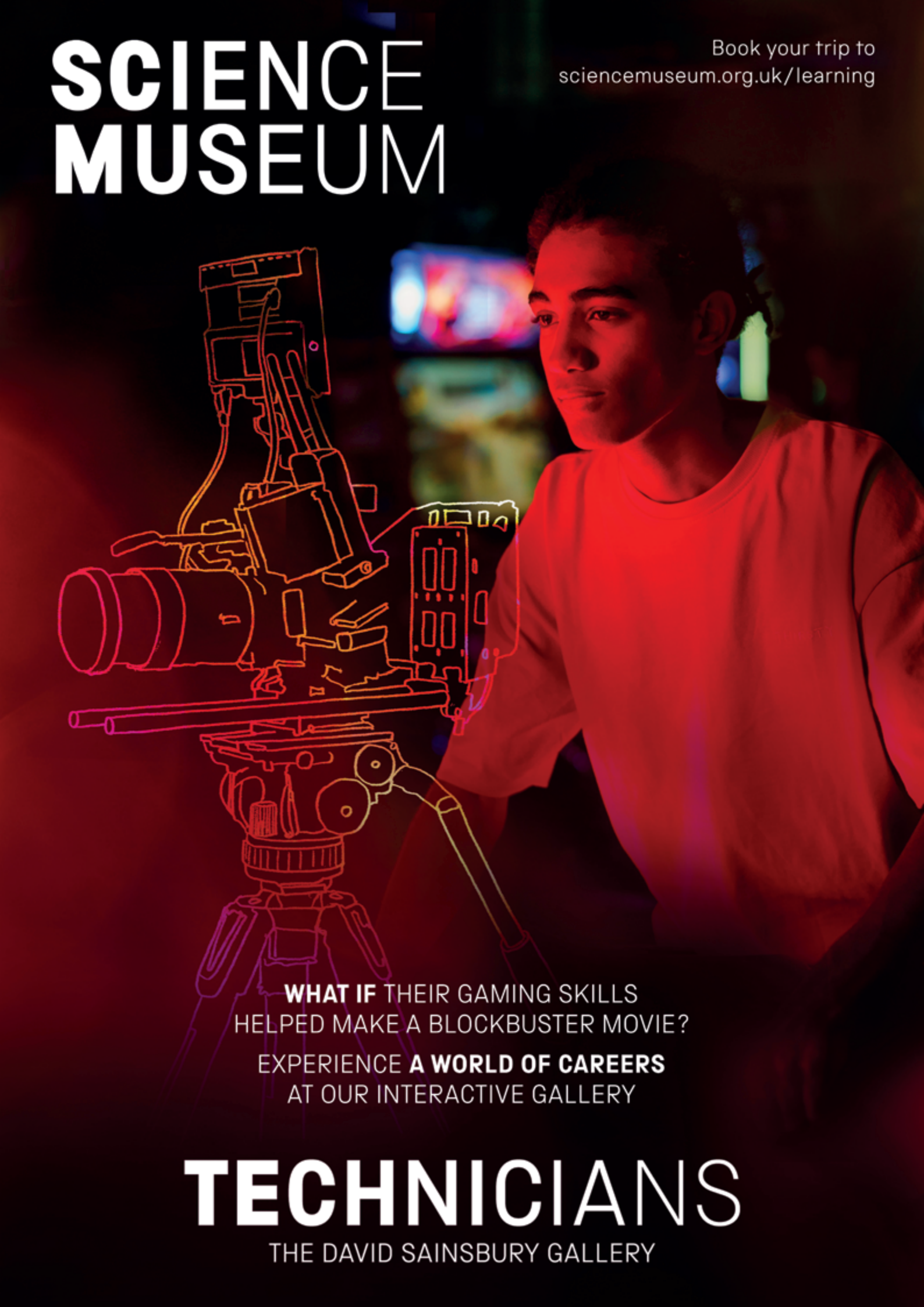

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A curriculum for what?

Meena Wood considers whether the government's current curriculum priorities risk being overtaken by wider societal trends...

One of the earliest actions taken by the current government was to commission a wide-ranging Curriculum Review overseen by Dr Becky Francis – who has been quoted as saying, "*If we put anything in, we have to take something out!*"

It appears that this Review will be informed by existing thinking, based on seeing children as 'vessels' that we fill with knowledge. With Ofsted downgrading schools when children can't demonstrate that they retain the holy grail of 'sequenced knowledge', it would seem inspectors remain less concerned with children's 'soft skills' in applying what they have learnt.

AI on the rise

Set against that, however, is a recent survey commissioned by the outdoor education provider Inspiring Learning, which reveals that a third of 16- to 24-year-old employees lack key employability skills, with over a quarter demonstrating insufficient communication, resilience and problem solving skills in the workplace.

Elsewhere, research by Internet Matters has found that over half of all students regularly use generative AI tools for their schoolwork, yet two thirds of schools don't discuss with students their use of AI.

Nor is it just students turning to AI. Research by Teacher Tapp suggests that growing workload demands and ongoing teacher shortages have resulted in AI becoming an essential daily support tool, with some four in ten teachers making regular use of AI in their daily duties. This can include using it to craft quizzes, develop topical lesson plans and ensure that teachers' own questions are sufficiently inclusive and accessible.

Fresh perspectives

At this stage, we know that AI can be a valuable technological tool that enables iterative ideation and metacognitive reflection. AI tools can also support neurodiverse students, by helping them to structure workflows, devising study strategies and revision plans, and making otherwise overwhelming tasks much more manageable.

Moreover, if used carefully, ChatGPT can already present students with fresh perspectives, alternative viewpoints and persuasive arguments by playing the role of a virtual debating partner. Students can potentially interview 'Picasso', a rocket scientist or a WWI conscript, and thus draw on their literacy and oracy skills in the course of their history studies.

One history professor has successfully used generative AI to create a 'Black Death simulator', creating voices and observations that give students a more visceral sense of life during The Plague, and later events that subsequently led to the development of vaccines.

The key question

For all their promise, however, current AI technologies do remain highly prone to citing factual errors or creating instances of misinformation.

Critical and digital literacy skills, if structured into curriculum, can act as a bulwark against information overload and more irresponsible uses of AI, enabling students to sift knowledge, analyse sources and more confidently evaluate the accuracy of what they see and hear.

Taken together, the methods by which schools are already using AI seem to be paving the way for big shifts in teaching and learning – which in turn will have huge ramifications for how and what Ofsted will inspect in future.

The Curriculum Review's current approach seems to be 'Evolution rather than revolution' – yet the stark reality is that global developments in technology will inevitably filter through to our young people, whether we're ready to embrace them or not. If we want AI to evolve as friend, rather than foe, then a focus on teaching 'soft skills', combined with better classroom training and support for practitioners and students should be our priority.

Upskilling students so that they can be independent, resilient learners, and articulate critical thinkers with reasoning and problem-solving skills, is what will equip them for the future. The key question for our time is now surely, '*How can education best shape future generations of young people?*'

ABOUT THE AUTHOR
Meena Wood is a former principal and HMI, and author of *Secondary Curriculum Transformed - Enabling All to Achieve* (Routledge, £24.99)

Literacy in the DIGITAL AGE

21st century technologies are reshaping how we all read and write, observes **David Voisin** – so is it time to reconsider the modern definition of 'literacy'?

How detrimental has digital technology been to literacy?

Historically, of course, new technologies have often been blamed for corrupting and debasing language, despite not actually doing so. The Canadian intellectual, Stephen Pinker, once joked about this phenomenon, citing a humorous cartoon depicting two figures in ancient Egypt looking at engravings on a wall, while lamenting the gradual worsening of their hieroglyphic writing.

And yet, the latest set of worldwide PISA scores would seem to indicate a worrying drop in literacy rates that suspiciously coincides with the advent and subsequent growth of social media...

Exploiting the plasticity

Pinker has previously explained how reading erupted so suddenly within our social evolution that its mechanics had to be 'bolted on' to our existing brain circuitry. Even within the span of one individual's lifetime, the acquisition of literacy takes place at lightning speed.

As the literacy scholar and neuroscientist Maryanne Wolf observes in her book *Proust and the Squid*, an invention that took 2,000 years to emerge has to be taught to a child over a period of 2,000 days: "*Literacy changes our brains, which changes the life trajectory of a person, which changes society, which changes our species.*"

The ways in which younger generations have adapted to the digital age have been fast too, but we're now talking about exponential celerity. In his book *The Anxious Generation*, the American psychologist Jonathan Haidt employs the rather sombre term 'rewiring' in pointing out how the profusion of apps that have emerged from Silicon Valley and elsewhere exploit the plasticity of young brains, in effect permanently engraving said software into adolescents' vulnerable minds.

This window of opportunity – the teenage years – is a span of time in which we, as teachers, are able to witness first-hand the tremendous damage new technologies can wreak.

"Books nourish the imagination – social media force-feeds us distorted reality"

Time well invested

The expression 'reading for pleasure' is a misleading one. We don't *read for pleasure*, but we may well get *pleasure from reading*. People read very different things, and with very different aims – though as the psychology professor Daniel T. Willingham has pointed out, the problem isn't that teens don't like reading. It's that it simply isn't their first choice of activity.

The linguist George Lakoff has previously shown how language is imbued with metaphors – see how we 'spend' time, for example. Reading is thus time well invested, being an activity found to carry huge cognitive and social gains.

When it comes to social media, however, Jonathan Haidt talks about such activity in terms of 'cost benefit'. The damage it does stems not just from what the product offers, but in what it takes away from other activities that could potentially do more to benefit a child's development.

App designers use all the tricks in the psychology toolbox to activate young people's dopamine and get them hooked. In Maryanne Wolf's view, "*Most of our youth and children are the recipients of multiple distractions that continuously claim their limited attention.*"

Happiness in routines

But if digital technology can create dangerous habits, then it can also help educators foster healthy routines. In his book *Atomic Habits*, writer James Clear states that we "*Raise to the level of our goals and fall to the level of our systems.*"

Routines are key to success and happiness. Online homework platforms enable educators to help develop and monitor some of those routines. It's vital to inform parents how digital technology can be harnessed for learning, and how healthy ingredients such as sport, homework, social time and reading can be incorporated into children's daily habits. Indeed, it may be the only true remedy we have against the dangers of social media.

I would argue that the essence of literacy is best encapsuled in Mary Cassatt's painting 'The Reading Lesson' (see sidebar). Counter-intuitive though it may sound, at the core of reading lies a social act. Books can, and do help us socially. Rates of criminality and literacy are inversely correlated. Submerging ourselves in written fiction helps us to become more empathetic.

Jonathan Haidt has argued that the disembodied and asynchronous nature of online interactions harms a child's social development, in that emojis and 'likes' are poor substitutes for the complexities of real emotions and genuine human rapport. Books nourish the imagination. Social media force-feeds us distorted reality.

Making us human

Nor should we overlook that other vital aspect of literacy – oracy. A significant portion of the Canon originated in oral tradition. Drama, MFL and RE present great opportunities for enhancing students' verbal abilities and developing the so-called 'soft skills' of confidence and resilience.

With platforms such as X continuing to be awash with vitriolic posts, invective and ad hominem attacks, it's never been more important to teach our students to argue in a civil manner. Besides which, in an era of AI and bots, reading serves the purpose of making us more human.

Digital technology may help us waste time, but it can also help us spend it more wisely and facilitate reading in terms of both space and time. Carrying a Kindle or iPad is considerably less cumbersome than hefting a stack of physical books. Audiobooks can seamlessly enable reading to occur in the gym or on the bus (the cognitive processes involved being the same as those relating to physical books).

Books that read YOU

At an early age, the physical aspects of literacy become important – from the symbolic act of turning pages, to the development of fine motor skills for writing. Recent research has shown that cursive writing appears to deeply engage the brain in ways that support learning. Handwriting is an integral part of children's cognitive development, and even in later life, note-taking can be useful for helping us actively process information and synthesise our thoughts.

Where modern digital technology can really help is is during that initial phase of decoding – i.e. learning to read. Studies have shown that subtitles can subliminally aid in language acquisition, especially among reluctant or weak readers. Such is the quality of subtitles now on streaming platforms such as Netflix, they can even help viewers learn foreign languages.

I once heard someone say that '*The internet possesses all the knowledge but none of the wisdom.*' A key danger of online information is that its algorithmically-driven distribution feeds individuals' pre-existing biases, luring them into cognitive echo-chambers. It calls to mind a chilling pensée by the historian, Yuval Noah Harari: "*Soon, books will read you while you are reading them.*"

A formidable tool

And yet, when harnessed appropriately, the internet can be a formidable tool for learning. Audiobooks and carefully curated podcasts can bring world class intellectuals straight to your ears, whatever your class or social background. Teachers should be directing students towards such autodidactic learning opportunities.

So, does digital technology augur a dark future for literacy? Yes and no. I believe that digital technology will exacerbate the literacy divide yet further – not because it's intrinsically bad, but because it has the potential to be both good *and* bad.

Perhaps in an age of ever-present, information, 'literacy' will no longer refer to knowing *how* to read, but to knowing *what* and *when* to read.

The Reading Lesson by Mary Cassatt (1901)

21ST CENTURY LITERACY ESSENTIALS

- Delay the use of keyboards for writing
- Use physical books for deep reading and ebooks for research (and notes or highlights)
- Use audiobooks, podcasts and other audio media to create more time and space for language immersion
- Foster environments and routines that reduce social media use and increase cultural capital
- Promote social and 'embodied' literacy via oracy exercises and classroom discussion
- Develop children's theory of the mind via rich reading opportunities and careful curriculum design; expose them to diverse identities and experiences, as well as different opinions
- Teach critical thinking and civil dialogue

ABOUT THE AUTHOR
David Voisin is a head of MFL

A critical MISSION

Your students are more interested in the news than any generation before them – but how are they supposed to know which narratives to trust, asks **Nicky Cox**...

I was recently speaking to a friend of mine who teaches science at a North Essex state secondary. She's a seasoned educator, and not one who can easily be 'played' by her students.

So when she told me that the previous week, she'd spent a good five minutes of a Y11 revision session trying to persuade an utterly convinced teen that *'No, the Earth really isn't flat'* – to no avail – I knew this wasn't a case of opportunistic time-wasting.

That young person in question, who was on track for 7 to 9s in all her GCSEs, had 'done her research', and no amount of 'facts' were going to change her mind.

Dangerous information

As founding editor-in-chief of the UK's first and only weekly newspaper for children, you might expect me to be a champion of giving young people the facts, and I am, of course. But 18 years after launching *First News*, I'm now seriously starting to wonder whether that's enough.

Because I'll be honest – the sheer volume of information, unchecked and unfiltered, with which our kids are now bombarded on a daily basis is terrifying to me.

Children are introduced to smartphones at an increasingly young age, putting them before algorithms designed to serve up content that grabs user attention and encourages sharing. A process that also promotes misleading clickbait, conspiratorial rhetoric and harmful mis/disinformation.

The line between what's fun and edgy, and what's harmful and dangerous, is a blurred distinction that even adults can struggle to perceive. Mis/disinformation can range from satire and parody to dangerous conspiracy theories, producing outcomes that span the mildly irritating to extremely serious – even to the point of people dying.

Blurred lines

Back in 2018, the UK's Commission on Fake News and Critical Literacy in Schools found that only 2% of children and young people possessed the critical literacy skills needed to judge whether a news story was real or false.

60% of teachers surveyed at the time believed that fake news was having harmful effects on children's wellbeing in the form of increased anxiety, damaged self-esteem and skewed worldviews.

From what our readers tell us – not to mention what we experience as media consumers ourselves – navigating this volatile landscape is only getting more challenging. When politicians are presenting TV shows and social media influencers are pushing policy agendas – how are today's teens supposed to know which news source to trust?

Literacy is rightly championed, along with numeracy, as a priority for our education system; but what about critical literacy? I believe that equipping children with the knowledge and skills needed to separate trusted sources from dubious ones – identifying bias and agendas, and triangulating data to create as accurate a picture as possible – should be woven into any curriculum designed to do more than simply enable students to jump through assessment hoops.

> ***"If a school really is 'Good', shouldn't its pupils leave with a healthy level of scepticism towards things they're being asked to accept and believe?"***

Whether you're of the opinion that 'critical literacy' should be taught as a discrete subject or not, I'm sure few would argue that simply absorbing prescribed chunks of information in order to regurgitate them later, on demand, represents a truly meaningful and empowering learning experience.

Healthy scepticism

The good news, which will come as no surprise to teachers, is that the skills required for critical literacy

are already being developed in classrooms everywhere.

Right from the first time they tackle a multiple-choice question with deliberately plausible wrong answers, through to 'guesstimating' the solution before using a calculator, examining the historical contexts in which plays, poems or novels were written, and replicating age-old experiments in science labs to see whether the conclusions still stand, pupils are taught, over and over, to *check their work*.

I wonder, though, whether this aspect of teaching should be made even more explicit, or even somehow worked into accountability measures. If a school really is Good, or even Outstanding, shouldn't its pupils leave with a healthy level of scepticism towards the things they're being asked to accept and believe?

I'm not suggesting there should be endless debate around every single name, date or equation presented for students to learn (although, my most memorable lesson ever was when our brilliant Y6 maths teacher cut a paper circle into segments, then rearranged them in a rough oblong by way of proving Pythagoras' theorem to us – so much more powerful than just committing the formulae to memory).

Rather, it's about consistently encouraging students to reinforce their learning independently, evidence their opinions and question their sources. Exactly what I expect, in fact, from every journalist writing for *First News*.

Knowledge may well be power, and the transfer of it is absolutely the core business of schools, but I'm convinced that being able to separate the truth from an attractive or convincing falsehood is a superpower to which all our young people should be entitled. And that it should be a priority for everyone involved in education.

Because the more teachers are able to address this – in corridors and playgrounds, as well as classrooms – the harder it will be for bad actors to persuade people, of any age, that the Earth is flat. Or worse.

3 CRITICAL LITERACY ACTIVITIES

1 Organise the students into groups, giving each a different page or spread from a suitable newspaper. Ask them to decide together which of the stories they can see is the most interesting/important/credible, then rotate the groups and repeat the exercise until all have seen every page. Discuss their choices as a class, insisting that they justify them where necessary. Has anyone changed their mind? Why/why not?

2 Share a selection of short news articles with the headlines removed and ask students to come up with appropriate titles. For an additional challenge, specify the target audience of the publication. This exercise can also work in reverse, with learners trying to predict the content of a story (and again, for extra challenge, the intended audience) from the headline alone.

3 Find coverage of the same story from a variety of newspapers. Ask the learners to compile a list of similarities and differences between the reports. Are there any details which are exactly the same, regardless of the publication? Which 'facts' do they trust, and why? Can they think of any ways in which they could confirm their choices?

ABOUT THE AUTHOR
Nicky Cox MBE is editor-in-chief of *First News*, a weekly newspaper for readers aged 7-14. To find out more about the paper and its accompanying free resources, visit tinyurl.com/TSFirstNews

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IBM SkillsBuild's AI resources provide teachers and students with a foundational understanding of artificial intelligence, including natural language processing, ethical considerations and practical applications. Developed with input from tech and education experts, these resources allow educators to lead dynamic discussions on AI's impact. Students can engage in hands-on projects, such as building chatbots or programming virtual robots, making AI education accessible, exciting and relevant. Empower your students to understand and shape the future of AI.

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In partnership with the University of Oxford Mindfulness Centre, IBM SkillsBuild presents a range of mindfulness resources that help reduce stress, lower anxiety, and boost learning. These free, easy-to-follow resources teach foundational mindfulness concepts and provide practical exercises that can be integrated into daily routines. Teachers can use these tools to help students build resilience, improve focus and develop greater self-awareness. By incorporating mindfulness into the classroom, educators can create a more balanced and productive learning environment for all students.

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CLASSROOM INSPIRATION

Fresh ideas to take teaching and learning to the next level

THE AGENDA:

From A to B

Bethany Windsor explains why teachers should introduce their students to the richly rewarding, yet frequently overlooked careers available within the logistics sector

When they contemplate the future, students often don't think past the school gates. In fact, new research – based on a survey conducted by Generation Logistics via TLF – reveals that 55% of young people don't know what they want to do when they finish school.

Having such little understanding of the different career opportunities available to them can result in young people feeling overwhelmed and confused when thinking about their careers. The good news, however, is that there is easily accessible information out there concerning the different career opportunities students can pursue, to support their decision making. That's where Generation Logistics comes in.

Accessible and available

As an awareness campaign created by Logistics UK and the Chartered Institute of Logistics and Transport (CILT (UK)), with backing from leading businesses from across the sector, Generation Logistics aims to raise awareness of the many opportunities and benefits that careers in logistics can offer the next generation of talent.

Logistics is often overlooked as a potential career, despite offering fantastic opportunities for those with many different skill sets and preferences – particularly within the technology sphere.

Unfortunately, many young people simply don't know what 'logistics' is, and what the sector involves. And they're not alone, with research indicating that over 90% of the UK has never considered a career in logistics.

How many know, for example, that a fully qualified HGV driver can earn £50,000 a year while using some of the latest technology available in transport? And they're almost certainly in the dark regarding the depth and diversity of the sector; the operational gurus, the sustainability specialists, the robotics engineers, the digital technicians and infrastructure experts. These roles are accessible and available – very often with clear progression pathways, great salaries and extensive on-the-job training.

> **"Many young people simply don't know what 'logistics' is, and what the sector involves"**

Career goals

How often has logistics come up in your career chats? Has it ever been mentioned at school or college as a possible career route? Likely not, but Generation Logistics can help.

Firstly, we need to identify exactly what young people are looking for when it comes to their careers, and how the logistics sector measures up to their expectations of what makes a great job. Thanks to research from Generation Logistics, it turns out that a '*Good work-life balance*' is the most important consideration (69%), in joint first place with '*High rates of pay*' (69%) and closely followed by '*Something I enjoy / I am good at*' (63%). '*Flexible hours*' comes in as the fourth most important consideration (50%), with '*Job security*' landing in fifth place (42%).

Given what young people seem to be looking for, we need to identify why logistics could be the solution. With its wide diversity of career paths, logistics is a sector that sits at the forefront of advanced technological developments, offering roles that relate to robotics, autonomous vehicles and last mile delivery solutions, to name just a few.

Spanning skills in digital technology, engineering and everything in between, logistics is calling out for young people who can manage everything from the apps customers use to track deliveries, through to the automated robotics found in warehouses.

Focused as they are on sustainability, automation and continuous improvement, logistics companies know that training and development for those that will lead the charge is essential. If you're still not convinced as to why you should encourage your class to learn more about logistics as a career path, there are plenty of other reasons – such as the ones below.

Why enter logistics?

1. Progression

In any career, your prospects matter. Young people want to know that they're going somewhere. Logistics has a culture of promoting from

within, with employers cherishing daily on-the-job experience, thus fuelling long-term ambition. Young people might join the sector at an entry level position straight from school, or perhaps consider an apprenticeship or graduate role. Regardless, there will be plenty of opportunities for them to learn, train on the job and grow into a new role. Today, warehouse operative – tomorrow, CEO.

2. Purpose
Logistics keeps the world moving. It's not just an important sector but an essential one, focused on moving anything and everything anywhere and everywhere – to the right place, at the right time and for the right price.

Beyond bringing parcels to your door and shipping cargo around the world, it's also about getting food on shelves, and delivering medicine to the sick and aid to the needy. Logistics is an area where the impacts are real, every single day.

3. Reward
Logistics is a profession that rewards effort, talent and attitude. Salaries in logistics are highly competitive, particularly for those with specialist skills, and yet it's a sector with a skills shortage – representing an opportunity for young people to step in and step up at pace.

Those progressing to senior positions (regardless of their starting point) can earn well into six figures, but the rewards aren't just financial. There's also the people they'll be working alongside, the excitement of a developing career journey in a growing sector, and the impact they'll see themselves making on the world.

4. Innovation
Modern logistics is all about innovation; using cutting edge technologies to find ways of doing things better, quicker and more sustainably. As well as being a brilliant sector for those seeking career progression and personal growth, it's also a career for those wanting to push the boundaries of what's possible, be it game-changing delivery tech, or decarbonisation of the supply chain. Bright ideas and new ways of thinking are always welcomed.

5. Diversity
A sector as diverse as logistics needs a diverse workforce. The greater the diversity of people, the greater the diversity of the skills in the sector, the healthier and more effective the sector will be.

Because of that, you can be sure that logistics is somewhere where your students' talents will be appreciated, where their skills will be developed, and where their ambitions can be realised.

Qualifications and pathways

With so many different areas of work, you might be thinking that specialist qualifications would be the order of the day.

Getting relevant qualifications is a good idea, but in logistics that generally happens on the job. Most of the job families listed above have entry level positions open to those without specialist qualifications. It's much more about attitude and ambition, with the result that having an interest in, or indeed passion for the sector goes a long way.

That said, apprenticeships (and degree apprenticeships), summer internships, placement schemes and graduate schemes can all be great starting points from which your students can begin to pursue a career in the sector.

ABOUT THE AUTHOR
Bethany Windsor is the Programme Director of Generation Logistics – a national, sector-backed campaign designed to raise awareness of the career opportunities available to young people within the logistics profession; for more information, visit **generationlogistics.org**

LOGISTICS IN THE CLASSROOM

If you're interested in introducing the sector to your class, these resources can help you get started...

Education Hub
Providing FREE curriculum-mapped resources for 13- to 18-year-olds, the Education Hub is designed to support education professionals as you mould the next generation of logistics talent. Featuring engaging downloadable lesson activities, student-ready tools and many other resources, the Hub can provide the information and support needed to help you raise awareness of logistics as an exciting and viable career path. There, you'll also find a request form for our Ambassador Programme and a downloadable Careers Booklet.
educationhub.generationlogistics.org

Ambassador Programme
Logistics is a great profession, but don't just take our word for it. You can request a Generation Logistics Ambassador to visit your school or college and deliver a talk on their experiences of working within the logistics sector – and why your students should consider this pathway, too.

The Careers Booklet
The Generation Logistics Careers Booklet presents a detailed outline of what the modern logistics sector looks like, as well as the career prospects available to young people today. It also breaks down the key areas of logistics, and includes case studies from logisticians (both junior and senior) currently working in each and every area – with details of salary bands – for curious minds.

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AGES 11-14

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https://www.ncsc.gov.uk/collection/cyberfirstnavigators

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National Cyber Security Centre
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5 REASONS WHY... NCSC Resources

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1 AN INTERACTIVE LEARNING EXPERIENCE

Our suite of resources are designed to engage and educate 7- to 11-year-olds and 11- to 14-year-olds with issues around online security. At the heart of each is a digital resource that brings the concepts to life, making the learning hands-on, interactive and relevant. Best of all, it's completely free!

2 THREE READY-TO-USE LESSON PLANS

Our digital resources are complemented by a collection of three convenient lesson plans, which build upon the concepts introduced in our interactive game and film. Students are given opportunities to explore the information and apply guidance across various activities, while deepening their understanding. Each lesson plan includes a PowerPoint presentation, along with all the necessary resources you'll need to get started. We hope they will allow you to create meaningful learning experiences with ease.

3 PRACTITIONER RESOURCES

The lesson material is accompanied by our comprehensive practitioner resources, which are packed with valuable background information to support your delivery. The content includes subject matter glossaries, FAQ answers and curriculum mapping for all four nations, together with clearly defined learning objectives and outcomes.

If the content in our packs works well for you, or if there is room for improvement, please help us refine the resources and make them even better by sharing your thoughts via the form available at forms.office.com/e/dissCBqkyx – we really appreciate your feedback.

Contact:
@ncsc (X)
@cyberhq (Insta)
ncsc.gov.uk

4 DON'T JUST TAKE OUR WORD FOR IT!

Our online game for KS2, CyberSprinters, has been recognised with three awards at the Learning Excellence Awards. Teachers also have shared positive feedback with us, describing it as an easily accessible resource for online safety lessons, and a valuable tool for child-led learning. In a survey of over 400 students, an impressive 85% felt more confident about cyber security after playing the game, while 87% expressed a heightened awareness of the importance of cyber security. Following a taster session for our recently launched KS3 resource CyberFirst Navigators, students commented on how much they'd learnt about the need to create secure passwords and why doing so is so important.

5 PSHE ASSOCIATION QUALITY ASSURANCE

The resources map to the UK Council for Internet Safety's 'Education for a Connected World' framework and there are also clear links to the computing curriculum. However, we see the quality assurance we've received from the PSHE Association as recognition that the internet is now an integral part of everyday life, making cyber security a crucial component of young people's personal and social education. This collaboration also means that our resources have been overseen by experienced educators, ensuring their effectiveness in live teaching settings.

Key Points

- **View and download these free teaching resources, plus supporting activities for use at home, via the NCSC website at ncsc.gov.uk/cyberfirst/resources**
- **Teachers can enjoy the flexibility of being able to deliver the content as part of either the PSHE or computer science curriculum**
- **With their focus on cyber security, these resources provide a unique angle from which to support young people's grasp of online safety**
- **Developed by both the UK's national technical authority on cyber threats and the PSHE association, thus combining subject expertise and educational expertise**

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5 REASONS TO TRY... HUE HD Pro

Convey visual concepts and livestream lessons more easily with this compact and flexible visualiser

30 SECOND BRIEFING

The HUE HD Pro is an award-winning, 1080p plug & play visualiser with a flexible neck, integrated microphone and LED lights, and comes supplied with a USB Type C adapter and black or multicoloured carry case.

1 AN ESSENTIAL FOR ANY TEACHER'S TOOLKIT

Tired of expensive, complicated classroom technology that doesn't get used? Then say hello to the HUE HD Pro document camera/visualiser.

This colourful and affordable edtech tool enables teachers to implement the key instructional strategies that underpin effective classroom teaching and learning, such as sharing worked examples and daily review.

A perpetual single-user licence for the HUE Intuition software is also included. It can be installed on multiple computers for capturing photos, recording videos, annotating images and online streaming.

2 FLIPPED, BLENDED OR HYBRID LEARNING

The camera makes it possible for teachers to project a video feed onto any standard whiteboard or interactive display in class, whilst simultaneously livestreaming lesson content to remote learners. The lesson can also be recorded for flipped learning, daily review and revision, or sent to students who are absent from class. This helps teachers to save time and reduces the likelihood of lost learning.

By recording and sharing lessons, demonstrations and experiments as videos, students can pause, rewind and learn at their own pace.

3 MODELLING MADE EASY

Whether or not you subscribe to the theories of '*Building thinking classrooms*' or '*I do, we do, you do*', at some point students will need to see how the 'magic trick' is done before the scaffolds are removed.

With the HUE HD Pro, teachers can share exercise books, worksheets and real-world objects to model mathematical equations, practical demonstrations, literary analysis or revision techniques from their desk, while facing and engaging every single student.

Contact:
huehd.com/contact
@HUEcameras (X)

4 LIGHTWEIGHT AND PORTABLE

Small and lightweight, the camera now comes with its own custom-built shockproof carry case to provide teachers with an ultraportable solution when moving between classes, or when relocating from class to home for remote teaching.

The camera's flexible neck can be rotated 360° for a multitude of uses right across the curriculum. Angle it straight ahead for use as a facecam, position it downwards to view documents, or bend the neck in real-time while examining objects.

5 SHOW STUDENTS THE BIGGER PICTURE

With a focus range of 1cm to infinity, and a lens which can capture a full A3 page, the HUE HD Pro can additionally be used as a simple microscope, or to record student presentations in the classroom, displaying everything in crystal clear high definition.

This makes it ideally suited for activities such as practical science demonstrations, where it might be difficult or even dangerous for everyone in class to watch at the same time.

Another helpful function of the camera is that by using it to enlarge text or small objects, students with SEND and/or visual impairments can participate more fully in lessons.

Key Points

Easy to use – Full HD 1080p, Plug & Play, USB visualiser. No installation or training required. Compatible with Windows, macOS, Linux and Chrome OS.

Interoperable – Use with IWBs, a wide range of software and browser-based apps, including Zoom, Google Meet, Teams, Flip, and the Windows and Chrome 'Camera' app.

Accessible – students find it easy to engage with and use the camera. By enlarging text, those with visual impairments can participate in classroom activities.

Affordable – Priced at £59.95 + VAT, with a 3-year warranty included as standard. Visit huehd.com/schools for bulk purchase discounts.

Achievement UNLOCKED

We can bemoan the amount of time students spend playing video games – or, as **Morgan Owen** points out, we can embrace the lessons they have to impart around storytelling...

By the time a gamer has won the final boss battle and saved the world from ruin, they'll have been on a long narrative journey. They'll have made friends and foes, experienced victory and defeat. The player is embedded in the story – not just as a passive spectator, but as an active protagonist.

In an era of shortening attention spans, ever more digital distractions and a growing list of reasons as to why we might all occasionally want to escape reality, it's hardly surprising that many young people now prefer gaming to reading.

Games allow us a degree of control in a world that sometimes gives us none. As games become yet more immersive in the future, books may struggle even further. Yet fighting against this is futile, when there's a better option – *embrace it*. Because video games are just another form of storytelling. The key difference is that in games, readers are being invited to take part in the action.

Fluid masterpieces

The majority of games take place in fantasy worlds, complete with casts of characters and plots that gradually unfold through dialogue and dramatic cutscenes, while also leaving some room for personalisation.

Whether the ending is a happy one or not will often be down to the player's efforts. There's typically going to be a story arc that's destined to be resolved, but those small, player-driven differences help make the story fresh, vivid and exciting to uncover.

Where a good book is an immovable piece of art, a good game is a fluid masterpiece. Ever since the days of Choose Your Own Adventure books, readers have enjoyed 'interactive stories' built around multiple paths and endings. Games create a unique experience by combining multiple plotlines with audience participation, which is what makes gaming such a compelling activity.

> **"Everything that makes for a good story also tends to be present in the most widely admired games"**

Collaborative works

Everything that makes for a good story also tends to be present in the most widely admired games. Modern titles can be vast in scope and complex in their construction, boasting subplots, distinct acts and arcs. They will have foreshadowing and plot twists. There are many gamers who will have wept at the death of a non-player character (NPC) or raged at the injustice of a villain's wrath.

The stories in some games can touch on poignant or powerful themes, such as tyranny, environmental destruction or the duality of human nature – themes made all the more impactful because the player is involved. They are present and consequential.

A game's writers and designers will lead the player on a journey of discovery, but it's really a collaborative work. Those making the game rely on the player to be curious, ask questions and explore in order to fully experience the story as conceived. This complexity of choice only adds to the overall immersive effect.

Characters and world-building

Games are also a great tool for teaching students about character development, dialogue and world-building. Most role-playing games have a character creation tool that lets players create their own box-fresh pixel person. In *The Sims 4*, players choose their character's appearance and clothing, but can also assign them certain personality traits, likes, dislikes and aspirations.

Whenever I start a new story, I'll usually recreate the characters I've made for that story in *The Sims*. This serves as a useful visual reference, but can also be a way of exploring their personalities. By hitting 'play' and letting them flex their Sim free will, I'm allowing for developments that might help make them feel like a full person, complete with flaws and idiosyncrasies.

Another fun task is to decorate a Sim's virtual room as a character would – choosing specific items to represent them and imagining how they'd spend their free time. This activity can be used for world-building too – *what does your own bedroom say about your reality?*

The room of someone living in a dystopian society will be very different to that of someone living in a fairytale kingdom. You could then build out from that initial room to create a house, a street or even a whole town. By building a fictional city brick by click, you can come to a better understanding of how it might actually work, stepping directly into your own story's setting.

Possibility spaces

Games like those in Nintendo's long-running *Legend of Zelda* series are Tolkienesque in their world-building scope, crammed full of unique trades, objects, creatures, locations, philosophies, mythologies and centuries of accumulated lore.

Even a nominal first-person combat

game like *Bioshock* can draw on a rich heritage of storytelling to support its gameplay. Peeking at the inventory of items a player has gathered can tell us lots about the world of the game and the player's role within it, since every piece of the puzzle will have been designed to tell a story.

Games ask you to navigate maps, collect treasures, use tools and find creative solutions to problems – but it's the fertile ground they provide for exercising the imagination that's perhaps their most beneficial feature.

Sophisticated open-world role-playing games like *Skyrim* are so rich with possibilities that they're as good as sitting down with a pen and a sheet of paper and being asked to write a story. Even comparatively 'simple' games like *Animal Crossing* can be a blank canvas upon which to create whatever you like.

Storytelling gifts

To be clear, nothing can replace the experience of reading a book – but sadly, not everyone enjoys it as an activity. Many reluctant readers struggle with exercising their visual imagination or concentrating. They may be interested in storytelling, but simply prefer to explore it in a different medium.

Technology will continue to rapidly advance and change society in ways we can't predict. Audiences are diversifying, with media becoming ever more tailored to the interests of individual viewers and players. Within a few decades, the line between books and games may become blurred. We might one day see a VR edition of *The Hunger Games* that lets readers compete alongside their favourite characters.

Until then, video games can be embraced as a fun and accessible way of nurturing important storytelling skills, because gaming isn't just an interactive story experience – it's a gift to storytelling, not a threat to it.

ABOUT THE AUTHOR
Morgan Owen is an author; her latest book, *The Boy with the Haunted Heart*, is available now (£8.99, Scholastic)

5 EXERCISES

1 *The Sims 4* base game (without optional add-ons) is available to play on PC for free. Use the character creator to build the protagonist of a story – a character that you've invented. Choose a relevant aspiration and three personality traits from the menu the game provides. Think about how their facial features, walk style, voice, clothes and accessories will express their personality. As an additional task, decorate a bedroom for this character.

2 In the game *Animal Crossing*, players can travel to a location called Harv's Island to stage a photo shoot. A tutorial teaches you how to use props, costumes and villagers as extras when setting up a scene. Take three pictures – one to represent the beginning of a story, one for the middle and one for the end. Use these photos like panels in a comic strip to create and illustrate a short visual sequence without using any words.

3 Describe the contents of your inventory in a video game you're currently playing. Think about what the objects represent and how they function within the game's universe. Then write a scenario in which your character uses one or more of these items to create a positive change in the world.

4 Write an essay about the fictional kingdom of Hyrule, the setting of the *Legend of Zelda* games, as if it were a real place. You don't necessarily need to know the games, since there's plenty of reference information about it to be found online. Summarise its culture, mythology, biology, geography and history, before concluding with a paragraph comparing it to our own world.

5 Write a short story with three different endings, depending on the actions taken by your character. For example, what would happen differently if they stayed to fight the villain, ran away from the villain, or attempted to befriend the villain?

READY FOR LAUNCH

Sophie Allan explains how classes can be inspired and enthused by context-led learning – especially when the topic at hand is out of this world...

Powering Rovers on Mars. Keeping humans alive in space. Protecting spacecraft from the heat of atmospheric re-entry.

These are all exciting and engaging topics that can capture the imagination of students – and with a bit of creativity, they can also be perfect vehicles for teaching radioactivity, gas laws, kinetic theory and thermal transfer.

For the last 15 years, I've tackled the wonderful challenge of bringing the information and skills needs of the secondary science curriculum to life for students across the UK using the inspirational and engaging context of space, and the rapidly growing UK space sector.

From one-day masterclasses, to entire A Level schemes of work, I've had the freedom to get creative in my planning. Though sometimes challenging, this has allowed me to get excited and passionate about the lessons I'm delivering.

It can be quite difficult at first to identify the 'hooks' and links with which to build a contextual curriculum, but with a little research and practice, it soon becomes second nature.

Everywhere you look, there's inspiration to be found. Teaching spectroscopy? That's how we identify what makes up a comet. Doing an inverse square law practical? Why not use that to explain the limitations of solar power for deep space missions? Studying moving charged particles in magnetic fields? That's the origin of the aurora and geomagnetic storms, and a wonderful opportunity to also discuss induced currents!

With a little thought and planning, these contexts can make students' learning more meaningful and relevant to their daily lives.

Aspirational examples

Our Space Engineering students certainly agree. These post-16 students follow an enhanced A Level programme consisting of A Level physics, A Level maths and a two-A Level equivalent BTEC in engineering, with much of the course delivered using contextualised space learning. Our student retention is high, with excellent results and incredible progression.

74% of our students later progress to a degree, mostly in engineering or physical sciences. 12% go on to a degree apprenticeship within engineering and 10% go on to level 5 apprenticeships or qualifications. Many also progress immediately into employment, often with local engineering and tech companies.

At exit interviews and through extensive longitudinal follow-ups, time and again our alumni show that the engagement, interest and aspirational examples used within our curriculum not only kept them focused during their studies, but also empowered them to select a path that they knew aligned with their interests and passions.

Of course, many teachers already incorporate a range of contexts within their learning. At heart, we're passionate, creative people who want our students to engage with the subjects we so love. What I'm keen to emphasise is that by extending this approach to an entire topic (or even a whole curriculum), and by making the context the leading factor, rather than an afterthought, you can drive meaningful engagement while improving your own teaching experience at the same time.

Make it happen

Writing a context-led lesson plan, or even a whole scheme of work,

> ***"By making the context the leading factor, rather than an afterthought, you can drive meaningful engagement"***

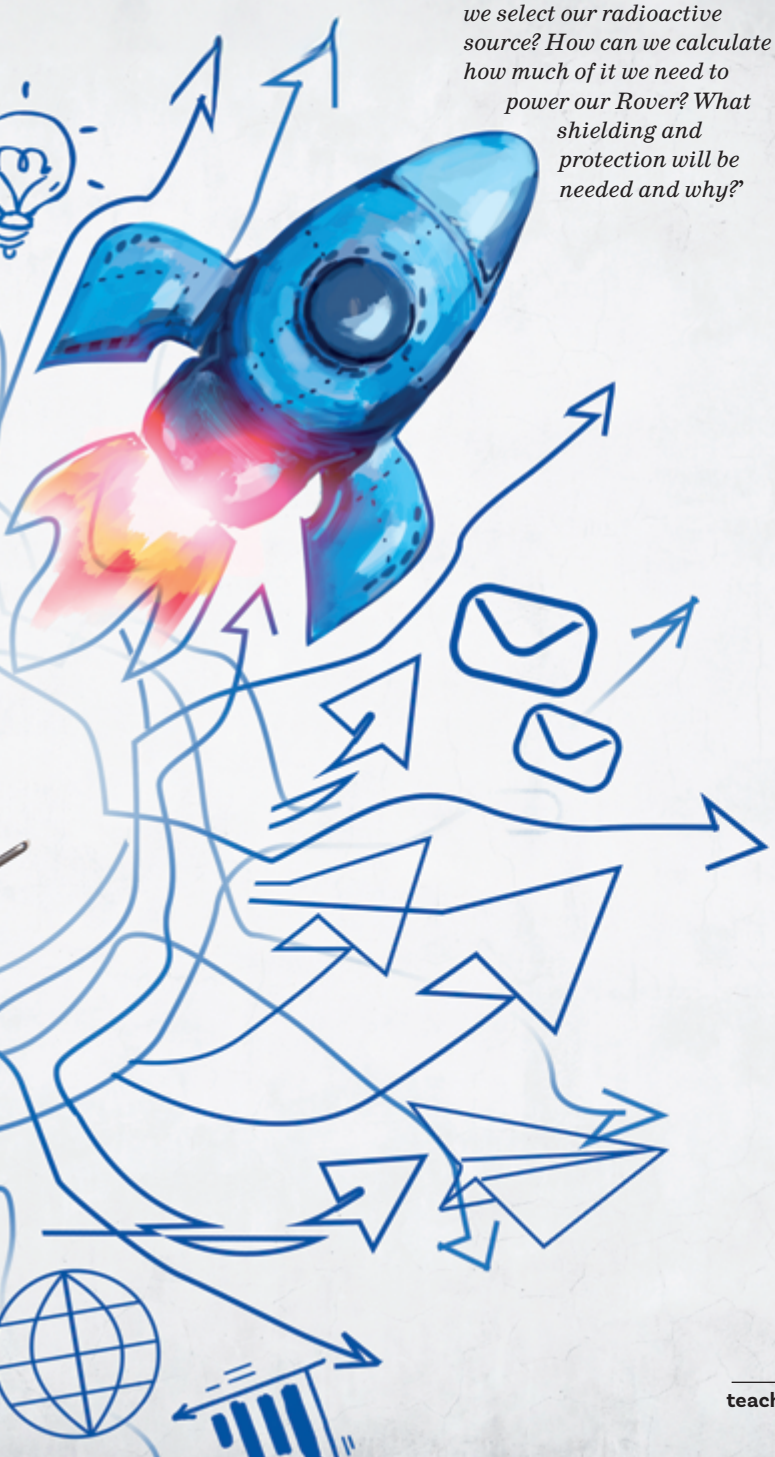
takes some effort – so for anyone interested, here are some tips.

1. Get your department on board!
Show your colleagues some past examples of successful context-based learning, so that they can see it's an approach worth trying.

2, Start small
Choose one topic to write a scheme for. When teaching cells, adaptation or enzymes, for example, you could use the ongoing search for alien life as your context. What might alien cells look like? How might alien life adapt to survive on a distant exoplanet with higher surface gravity than Earth?

By looking at the most extreme forms of life on Earth – such as those that thrive in the boiling hot acidic pools of Yellowstone Park – you could potentially identify the kind of life one might encounter in Venus' acidic, hot atmosphere.

3. Begin with a question
When teaching radioactivity, our overarching question will be, '*How can we power our Mars Rover?*' Individual lessons can then have their own sub-questions – '*How do we select our radioactive source? How can we calculate how much of it we need to power our Rover? What shielding and protection will be needed and why?*'



4. Maintain a local focus
Research your locality to see if there might be any themes you can tap into. Is there an industry that's particularly strong in your area? Maybe there are some interesting landmarks or parks you can use for examples? Get your students involved by asking them what they're interested in, and identifying any key questions and concerns they might have, thus increasing their buy-in and connection to the lessons.

5. Don't reinvent the wheel
There's an abundance of resources produced by institutions specialising in a particular subject. Universities and research organisations will often produce free resources aligned to their research and development, which can serve as a useful starting point for your own explorations.

If you find a site with numerous high quality resources relating to one particular topic, you could build your scheme around these. We have a wealth of free-to-download classroom resources that we would love more schools to incorporate into their schemes of work!

6. Highlight role models
These could be individuals who are cited within your lesson resources, or people you've asked to come in and give a talk.

More companies now showcase their employees' work and sector-relevant career pathways via their websites, so find a name, get a picture (and maybe contact them for more information), and show students that the science they're learning can lead to some interesting jobs – some of which they may have never even heard of before!

We have a range of free careers videos available at **nationalspaceacademy.org/careers/career-resources** for any schools using space exploration as a context. It's also worth contacting university outreach leads and local companies for potential speakers, so that you can bring your context further to life with an actual face and contextual experience – or you could arrange for a STEM ambassador to visit your school.

Students can't aspire to roles they don't know exist; highlighting such roles within your resources, even in small ways, can have a really meaningful impact.

Most importantly, start with something that engages you – a news story, the topic you enjoyed most at university, something that's recently caught your interest in a podcast. If you, as the teacher, find yourself truly engaged with it, then you'll want to put in the legwork of identifying and possibly developing resources you can use in class. Having done this for one topic, others will then follow more easily.

ABOUT THE AUTHOR
Sophie Allan is head of teaching and learning at the National Space Academy

LIFT OFF

Commence your journey into space exploration by checking out these recommended links:

National Space Academy Resources
nationalspaceacademy.org/what-we-do/i-am-a-teacher

National Space Academy 'Space to Learn' funded in-school workshops nationalspaceacademy.org/space-to-learn

NATIONAL SPACE ACADEMY

SPACE TO LEARN

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Enrich your students' science education with our free sessions, which use the exciting context of space to bring science to life. Our sessions are delivered by specially-trained experts in schools across the UK or at fantastic relevant venues.

WHAT WE OFFER

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- Careers Conferences
- In-school workshops
- Sessions are curriculum-linked
- Travel bursaries are included

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REASONS TO TRY...

5 Space to Learn science workshops

Free in-school sessions to support your science curriculum

30 SECOND BRIEFING

Space to Learn, delivered UK-wide by the National Space Academy, brings expert teachers into your classroom, delivering hands-on, curriculum-linked physics workshops at no cost to your school, inspiring students to engage with science through the exciting context of space.

1 ENGAGING AND EXCITING LEARNING

Choose from our list of science topics and get ready for a workshop filled with hands-on learning, featuring everything from rocket science, to aliens and human survival in space.

Our teachers know how to get the best of out a class, and ensure that while your students have had an out of this world experience, they've also learnt real, relevant science that will support their curriculum learning – and hopefully inspire them to dig deeper into the ever-growing worlds of space and science.

2 DEVELOP SCIENCE CAPITAL

In a world where science is ever more important to our future, it's vital to get youngsters excited and engaged with STEM. Our workshops highlight the science, scope and possibilities within the UK space industry, and are delivered by qualified, specially trained teachers equipped with kit that includes real meteors, pressure suits and much more.

Masterclasses are closely linked to the curriculum, and feature thrilling, hands-on learning to ensure the students get actively involved – whether this is through conducting experiments, or even building and launching their own rockets!

NATIONAL SPACE ACADEMY
SPACE TO LEARN

Contact:
0116 258 2147
spacetolearn@spacecentre.co.uk
nationalspaceacademy.org

3 WE COME TO YOU

Our network of specially trained teachers is spread across the UK – we can't promise to get absolutely everywhere, but we'll make every effort to reach you!

This means less disruption for students, fewer logistical challenges and more time for science. All we need is a school science lab, a group of students who are ready to learn and we'll do the rest.

For students aged 11 to 16, we'll run two sessions in one day; for students aged 16+, we'll run a day-long session.

4 CAREER INSPIRATION

As secondary students consider their futures, it's vital to provide them with the knowledge and tools to choose the right pathways for them. Space to Learn includes career information designed to make students aware of the incredible breadth of jobs that the UK space sector offers. Our supplementary online resource package, Find Your Space, features in-depth interviews with people who took a variety of routes into the space industry, pursuing careers as varied as space lawyer, space engineer and space artist! Further details of these can be found at nationalspaceacademy.org/careers

5 IT'S FREE

We want to bring exciting opportunities to students who otherwise may not be able to experience them. Our Space to Learn workshops are fully funded which means they cost schools nothing. We also offer travel bursaries for our off-site events to ensure there are no limits to participation. We use a series of criteria to ensure priority is given to underserved students, although any school is welcome to apply. The criteria can be found at nationalspaceacademy.org/space-to-learn.

Key Points

We have availability for Space to Learn masterclasses throughout the UK until March 2025 – funding is limited, so please apply now

Space to Learn also offers non-residential Space Camps and Careers Conferences; learn more and find one near you by visiting nationalspaceacademy.org/space-to-learn

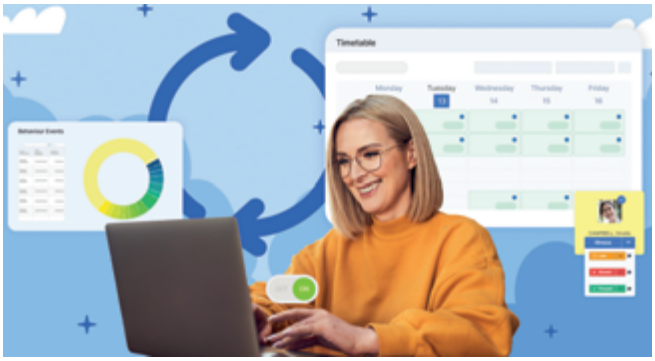
Space to Learn is funded by the UK Space Agency and developed by a team of experts, ensuring that your students receive high quality education

Priority is given to schools meeting eligibility criteria to ensure that underserved students benefit from the programme, but all schools may apply

ASK THE EXPERT

Tackling the MIS dilemma

If you plan ahead, switching your MIS can be smooth and straightforward, says **Ali Guryel**



Bromcom

1 DON'T SUFFER IN SILENCE

Switching your MIS can be a simple, safe and secure process, but it's important to leave yourself enough time. If you're thinking of putting it off until later in the year, you could find yourself battling for migration slots alongside thousands of other schools, or locked into a contract renewal with a MIS that's not fit for purpose. If your school or MAT is with a MIS provider that isn't meeting your needs, don't suffer in silence. It's better to switch to a solution now that's going to meet your long-term requirements and goals.

2 FOCUS ON OUTCOMES FIRST

Think carefully about how your current MIS is falling short, and how you want your new system to improve outcomes. Doing this early gives you more freedom and flexibility when choosing your start date, as well as more control over your MIS rollout. If you have a MIS that can adapt to your unique needs and greatly simplify administrative tasks, the time saved can be put towards initiatives that lead to better educational outcomes.

3 EXPLORE PROVIDERS

The first stage of the process is to decide on which solutions you want to explore and see in action, while identifying where your current MIS is falling short. This can usually take up to four weeks, and will involve talking to your colleagues – and maybe other schools – as you discover which features are required, before selecting the best MIS for your needs.

4 SET A REALISTIC TIMEFRAME

Your current provider will require a 12-week notice period, allowing plenty of time to prepare and begin onboarding discussions with your new MIS team. You will need to outline the timeframes involved, any requirements on the part of staff and your plans for managing the attendant risks. This can take, on average, a minimum of 8 weeks for primary schools and up to 12 for secondaries.

At a glance

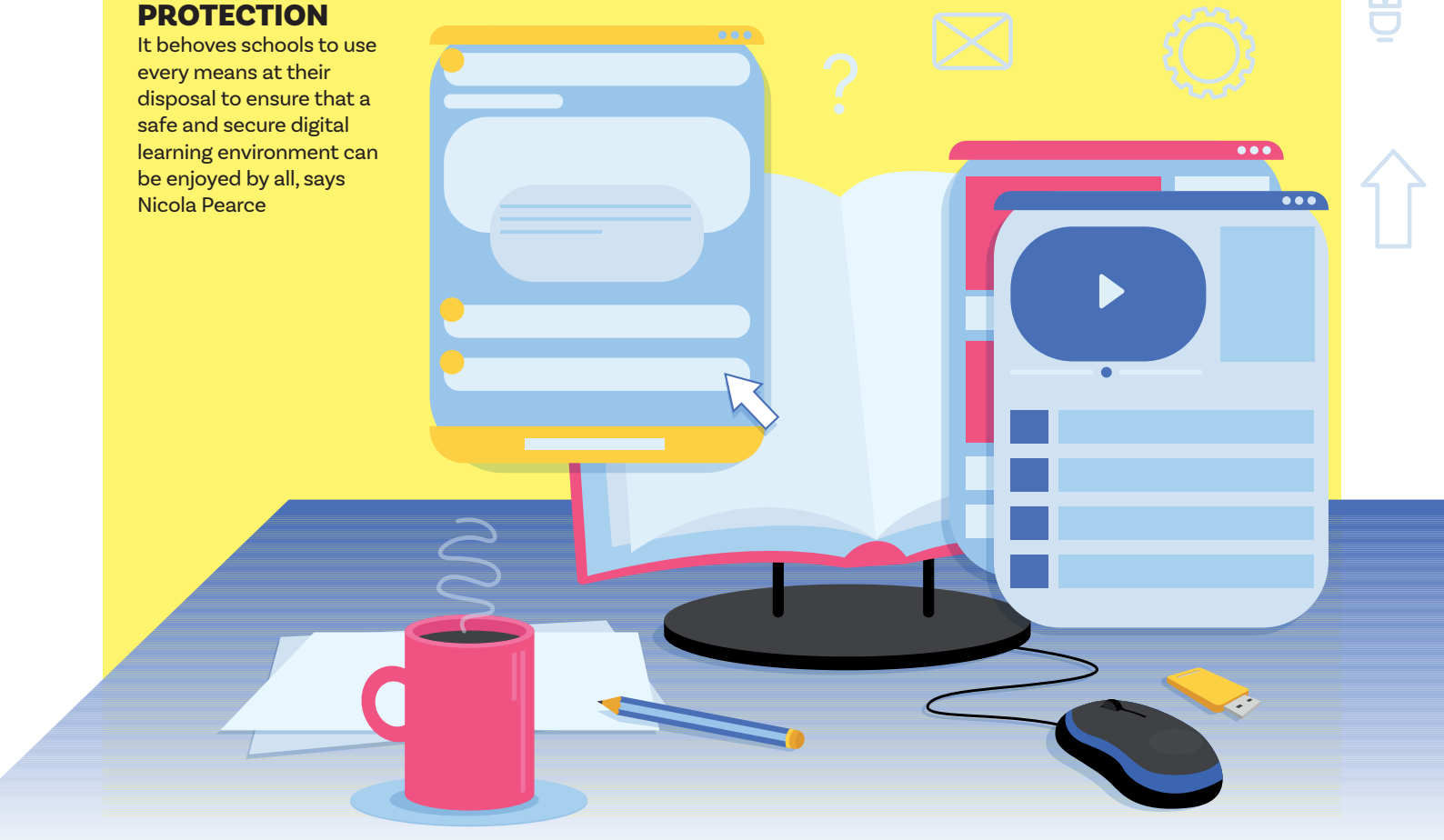
- Switching a MIS is simple and safe
- Engage with the right partner
- Give yourself enough time

Contact: bromcom.com/switch

SCHOOL SOLUTIONS

Innovations that reach into every learning space

THE AGENDA:



NAVIGATING *the network switch-off*

With a new era in school communications dawning, now's the time to ensure that your school is ready to make the switch, advises **Phil Allum**...

The long-awaited Network Switch Off by BT and other operators in the UK is fast approaching. As the landscape of telecommunications continues to evolve, schools find themselves at a crossroads, needing to transition from the traditional Public Switched Telephone Network (PSTN) to a fully digital network.

The good news for schools that have yet to make the move to new digital networks is that the originally planned deadline for switch-off has been delayed from December 2025 to January 2027. At a time of budget constraints, this 13-month reprieve will likely be welcome news to many schools.

Why the move to digital?

PSTN and ISDN lines, which have served as the resilient backbone of the UK's phone network for decades, are being phased out to make way for modern communication technologies. In some cases, the copper cabling used to deliver these lines dates back to the 19th century, and is showing signs of age.

As technology has rapidly evolved – from smartphones, to apps, the Cloud, video calls, and latterly the Internet of Things – the limitations of these older networks have become increasingly apparent.

Replacing the architecture of these networks with fibre lines, and transitioning to Internet Protocol (IP)-based communications isn't merely an upgrade; it's a much-needed leap forward into a more efficient, flexible, and feature-rich era.

This transition to an all-digital communications infrastructure isn't unique to the UK. Countries like Germany, Japan, and Sweden are leading the charge, while Estonia and the Netherlands have already switched off their PSTN networks. It's a global trend, underscoring the urgency with which schools should be planning for a digital future.

> **"The complexities and costs associated with transitioning to a new digital network necessitate early planning"**

The impact on schools

It's common to find PSTN and ISDN lines installed in schools. ISDN lines are typically used for delivering voice traffic to school phone systems. PSTN lines, on the other hand, are commonly used for emergency phone lines in lifts, and for connecting fire/intruder alarms, door intercoms, barrier gates and certain types of broadband lines, such as FTTC or ADSL.

It's imperative that any school operating with technology connected to any of these lines takes action before BT switches them off in January 2027.

While 2027 might seem a long way off, the complexities and costs associated with transitioning to a new digital network necessitate early planning. It's not merely about phone calls; it's about reviewing *everything* connected to your phone lines – including alarms, lifts, phone systems and broadband.

Schools that have already completed, or started their transition are benefiting from reduced costs, improved communications and the efficiencies that technology upgrades deliver.

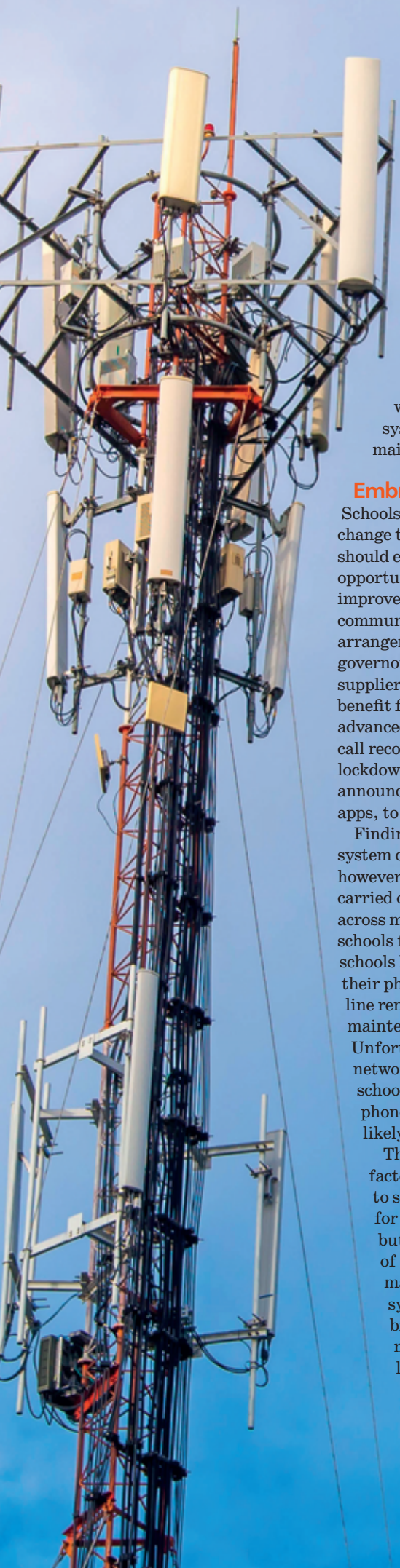
With technology and network prices continuing to rise, those schools that delay making the move to new digital networks risk paying a premium as the switch-off date draws closer.

Minimum requirements

Robust internet connectivity plays a more crucial role than ever before. It's the very cornerstone of a functioning Voice over Internet Protocol (VoIP) phone system, as well all of your other interconnected services, which will now operate via broadband connections in place of the copper cabling of old.

The importance of having schools equipped with high-speed, resilient broadband connections isn't lost on the DfE, whose latest digital technology standards detail the *minimum* requirements that schools should now meet (see tiny.cc/T11-AI1) – which include having a full-fibre broadband connection with a failover backup line in place, should the main line ever fail.

Does that mean your school needs to change its phone system? Well, that depends on the types of phone lines currently connected to your phone system, as well as the make, model and age of the system itself. All schools that presently have PSTN or ISDN



lines connected to their phone systems will need to replace or upgrade their systems.

If you are unsure, it's crucial to check with your phone system provider or maintainer.

Embrace the change

Schools that do need to change their phone systems should embrace it as an opportunity to review and improve their existing communication arrangements with governors, parents and suppliers. Schools can benefit from new, more advanced features such as call recording, integrated lockdown and evacuation announcements and mobile apps, to name just a few.

Finding the right phone system can be a minefield, however. Independent audits carried out by TGE Solutions across more than 1,000 schools found that 97% of schools had overpaid for their phone systems, phone line rentals and maintenance contracts.

Unfortunately, with the network switch-off forcing schools to change their phone systems, many are likely to be exploited.

There are various factors that contribute to schools overpaying for their phone systems, but the main one is lack of knowledge. The market for phone systems, as with the broader technology market as a whole, largely consists of different suppliers selling products from various manufacturers, with systems varying widely in terms of quality and pricing.

The complex configuration of most phone systems makes it difficult, if not impossible in most cases for schools to calculate what price they should be paying. More often than not, they'll be wholly reliant on the prices quoted by salespersons, who will typically be paid a commission based on the profits generated from sales of their company's products and services.

The phone system industry never stands still. New systems are constantly being launched, while others are upgraded with new features or discontinued – yet the average school only replaces its phone system every seven to ten years.

Given these factors, it's little wonder that schools often make the wrong choices and end up overpaying for systems that might not even be suitable for their environment.

Do the research

Considering the requirement for most systems to remain in place for close to a decade, it's obviously important for schools to make the right choice for them when changing their phone system. The easiest option – buying from an incumbent telephony or IT provider – shouldn't be rushed into. Instead, take time to research the market carefully.

It's best to seek out companies that specialise in supplying phone systems to schools, since their understanding of schools will enable them to offer advice on the many features schools will need and can benefit from. Then draw up a list of 'must-have' and 'nice-to-have' features, so that all companies you approach will be quoting on a like-for-like basis.

The next step is to research the products being proposed. This can sometimes be difficult, as many modern cloud-based phone systems will carry names on proposals that don't reflect the manufacturer. Identifying the manufacturer of the phone system is crucial, so that you can conduct research into their reputation. You should ensure you are selecting a system from a large, reputable and financially secure manufacturer.

Finally, do as much research as you can into the pricing of different manufacturers' systems. The cheapest price quoted won't always be the best, or even most suitable solution for your school. You should also ask what discounts (if any) have been applied. Check with other local schools, ask for advice on school business leader forums – or seek advice from an independent consultant, who will do all the research for you and ensure you procure the right system at the best price.

ABOUT THE AUTHOR
Phillip Allum is the managing director of TGE Solutions

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"Too often, schools overpay"

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30 SECOND BRIEFING

TGE Solutions is the UK's leading provider of audit and procurement services for the education sector, specialising in telecoms, IT and broadband. They help schools optimise technology and ensure that suitable, cost-effective solutions are procured.

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What are the main challenges schools are facing?

We find cost savings for 97% of the schools we work with – overpayment for technology products and services being among the biggest issues we've identified. Another major challenge that schools face is complying with the DfE's ever-changing Digital Technology Standards. Meeting these standards, while contending with budget constraints, knowledge gaps and time limitations, is one of the most common problems schools currently face.

What advice would you offer to schools embarking on a technology project?

I'd recommend that schools seek the services of an independent expert, like TGE Solutions, who will work on their behalf. However, for those schools wishing to manage a project themselves, my advice would be to *not rush*. Allow ample time to thoroughly research the market, available products, potential suppliers and pricing, before then seeking advice from other schools. Too often, schools overpay for products and services that aren't always well-suited to their needs.

ABOUT PHIL: Phillip Allum is the managing director of TGE Solutions

TGE Solutions

Contact:
info@tgesolutions.co.uk
01937 420 052

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First line of DEFENCE

Once upon a time, teachers could leave cybersecurity to the IT experts – but guarding against online threats directed at school infrastructure and pupils is now everyone's duty, says **Megan Morris**

Cybersecurity may seem like a distant concern for educators, with most schools having dedicated IT departments in place to handle any potential issues. Yet as the digital landscape continues to evolve, it's becoming increasingly clear that teachers can also have a critical role to play in maintaining a safe online environment for their pupils and school as a whole.

At a time when technology is becoming ever more deeply integrated into our lives, maintaining the security of devices like smartphones, laptops and tablets has become an essential task that we can't afford to overlook. The target may be the personal data we store on them, or the services we access through them – in any case, cyberattacks pose a constant and very real threat. And for schools, the stakes are particularly high.

Beyond the IT department

According to ParentPay's cybersecurity guide for schools (see parentpay.com/cyber-security-guide), the UK education sector faces a disproportionately large number of cyber threats compared to many other business sectors.

The government's 2023 Cyber Security Breaches Survey (see **tiny.cc/ts137-CS1)** highlighted that 63% of secondary schools and 41% of primary schools have experienced some form of breach or attack.

The threats are plainly serious, but that still leaves the question – why should educators spend time worrying about cybersecurity, when educational institutions have IT departments and specialists on hand to defend against such threats?

While it's true that schools have IT professionals in place tasked with safeguarding their systems, the strength of any cybersecurity effort ultimately depends upon the actions of *all* staff members – and that includes teachers. A school's data is only as secure as its weakest link. And that weak link could be anyone who neglects to follow good cybersecurity practices.

A single breach can be enough to expose pupils' personal information, disrupt classroom activities or even cause long-term damage to the school's operations. Cyberattacks that deploy measures such as ransomware and phishing won't just be aimed at your IT personnel. They can, and will, target *anyone*, including teachers.

An April 2022 report produced by SWGfL and the University of Kent (see tiny.cc/ts137-CS2) revealed that while teachers rely heavily on the internet for their work, many schools are still lagging behind in the cybersecurity training they provide. More than 60% of schools hadn't rolled out such training, while one in three lacked any kind of cybersecurity policy at all – thus leaving their teachers both vulnerable to attacks, and unprepared to deal with the consequences.

An essential safeguarding tool

For schools, the implications of a cyberattack can go far beyond financial loss or organisational disruption. The safety of pupils can be put at risk – as was made abundantly clear following an incident in 2018, when the CCTV systems of several schools in Blackpool were allegedly compromised and their video feeds livestreamed on the internet. This underscores the serious risks that weak cybersecurity in schools can pose. Schools have a legal and ethical obligation to protect their pupils, with strong cybersecurity practices being a key part of that responsibility.

Educators must understand that they're not just safeguarding their devices or data; they're also protecting their pupils from real-world harms, making it

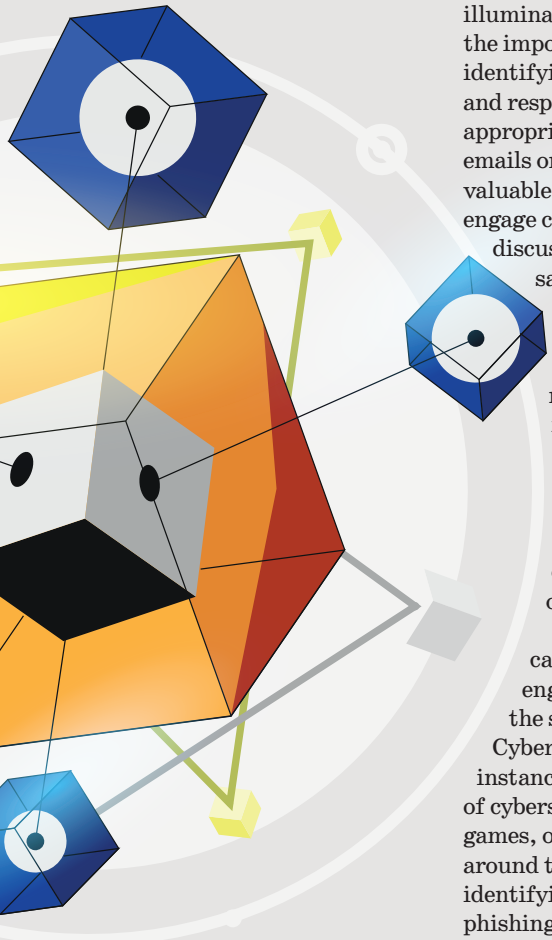
> **"Many schools are still lagging behind in the cybersecurity training they provide"**

essential that cybersecurity measures be integrated into schools' broader safeguarding policies.

Cybersecurity and the curriculum

One of the best ways of ensuring pupils understand the importance of cybersecurity is to weave it into everyday lessons. Cybersecurity doesn't have to be taught in isolation; it can be introduced within existing subjects. Whether it's in science, maths or social studies, exploring the real-world applications of cybersecurity can make the concept much more relevant and engaging.

Teachers could, for example, begin a class discussion by asking pupils to list the apps and websites they use regularly. By writing these down on the board, teachers can highlight the sheer number of different services and platforms that have access to students' personal information. This can open up a conversation around the importance of using secure passwords and engaging in safe online practices. Talking about cybersecurity in this way can help to ensure that children understand the importance of keeping themselves secure online.



How to make cybersecurity fun

The topic of cybersecurity can feel somewhat daunting at first, but by breaking it down into manageable activities and discrete discussions, it can be made more accessible – and perhaps even fun.

Role-playing various online attack scenarios can give pupils some illuminating insights into the important process of identifying potential threats and responding appropriately to suspicious emails or requests. Another valuable activity can be to engage children in discussions around the safe online practices they currently observe in their own time – such as being mindful of the information they share with others, avoiding suspicious links and limiting the overall amount of time they spend online.

These discussions can be made more engaging still through the shrewd use of games. CyberGamesUK, for instance, develops a range of cybersecurity-themed games, one of which is based around the process of identifying and detecting of phishing emails (see cybergamesuk.com). Teachers can begin by explaining what phishing is, before directing pupils to enter the browser-based CyberCity game and begin the 'Flower Shop' activity.

Teachers can then monitor their pupils' progress through the game, stepping in when they might have questions. Such games provide a way for pupils to develop real-world cybersecurity skills via interactive means, thus making for an enjoyable learning process.

Cybersecurity champions

The technical aspects of your school's cybersecurity may ultimately fall within the auspices of your school's IT department, but maintaining the effectiveness of those cybersecurity measures is very much a team effort.

It shouldn't be forgotten that teachers play a vital role in reinforcing good cybersecurity practice within the classroom. By building an awareness of the basics of cybersecurity, and then in turn passing this knowledge on to their pupils, teachers will not only be protecting themselves, but also empowering their pupils to navigate the digital world more safely.

Cybersecurity has long ceased being 'just' an IT issue. It's an educational one, too – so let's make sure we're all doing our part.

ABOUT THE AUTHOR

Megan Morris is Head of Brand – Cashless Payments & Parental Engagement at ParentPay; with 4+ years in edtech, Megan has valuable insights into the challenges schools face with parental engagement and cashless payments, whilst understanding effective solutions to support modern educators. Find out more at parentpay.com or follow @parentpay

CLASSROOM CYBERSECURITY – WHERE TO START

While the lack of formal cyber security training in schools certainly needs to be addressed, there are also some simple steps teachers can take right now to protect themselves and their pupils from cyber attacks.

- **Use strong passwords**
  Remind pupils to always use complex passwords that include upper and lowercase letters, numbers *and* special characters. Thereafter, they should be regularly updated – ideally, at least twice within the same academic year.
- **Keep software updated**
  Ensure that the devices you and your pupils use run on up-to-date operating systems with all the latest security patches and updates installed.
- **Guard personal information**
  Educate pupils about the dangers of sharing any personally identifiable information online. Teach them to avoid using mentions of real names or birthdates in their online usernames, and to think carefully before volunteering their personal details to an online service.
- **Pause before clicking:**
  Teach pupils to proceed with caution during online interactions. Clicking on dubious links, QR codes or pop-up ads can easily invite malware into your system. Establish 'Pause and Think' as a regular classroom practice to remind pupils of this habit's importance.

Future-proofed PROTECTION

Nicola Pearce explains how building cyber-resilient schools requires a certain level of awareness on the part of staff and students alike

In the current digital landscape, technology has become an integral part of education. With this reliance, however, comes a series of security risks.

Now more than ever, schools are becoming targets of cyber incidents – be it phishing attempts at stealing passwords, or ransomware attacks that encrypt files – with the result that they can't afford to overlook the importance of cyber security.

Safe digital habits

Cyber threats continue to present increasing challenges, because as technology evolves, so too does the threat risk – meaning that the best time to act is *now*.

That said, cyber security improvements should be a collective staff effort, due to the widespread impacts they can have, rather than just remaining the sole responsibility of IT staff.

Cyber security helps to instil safe digital habits, so while your IT staff does have a crucial role to play in implementing and maintaining technical defences, one of the most reliable ways of mitigating such risks is to provide suitable education and training for *all* users – admin staff, teachers, and students.

New devices

It pays dividends for schools to employ the latest technologies. For students, getting hands-on experience with devices and software they'll likely use beyond school will ensure that their learning is 'future-proofed', while for teachers and staff, interactive displays and other such hardware can improve their operational efficiency.

Aside from not providing as many functions, or being as relevant to future workplace applications, older devices are also more likely to create security loopholes that leave schools more vulnerable to external attacks and data leaks, thanks to outdated firmware and apps. All systems must therefore be kept up to date, so as to ensure optimal device performance and data security.

For schools, this is critical. Not only is there likely to be a large number of devices connected to the network, there will also be a range of cases where multiple users are regularly logging in and using the same device – with classroom displays or library laptops, for example – potentially putting students, teachers and staff at risk.

Protective measures

Secure prevention practices can be implemented to guard against any tampering with, or accessing of assorted settings, user files, and folders. With the aid of secure Account Management System (AMS) and Identity and Access Management (IAM) software, IT administrators can create and manage user accounts by setting unique permissions for individuals or groups, while simultaneously restricting any sections of the network containing sensitive data – such as academic information and student records – to authorised personnel only.

These, combined with a single sign-on (SSO) authentication method, will enable users to securely access multiple platforms using one set of credentials, while ensuring that only approved users can retrieve sensitive information.

Yet while SSO is an effective method for making logins easier, there can be a danger of some devices using SSO less securely. Interactive displays that allow for SSO via Google and Facebook accounts, for example, can result in students being able to sign in using their own personal accounts, and from there, obtaining access to the wider internet.

An inevitable challenge

The same goes for when devices are left unattended and unlocked. It's possible for individuals to take advantage of this, and access private data on a device while a user account is still logged in. Some AMS and IAM systems allow administrators to prevent this by remotely configuring an 'idle session logout time', so that if a teacher ever forgets to log out of their device, the AMS or IAM will log the user out of their account automatically after a certain period of time.

Above all, to allay any security concerns, manufacturers and software developers must be able to provide relevant details of how their 'smart' products comply with all minimum-security requirements and obligations.

The periodic introduction of new technology is something all schools will now inevitably need to manage for the foreseeable future. As such, cyber security education will remain a necessity for protecting against the numerous online threats and risks that staff and students will surely encounter.

However, through appropriate implementation of robust security measures – such as account management systems, multi-factor authentication and regular over-the-air security updates – everyone within your school can collectively minimise those risks and help to create a safer learning environment.

ABOUT THE AUTHOR
Nicola Pearce is head of education at BenQ

Can AI do artistry?

Hannah Day considers the role that AI could eventually play in art and design education – and the problems it's causing in the here and now...

This term, as part of the graphics A Level, we looked at colour theory, for which students built colour palettes. One student, rather than selecting and refining his collections, sat back and let the computer do it. I asked him how. *"Oh, I just built some code..."* he responded, casually.

We then watched as his screen filled square after square with various tones. On the spot, I had to decide what I thought and how I should react to what I was witnessing.

Consider this

My issue with this student's work was the overall *lack of selection or refinement*. He was merely accepting a result that some highly advanced software was giving him, rather than evaluating work he had produced by himself and changing it accordingly. In the event, the colour palettes 'he' produced were ultimately bland, and the work his code had generated garnered the poorest outcomes in the class.

Artificial intelligence, as applied to the field of art, currently works by taking all the information it can access, and using this to produce 'new' creations when prompted to by human input – but it's a process that ensures the end results will only ever be average. In this case, the student's colour palettes weren't as good as they would have been had he simply done the work himself.

That said, a student of art will typically explore how different paints, brushes and marks can change a painting, If that student then uses different AI tools and prompts to create a range of outcomes, selects the best and uses them to further develop their own work – how is that process any different?

But then there's the matter of referencing. Any text that's repurposed and used in an essay must be clearly referenced and cited. It therefore follows that any use of AI in image creation should be similarly highlighted and explained. What tool(s) were used in the work's production? What prompt(s) did the student enter? How many outcomes were generated, and how did the student approach those outcomes?

"Any text repurposed and used in an essay must be clearly cited; it follows that any use of AI should be similarly highlighted"

If those elements of a work directly ascribable to the students' actions, and those that are the direct result of AI technology could be separately and clearly recorded, that would at least leave open the possibility of assessing that all-important reflection and refinement.

'Dead' media

Finally, there are the implications for research. AI can easily generate false information – as neatly illustrated by a photograph I recently saw picturing Picasso, Basquiat, Dali and Warhol all sharing a drink together. I knew immediately that this was an AI-generated image, but students just starting out on their art history journey likely won't know that these four artists never met together.

To prevent false information appearing in essays and being cited as genuine research, we'll need to better educate our students in the skill of checking sources, and the importance of locating multiple examples of research to back up their assertions.

In contrast, there's the humble, yet also mighty book. The thorough editing and fact checking undertaken by publishers before releasing any title far outstrips the comparative 'anything goes' wild west of online publishing.

With the internet becoming ever more swamped with unreliable sources – which are now feeding AI tools that in turn produce yet more unreliable content – perhaps in time we'll see a true resurgence of books and other printed matter.

Manipulating the paintbrush

So what does an actual artist make of all this? I wanted to talk to someone working across both the tech and art sectors and get their perspective – which is how I found myself in the studio of Dan Catt, who considers himself to be both an engineer and an artist.

Dan writes code, which he sends to a mechanical arm that he built himself. Said arm holds a fountain pen, the movements of which produce beautiful lined drawings.

This, however, is *not* an example of AI art, because Dan is actively telling the arm what do to. The process is functionally the same as what your own arm would do when manipulating a paintbrush. The only difference is the use of technology being placed front and centre.

In Dan's view, we're all trained to varying degrees in the history of art, just as an AI would be, since nothing or no one can work fully independently of the canon of imagery we have. The difference is the speed at which AI can absorb and assimilate this data, and the immediacy and range of its outputs.

He suggests that this can be seen by setting an AI a relatively simple task: "*Take light, for example. AI can generate an image of each individual student's home town, and explore light in the style of 10 different artists. Suddenly, you see the same place specified by the same prompt, but rendered through very different approaches, making comparisons and analysis much simpler.*"

Never go 'whole code'

Another of Dan's observations concerns idea generation. If you have a student wanting to create a poster for a music festival, they could ask an AI to generate 100 different

starting points while keeping the overall theme prompt consistent (such as 'Glastonbury Festival'), but changing the suggested artist or influence (such as 'Art Deco', 'Milton Glazer', 'Paula Scher' and so on). These can then be utilised in much the same way as one might use a moodboard.

"*As an engineer, I want efficiency,*" Dan explains. "*I therefore plot a whole page of code.*" However, while he can predict whether his code will lead to straight, curved or jagged lines, he can't focus as fully on the aesthetics until a later stage. Only once the mechanical arm starts drawing can he see how the code is actually building on the page. "*I almost always stop the artwork part way through,*" he says. "*I see it build, and know when it's reached a point that, for whatever reason, works visually. If ever I let the arm draw the whole code, I'm always disappointed.*"

More recently, Dan has introduced a new element into his code writing that he calls 'Co Pilot'. The idea is for Co Pilot to make further suggestions based on code that's already been written, thus speeding up his processes considerably. Dan is, however, careful to note that Co Pilot doesn't have any understanding of aesthetic value – it's still the artist who must decide on that.

I'm relieved to find that Dan's views, while more practical and developed through his use of technology, coding and nascent AI, otherwise broadly align with mine. Reference, explore, rework; keep the artist as the final arbiter, and think of AI as a useful tool.

Tomorrow's photography

Before I leave, he shows me some images produced by Midjourney – a generative AI programme and service that's attracted attention for its sometimes sublime imagery – examples of which have been used as illustrations by a number of media outlets, including *The Economist*. Dan makes the point that artists and creators now have the option to develop their own artistic style using the same tool.

"*Before AI, if you had an idea you also needed the skills to create that idea. Now, using AI, you can create a visual output for that idea. Some people view those working in this way as artists, and some don't.*"

His comment reminded me of the conversations that would have taken place during the early days of photography and still continue to this day. For many, the mechanical nature of the camera, and its ability to create images that can be reproduced infinitely, prevent them from considering photography as art – even some 200 years after the first photographic images were created.

Collectively, we seem to have a deep and perennial desire for the human and the unique. Yet AI is now very much with us, and will only become more sophisticated in its uses and applications over time. Just like the 'ready-made' and often conceptual art of photography, the notion that AI won't similarly become a specialism in its own right appears absurd.

It seems to me that as teachers, we need to get on board and start helping our students understand how AI might influence, and maybe one day even enhance their artistic journeys.

Artwork created using Generative AI powered by Adobe Firefly

A.I. IN THE CLASSROOM

- Familiarise yourself with your exam board's AI guidelines. These must top everything, since it's the exam board that will ultimately be awarding the qualification. Check this each year as the tech develops. Some exam boards have made their AI guidance available online, including JCQ (bit.ly/ts131-AIA1) and OCR (bit.ly/ts131-AIA2).
- Discuss AI with your students and help them to understand its pros and cons. It may be beneficial to do this at a whole school level, rather than having each subject department tackle the issue separately.
- Ensure all AI-produced elements are clearly labelled, just as one might reference research in an essay.
- Where possible, students should use their own code or prompts for tasks involving AI assistance. If the code is then reworked to produce different outcomes, *the code is the media*. If the student is using existing code from elsewhere, then this should be deployed sparingly – and certainly not in a way that makes it central to the creation of the final piece.

ABOUT THE AUTHOR
Hannah Day is head of art, media and film at Ludlow College

Like, share, ask, learn

Online spaces play hugely important roles in teenagers' lives – so let's ask them how we can make the platforms they use better and safer, writes **Rebecca Westcott**

As a deputy head and parent of three children, I've long been interested in how being a teenager has changed since my own experience of those roller-coaster years.

Many things are universal and have remained the same – the stresses of peer pressure, the need to fit in, working out how to handle things if you don't. But there are some differences, too – the biggest of which has to be the emergence of the internet and social media.

Nowhere to hide

When I was 14, a rough day at school could be left behind when I closed my front door. I had respite and sanctuary, at least until 9am the following morning. Today, there's nowhere to hide. Kids are contactable 24 hours a day, and negativity can find them everywhere. As we know all too well, this can end in disaster – and in some cases, it tragically has.

Breathless headlines link social media activity to increases in depression, anxiety, mental distress, self-harming behaviours and risks of suicide, but that's a list none of us can afford to ignore. So we endlessly discuss the ways in which young people now seem to live their lives online, and the huge value they place on gaining clout or likes. We ask ourselves why they opt to spend so much time on their phones, and bemoan how they often seem happiest when in front of screens.

I was curious about the true impact of social media on teenagers' mental health – and so, when I devised the idea for a YA novel centred on teenage girls and how their wellbeing is affected by cyber-bullying, I went looking for evidence.

First-hand experience

The sea of opinions out there – mostly variations on the 'evils of the internet' and their consequences for the teenage mind – are largely written by adults who grew up before even mobile phones were a thing, never mind Snapchat or TikTok. Notably absent was published commentary and data from those people who actually know what it's like.

I wanted to find out what they thought, because if we want to genuinely help our young people navigate this new world, then we need to hear the thoughts and ideas of individuals with first-hand experience of the issues involved. So I asked them.

With the help of Scholastic, we sent out the 'Say It Like It Is' survey, and were amazed to receive just over 1,000 responses from young people around the UK. I asked them questions regarding their use of social media, and what they would like adults and other kids to know about the internet more broadly.

I also asked whether they felt that the person they are online is the same as the person they are in real life. I asked if they'd ever been made to feel uncomfortable online – and whether they'd ever behaved negatively themselves from behind a screen. Above all, I asked what rules around internet use, if any, they would put in place if they were in charge.

The responses I saw were intelligent, thoughtful and sometimes heartbreaking.

The kids are alright

Age restrictions came up a lot. There are clear concerns among teens around younger children being given unrestricted access to the internet, as well as a desire to prevent anyone over the age of 18 from being able to contact them unless they've been specifically approved by a trusted guardian. The kids, it seems, are alright. It's often the adults who present the threat.

> **"Many issued a plea for better filters that could prevent them being exposed to disturbing material"**

Many of the survey's respondents issued a plea for better filters that could prevent them being exposed to disturbing material. 'Pro-ana', diet culture, rape culture, racist and body shaming content were all mentioned as things they didn't wish to view or stumble upon – as well as content and views conveying homophobia, transphobia and animal abuse.

Sexual material, as well as requests to send nudes or the sending of unsolicited nudes, was another area that caused these respondents distress – not that they're moaning about it. The matter-of-fact way in which they offered these suggestions for simply *limiting the chances of them seeing horrifying posts, pictures and videos* was one of the hardest things to stomach about the survey's comments.

Some suggested handing out time restrictions for antisocial internet users. Others thought that permanent bans should be issued to repeat offenders who ignore guidelines – including the senders of death threats. A large number believed that the issues at hand could be solved if people simply tried to be 'kind' and 'respectful', and 'didn't bully or give hate'. They're not wrong.

Risk versus reward

In the opinion of just over 1,000 young people, what we *shouldn't* do is take away their phones or arbitrarily restrict their access.

That's because doing so could result in teenagers deciding not to seek our advice or support when things have gone wrong online, because they would rather try to cope alone than tell their teachers or caregivers what's actually going on.

Additionally, the high probability of them losing their devices when such incidents come to light means that they feel silenced out of necessity. When weighing up the risk versus reward, many believe that their lives will be seriously diminished without the ability to connect, discover, explore or create online.

It's important to remember that removing their online access effectively amounts to taking away their friends, their links with family, and freedom to entertain and educate themselves.

So, what *can* we in schools do to create more relevant and nuanced pastoral policies that will support our students, rather than push them away? Well, we first have to involve them. That means writing policies *with* them, rather than *for* them.

If we want to help our students navigate those online pitfalls and minefields, then we need to properly understand how they use social media. We should let them know that they won't be punished for telling us the truth, and we need to be honest with ourselves. That e-safety training you did 12 months ago is already woefully out of date – but that's okay, because we can now all have access to cutting-edge CPD right here in our classrooms.

Openness and honesty

We need to educate our students about the things that can go wrong when they're online, and then equip them with strategies for what to do when they encounter content that disturbs them.

Yes, we already do that, sure – but what if the strategies we've given them don't, or even can't work for them? What if 'telling an adult' simply isn't an option? Many of the survey responses called for better education around the use of different platforms' 'block', 'report' and 'mute' buttons, rather than using crude scare tactics in an attempt to put them off using the internet altogether.

A surprising number of responses mentioned wanting help with finding a healthy amount of time for them to be online. They expressed worries around their eyesight, posture and overall health being impacted by too much screen time, and acknowledged the knock-on effect that lack of sleep was having on their ability to focus at school.

If we can create a culture of genuine openness and honesty around internet use, it could open up new conversations around how students can be helped in setting their own boundaries.

What's abundantly clear is that social media isn't going anywhere, and that we educators have to stop seeing it as the root of all evil. It's a life tool. Our kids are using it to relax, escape, learn and communicate. They're using it to find themselves and likeminded acquaintances. Most importantly, they're *asking for support in how to use it healthily*, from understanding adults who won't threaten to remove their devices every time something goes wrong.

Mind you, the respondent who earnestly wrote that '*Racists and homophones should be banned*' is probably asking for a few more lessons on word definitions...

'SAY IT LIKE IT IS' – KEY FINDINGS

28%

spend 3 to 4 hours a day on social media; 17% spend 6 hours or more

26%

would like to reduce their usage.

78%

have experienced feeling happy and accepted because of social media

68%

say they have never personally had a particularly negative experience on social media

65%

have witnessed someone being racist, homophobic, sexist, or bullying another because of their religion

The 'Say It Like It Is' survey was conducted in 2022 and completed by 1,024 participants aged 10 to 15 across the UK

ABOUT THE AUTHOR
Rebecca Westcott is a deputy headteacher and author; her YA novel, *Like a Girl*, is available now (£8.99, Scholastic)

What's New?

Our pick of the latest solutions and innovations for secondary education

1 Create engaging coding lessons

Designed with young learners in mind, the Raspberry Pi Foundation's Code Editor helps make text-based programming easy and accessible for children aged 9 and up. By registering a new school account, you can confidently use the Code Editor in your classroom, knowing that your students' data will be protected. Educators benefit from an intuitive interface when creating and managing student accounts, organising students into classes and assisting with password resets.

Whether you want to help your students create original games and art using Python, or build websites using HTML, CSS, and JavaScript, the Code Editor lets you create your own custom coding projects. Register your school for a free account at **rpf.io/code-editor-teach**

2 Put your people first

access Education People

With teacher shortages on the rise, schools are searching for solutions to help them manage their biggest asset – their people.

Access Education HR and Payroll can provide a powerful solution for schools and MATs. More than just software, it offers a comprehensive suite that streamlines recruitment, promotes wellbeing initiatives and empowers staff with mobile access to vital HR information. This cloud-based platform can tackle complex tasks like pensions and benefits, freeing up valuable time and resources. Over 9,000 UK learning institutions trust Access Education. Invest in a platform that puts your people first. Learn more at **theaccessgroup.com/education**

3 Get lockdown-ready

In anticipation of the measures set out in the Terrorism (Protection of Premises) Bill, AKA Martyn's Law, Bodet Time wants to ensure your educational setting is ready to protect your staff and pupils against acts of terrorism by having an effective lockdown procedure in place.

With our Lockdown Solutions installed, alerts can be triggered simultaneously across multiple buildings, accompanied by calm, pre-recorded messages. Alerts can be broadcasted in different ways, including text displays and luminous strobes, with the option to switch between alert types via a dedicated control box.

For a personalised quote, contact our friendly team by emailing **enquiries@bodet-time.co.uk** or calling **01442 418 800**

FlashAcademy®

4 EAL made easy

At FlashAcademy®, we believe in shaping a future where language is a bridge, not a barrier. That's why we're the UK's number 1 EAL platform, used by over 250,000 learners to accelerate their English language acquisition. Packed with time-saving technology and developed by language-learning experts, FlashAcademy® is the ultimate EAL toolkit for secondary schools. Teachers can assign individual or whole-classroom lessons, auto-mark assessments and monitor learner progress with ease.

Talk to us about how to make EAL teaching work for you at **flashacademy.com**

GENERATION LOGISTICS
PUSH YOUR BOUNDARIES

5 Plan your next move

Generation Logistics is a government-backed initiative aimed at highlighting the career opportunities available within the logistics sector. It's about broadening the understanding of a sector that's crucial to the global economy, but also hugely diverse in terms of the roles it spans and the skill sets needed for those roles.

The initiative has partly focused on reaching young people directly through social channels, but has also sought to engage via education, helping students better understand the prospects and opportunities on offer within logistics. With that in mind, our central campaign hub, GenerationLogistics.org, has now been joined by a second online destination that's packed with curriculum-aligned resources for teachers. Find out more at **EducationHub.GenerationLogistics.org**

6 Seeing is believing

HUE specialises in affordable technology to inspire teaching and learning. Recognised for its colourful, high-quality, flexible document cameras and visualisers, HUE has won many awards around the world. The cameras are easy-to-use, affordable and perfect for use in the classroom, at home or in the school office.

Without any training, teachers can use HUE cameras right across the curriculum to share work or record a demonstration and students can record their own presentations and save videos for sharing with teachers and family. Now available with 3-year warranty and custom-built shockproof cases to further enhance their longevity. HUE cameras are compatible with pre-installed software and browser-based apps including Zoom, Microsoft Teams or Flip, Google Meet, **Mathsboth.com/cam**, QuickTime, Windows and Chrome "Camera".

7 Safely secure

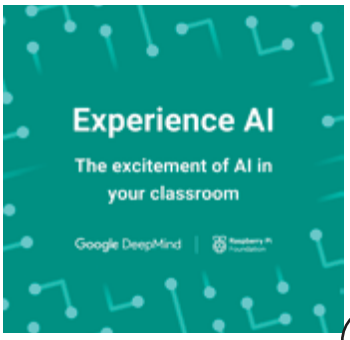
Lapsafe® is the UK's industry-leading expert in innovative Smart Lockers and Charging solutions, and is proud to be the preferred supplier of Smart Lockers within the education sector. Over 80% of UK universities currently use its Smart Lockers, with UK colleges following closely behind.

Enhance your device management with Lapsafe®'s advanced Charging Trolleys, which are designed to eliminate the time-consuming, manual process of loaning devices to students. These compact solutions can store, charge and even apply system updates to devices in volume. Its robust design, intelligent charging and upgradable modules can additionally support your school's net zero targets. For more information, visit **lapsafe.com**.

8 Technicians: The David Sainsbury Gallery

Visit the Science Museum in London and step into the fascinating world of STEM careers at *Technicians: The David Sainsbury Gallery*. Recreating the workplaces of technicians across multiple sectors – health science, creative arts, manufacturing, and renewable energy – your group will get hands-on with interactive exhibits that simulate job-related tasks.

Students will experience what it's like to be a lighting technician on the *Black Panther* film set from Marvel Studios, explore the problems faced by wind turbine technicians, and discover how NHS pharmacy technicians make life-saving medicines. Groups can also book free 'Meet an Employee' workshops, where they will participate in activities and Q&A sessions with real-life technicians. Book your free visit at **sciencemuseum.org.uk/groups.**



9 Free AI resources

Experience AI is an educational programme that provides cutting-edge resources on artificial intelligence and machine learning to teachers and students aged 11 to 14.

Developed by the Raspberry Pi Foundation in collaboration with Google DeepMind, the programme offers a range of free teaching resources, including adaptable lesson plans, slide decks, worksheets and videos. All our resources are designed to get young people passionate about the subject, and are accessible to all educators – regardless of subject expertise or technical experience.

Ready to inspire your students? Download our Experience AI resources today at **experience-ai.org** and help prepare the next generation of AI innovators.

10 Girls belong too

Computer science is the fastest growing STEM subject, yet despite its popularity, girls taking the subject remain consistently outnumbered by boys. 'I Belong: encouraging girls into computer science' is an inspiring programme delivered by the National Centre for Computing Education that supports teachers and leaders in understanding the barriers to girls' participation in computer science, and helps make a plan to overcome them. By enrolling on the programme, you will be shaping the future of computing, improving diversity within the subject and ensuring that every girl knows she belongs in this dynamic and rewarding field. Find out more and enrol at **ncce.io/belonging**

4 REASONS TO TRY... Tech She Can

Resources and on-demand lessons aimed at making tech-related topics as engaging and inclusive as they should be

1 IGNITING A PASSION FOR TECH CAREERS

At Tech She Can, we inspire the next generation by showing how technology can connect with children's passions. Our mission is to ensure that both girls and boys see themselves in future tech roles, helping to close the gender gap and shape a more inclusive future for all.

2 FREE HIGH-QUALITY RESOURCES

Our high quality educational resources are designed by teachers, for teachers, and are industry-funded, which makes them completely free to access. Covering a wide range of tech topics – from AI to space tech – these resources have already reached over half a million students and are tailored to engage and inspire children of all abilities.

3 LIVE LESSONS ON EXCITING TOPICS

Our LIVE lessons cover cutting-edge subjects like Tech for Sustainable Transport, Gen AI, and Tech for Sport. These interactive sessions include downloadable worksheets and tasks, ensuring students actively participate and gain valuable insights into real-world tech applications.

4 ON-DEMAND CONTENT FOR FLEXIBLE LEARNING

Tech She Can also offers a variety of on-demand lessons, allowing teachers to introduce tech topics at their own pace. Our ready-made, engaging resources make it easy for educators to bring tech careers into the classroom, ensuring students receive a relevant and inspiring tech education.

/tech she can;

Contact:
info@techshecan.org
techshecan.org/live-assemblies

Why choose Tech She Can?

+ Free, engaging resources designed by teachers, for teachers

+ Interactive lessons with real-world applications and role models

+ Inspiring tech career pathways for both girls and boys

2024
AUTUMN TERM
FREE
VIRTUAL LIVE LESSONS!

Inspire the Next Generation with Tech She Can!

At Tech She Can, we're on a mission to inspire children-especially girls-to explore exciting careers in technology. This autumn term, our free live virtual lessons are back for both primary and secondary schools, offering interactive, engaging content. Our lessons are designed to captivate young minds, sparking interest in tech careers they may never have considered.

Gen AI
Tech for Sport
Tech for Connectivity
Tech for Living in Space
Tech for Sustainable Transport

Pupil tasks
Live participation
On demand lessons
By teachers for teachers

Register here

/tech she can;

TECH IN ACTION

Stories of the impact technology is having in the here and now

THE AGENDA:

Access, apply, succeed

Becky Patel shares how Tech She Can is helping to break down the barriers that put girls off from pursuing potentially rewarding careers in the tech sector

Technology has long become prevalent across all aspects of our lives, and will continue to play an ever more significant role in the careers and personal lives of future generations. Some 80% of jobs in the UK require at least some form of digital skills, and we can expect a significant number of children currently in school to one day work in jobs we can't even conceive of.

And yet, females remain chronically under-represented in explicitly tech-related jobs. As a result, the country is missing out on a potentially huge pool of untapped talent, with too many girls effectively excluded from the rewards and opportunities that a career in the tech sector can offer.

Successful futures

The Tech She Can charter was launched in 2018, after 18 organisations agreed to collaborate and work together on changing the ratio of women working in technology roles for the better. Tech She Can then became an independent charity three years later, in order to extend its reach and impact.

Today, we're able to bring together the collective experience and expertise of over 250 member organisations in providing initiatives aimed at inspiring all children – but particularly girls – to consider future careers in technology. Our range of resources are all industry-funded, which means they can be provided at no cost to teachers, parents and children.

Everything we do is based around preparing children for a happy and successful future ahead. If we're to ensure that all children are able to participate in the jobs of the future, however, we must educate and excite them about technology, and the people who develop it, from an early age. It's also critical that we have diversity across the workforce involved in designing, creating and implementing modern technological solutions, so that they work for everyone.

> **"Girls often lack awareness of tech opportunities, or worse, are actively discouraged from entering the field"**

Harmful stereotypes

Research has shown that girls often lack awareness of tech opportunities, or worse, are actively discouraged from entering the field. Our work with teachers has highlighted to us how harmful gender stereotypes around STEM can begin very early on, with 70% of teachers noting that such biases emerge before age 11.

Acting as a bridge between industry, education and policy, Tech She Can is a uniquely positioned charity capable of bringing together numerous voices from across fields of education, careers support and skills-building. Educating and inspiring the next generation of technologists is one of our core objectives, which we seek to accomplish through our Tech We Can programme of free learning materials for teachers and parents.

As a teacher myself, with over 10 years experience at both primary and secondary level, I'm passionate about ensuring that children understand how their interests and passions can help guide them on their future career paths. Our Tech We Can resources will often focus on hobbies and interests, in order to demonstrate to children how these can pave the way for successful future careers within the technology sector. We'll deliver these resources to children as young as 5, so that we can start to challenge the issue of gender stereotyping as early as possible.

The Tech We Can resources are designed by a team of experienced educators who understand the challenges teachers face in classroom – such as lack of curriculum space for delivering careers-related lesson content, time constraints, limited knowledge making it hard to explore future career options for all students, the need to remember multiple passwords for different platforms and so forth.

The Tech We Can resources are designed with all this in mind, in that they're:

- Available at no cost to schools and teachers
- Inclusive for all, but especially female-friendly
- Based on the most up-to-date industry advances and information
- All available live and on-demand to accommodate varied timetables
- Fully explained in our free teacher CPD sessions

The aspiration gap

It's vital that teachers of all disciplines understand the importance of highlighting technology careers to their students. An awareness of technological advancements and related careers is no longer just required by students actively wanting to pursue STEM careers, but is increasingly relevant to the vast majority of subjects and students – which is why our Tech We Can resources are cross-curricular, with links to subjects spanning geography, history, PE and maths.

At Tech She Can, we're not just trying to inspire students to consider careers in technology, but also to overcome the aspiration gap. Our research has shown that gender and social mobility have a multiplying effect, with girls who experience disadvantages more likely to perceive that a tech career isn't for them.

Despite 25% of girls enjoying STEM subjects more than boys, girls attending state schools are 69% less likely to aspire to STEM careers than boys.

In addition to producing the Tech We Can resources, Tech She Can designs and delivers Career Insight Days

across the UK, alongside our industry partners. These fantastic events are offered to schools and students in social mobility cold spots, providing their students with what, for many, will likely be their first ever opportunity to connect with industry professionals in a formal setting.

During Career Insight Days, we literally open the doors to actual offices for an immersive, creative and hands-on day of exploration into what a career in technology will involve. By far the most valuable part of the day is meeting the role models. Female students get to see women they can relate to – who often comes from similar backgrounds – actively pursuing successful and rewarding tech careers.

80% of girls attending have later said the days changed their thoughts about the next steps they should take on their own career journeys. This increased understanding and interest then often translates into a realisation of the different career paths available to them, with 70% of female students expressing interest in taking up tech apprenticeships after visiting a Career Insight Day.

Our impact and vision

With the support of our wonderful industry partners, to date over half a million UK students have accessed our resources and been shown that a rewarding tech career is within their reach.

LIVE AND DIRECT

Tech She Can designs and delivers engaging and inspiring LIVE virtual lessons to tens of thousands of students at a time, with the aim of showcasing how technology roles are creative, and how technology can be used to solve important problems for people within groups, local communities, across the UK and throughout the wider world.

These lessons are perfect for KS3, in that they feature diverse and relatable industry role models who can provide students with a vivid illustration of what the individuals who create world-changing technologies are really like, while showcasing the sheer breadth and depth of tech careers.

Schools interested in taking part can sign up for free via techshecan.org/live-assemblies

As we enter our fourth year of operating, Tech She Can remains dedicated to driving real and lasting impact, with a particular focus on helping to organise repeat engagements that make a genuine difference. But we can't do this alone! Please join us by exploring the resources, and by helping to inspire the next generation of technologists.

ABOUT THE AUTHOR
Becky Patel is Head of Education and Learning at Tech She Can, having previously taught for 10 years across the primary and secondary phases

How can AI help teachers today?

Professor Geoff Baker and **Craig Lomas** explain how artificial intelligence can be used to alleviate teachers' workload and support them in their professional development

"*Forget robot teachers, adaptive intelligent tutors and smart essay marking software. These aren't 'the future' of artificial intelligence in education, but merely a step along the way.*" **– Rose Luckin, UCL professor and co-founder of the Institute for Ethical AI in Education**

You don't have to search far before stumbling across a blog or article offering tips and advice for overworked teachers lacking even the time to finish the now cold beverages they thought would get them through the morning.

The emergence of artificial intelligence in recent years, however, has introduced a new element to these discussions; one that might finally make good on that well-worn expression, '*Work smarter, not harder*', and finally offer a way out of the time dilemma.

Changing the discussion

Research indicates that many professional development programmes are actually ineffective in supporting changes in teachers' practices and student learning. Multiple reviews conducted by the DfE (most recently in 2023 – see bit.ly/ts133-AI1) have found that one of the biggest barriers to professional progression cited by teachers continues to be their workload, with teachers simply lacking the time needed to invest and properly engage in professional development. It might not be the only such barrier, but it remains the key reason as to why many teachers fail to invest in their practice in any meaningful way.

Yet AI may be about to change the direction of this discussion for good. The hype around AI, and its transformative potential within education is still hotly debated, but it's now become clear that existing AI technology can make a dramatic difference to teachers' working lives.

Take ChatGPT – a large language model that can perform an inordinate number of tasks in a matter of minutes, when given appropriate prompts. The use of ChatGPT for educational purposes, and the ethical considerations that entails, is perhaps a topic for another discussion – but one thing we can say for certain is that it can complete all manner of tasks that might otherwise take away teachers' precious time – from the creation of schemes of work and teaching resources, to essential data analysis, marking and feedback.

The potential applications of this software are almost endless. With suitable training on how to interact with it, and provide adequate detail in the prompts, ChatGPT can free up teacher time to be spent in ways that have far more impact.

"By utilising ChatGPT, we can create bespoke learning pathways in real time"

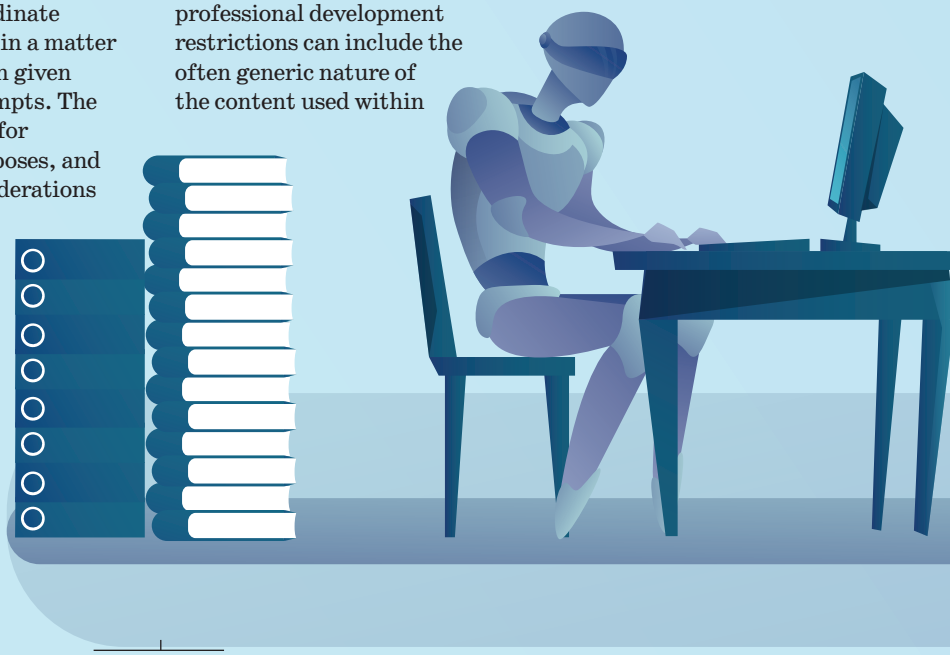
So, if AI can give the gift of time, what else can it do?

Direct CPD

AI software can also be used to supplement and enhance professional development programmes in a more direct way. Besides workload, other professional development restrictions can include the often generic nature of the content used within CPD sessions, as well the traditional 'training model' approach to whole school delivery identified in 2005 by Aileen Kennedy of the University of Glasgow's School of Education (see bit.ly/ts133-AI2).

This typically sees all staff congregate in their school's main hall or theatre, before proceeding to be talked at for the next 60 minutes by an outside 'expert'. While some schools have evolved their practice in this regard, other haven't, or perhaps don't even view such approaches as problematic.

Through AI software, again utilising ChatGPT, the first of these issues can be addressed. Generic content in professional development sessions, whilst unavoidable in some cases, is usually equivalent to delivering the same content in the same manner to all the students you teach, with little to no



consideration for differing levels of ability or need. We don't do it in our lessons, so why is it seen as appropriate for teacher training?

Variations in needs

Unfortunately, we don't always practice what we preach, and approaches to professional development don't always draw on and reflect our collective knowledge base around the fundamentals of learning.

Take, for instance, a session on questioning. It could be argued that this is a universal skill that every education professional ought to develop further, but at the same time, there are numerous complexities involved, different layers to questions and types of questioning.

A teacher's prior experience, abilities, confidence around implementation and subject specialism will all factor into their specific training needs. Whilst we may all need to develop aspects of questioning, there will likely be variations in those needs.

Facilitation, not revolution

By utilising ChatGPT, we can create bespoke learning pathways in real time. Teachers can input their own existing experience levels, specific needs, and desired outcomes, whereupon ChatGPT can generate tailored development plans or learning pathways that include a structured plan of action, wider reading recommendations and specific strategies (often based on up-to-date research-based pedagogy), along with modelled examples.

Admittedly, not all the resulting suggestions may be of practical use, but ChatGPT can at least consistently create that often elusive starting point for professional development. It can prevent the dreaded temptation to procrastinate because you simply don't know where to begin. It can provide a starting framework, within which you can then develop and start to evolve your professional development.

Beyond those valuable starting points and guiding frameworks for professional development, ChatGPT can also be used as a research tool, saving teachers precious time by summarising articles, chapters or even whole books prior to reading them, to help you determine their relevance (or otherwise) to your particular avenue of research.

Moreover, it can generate recommended reading lists based on specific areas of need. ChatGPT can also help you develop initial hypotheses and enquiry questions, along with appropriate methodologies, to help begin the process. In the panel on the right you'll find five practical uses of ChatGPT, along with some suggested command prompts, which you can use to further explore the potential AI has to support teacher workload.

Ultimately, we know that it's the quality of teaching that makes the biggest difference to children's learning, and to school improvement as a whole – for which a sustained and carefully considered professional development plan is essential.

So, *will* AI revolutionise education, as the hype cycle seems to insist? We're yet to find out for sure, but there's perhaps another, perhaps more important question that we should be asking: *can AI make teachers' lives easier by assisting with key elements of teacher practice?* And the answer to that question is yes. Absolutely.

ABOUT THE AUTHOR
Geoff Baker is a Professor of Education and Craig Lomas a Senior Lecturer in Education, both at the University of Bolton, and both former senior secondary school leaders

AT YOUR SERVICE

Five practical tasks that ChatGPT can perform, along with some example command prompts...

1 LESSON PREPARATION AND ADMINISTRATION

You can create more time for yourself by enlisting the help of ChatGPT for tasks such as lesson plans, creating resources, marking work and analysing data.
Example prompt: *Plan a 60 minute lesson on glaciation for a Year 7 mixed ability class*

2 THE GENERATION OF SPECIFIC LEARNING PATHWAYS

Counter the tendency towards 'one size fits all' teacher training by focusing your professional development on specific areas of need.
Example prompt: *I am an ECT struggling with management of low level behavioural issues. Can you suggest some strategies to move forward?*

3 STREAMLINING RESEARCH

Use ChatGPT to summarise articles before reading them, so that you can acquire better insights into whether or not they're relevant to the field you're researching.
Example prompt: *Summarise Luckin, Rose (2020) 'AI in education will help us understand how we think'*

4 HELPING YOU READ MORE WIDELY

ChatGPT can be used to recommend wider reading around a particular area of need, or just broad topics that you happen to be interested in.
Example prompt: *Suggest key texts on AI and education*

5 CRITIQUING YOUR TEACHING

Another possible use for ChatGPT is to gauge the likely effectiveness of your lesson planning; you can then use its findings to help you better reflect on your practice.
Example prompt: *I plan to do a group task with a mixed ability Year 8 class. What might the limitations of this approach be?*

CLASSROOM LIFE

All the right notes

James Tuck, head of music at Mayflower High School, Billericay, shares his experiences of encouraging a hands-on approach to the subject – and what it takes to break through the '*I can't sing*' barrier...

Before joining the staff of Mayflower High School back in 2013, I remember talking to the kids during my initial visit about their music lessons. I asked what they did, and they told me they '*Played on the keyboards*'. I knew that the school had a few other instruments, so I asked if they ever got to play any of those – '*Not really.*'

That's when I knew that if I was offered the job, I'd be able to make a difference. After being appointed, the SLT trusted me to do what I wanted to do over that initial year, and were prepared to back me when it came to the subject curriculum and the department's finances. That was a big motivation for me, and a key reason for me staying at the school for as long as I have.

"THE REASON FOR STUDYING MUSIC IS THAT BY DOING SO, WE GET TO LEARN WHAT IT IS TO BE HUMAN"

– JAMES TUCK, HEAD OF MUSIC

Lessons in humanity

Mayflower High School has around 1,600 students on roll, and is in a fairly affluent area. One challenge with that, though, has been overcoming what some parents see as the place of music within the wider curriculum, particularly from KS4 onwards.

Many parents would work in the City and often ask me, '*What's the point of learning music? How's that going to get them a job?*' My perspective is that the study of music has a much bigger impact on pupils' lives than that – so I'd often ask them, '*Do you want your children to be happy?*' I then go on to explain how the reason for studying music is that by doing so, we get to learn what it is to be human.

When it's your birthday, for example, others will celebrate the occasion by singing you *that* song. When people get married, there'll usually be music at the ceremony. When Olympic athletes win a gold medal, their national anthem will typically be played during the presentation ceremony. Music is something that exists completely within us. Small children will often sing before they can talk.

Teaching musicians

The most vital stage in a young person's musical development is KS3. In those three years, maybe for the first time in their lives, they'll have got to spend time with a professional music specialist.

That's why, when they walk through the door, one of the first things I'll always say to Y7s that we don't see them as students; we always refer to them as *musicians*.

The areas we focus on at KS3 are singing, 'band skills' (i.e. learning how to play an instrument as part of a larger group), and the technology of making music, with an emphasis on live performance.

We concentrate mainly on those three areas, rather than covering multiple smaller topics, as I feel that's the best way of appreciably developing students' strengths in music

> *"The aim is always to get them performing their pieces live"*

– especially with regards to voice, given how much boys' voices can change.

Avoiding isolation

Girls' vocal confidence can meanwhile diminish as they get older, which we try to address in Y9 by exploring rap and hip-hop, and helping our musicians appreciate the links between vocal confidence and succeeding at certain tasks in adult life, like taking part in job interviews and delivering presentations.

The 'band skills' component gives our musicians access to instruments they might not otherwise have the chance to play. Whatever they end up doing, however, we try to avoid lessons consisting of young musicians wearing headphones, sat in front of computers in their own isolated worlds. The aim is always to get them performing their pieces live.

A detention session

In practice, most Y7s will sing if asked, but not all. There was a lad in one of my Y7 singing classes earlier this year who simply refused to sing. My response was to tell him that if he was in a maths class he'd be expected to perform calculations. In an English class, he'd be expected to read and write. So in this singing class, he was expected to sing.

I then told him that if he didn't sing, I'd have no option but to follow the school's policy and place him in detention. He still refused.

I've never seen detentions as just a means of punishment; they're about finding ways of moving forward, because otherwise, teachers and learners will end up stuck in a loop. I found out from a call home that his parents were supportive of the detention, so when the time came, I went with the student to one of the music practice rooms for a while. I began by asking him how he was, by way of conversation. I then asked if he liked football, and established that we were both Arsenal fans.

That's when I started singing one of the team's chants to a piano accompaniment, and pretty soon, he was singing it back to me.

Having sensed that he was wary in lessons of how high he'd be required to sing, I used this impromptu 'detention session' as an opportunity to explore key changes, and after a few attempts, was able to show him where his vocal range lay. I explained that it wasn't so much that he hated singing; the issue was more around how he felt about using his voice to sing in front of others.

Underlying causes

Often, getting past that initial reluctance is about about finding some way in. There's no single way of doing that, though, since it depends on being able to build up an understanding of the individual concerned before it can work. The kickbacks you encounter when students are asked to sing won't be because they can't, but because at some point, someone has *told* them they can't, or they lack self-confidence. The underlying causes need to be picked apart.

I'm happy to say that quite a few Mayflower students have gone on to do great things in music. The nicest thing is when the musicians are leaving the class and someone simply says 'thank you'. Recently, one boy who was usually fairly quiet came up and said, '*Can I just shake your hand? I absolutely loved that.*' Just a genuinely lovely moment.

TECH TIPS

- **Don't scrimp**
  When equipping a music department, 'buy good, buy once'. Cutting corners can entail spending extra on fixing equipment later on, or prove to be a poor, off-putting experience for the musicians who'll be using it.

- **Prioritise portability**
  Imagine a talented saxophonist is sat before a desktop computer with a MIDI keyboard in front. How will they make music with a saxophone they can play, but a MIDI keyboard they might not know how to use? Where possible, use laptops in class – that way, our saxophonist can take a laptop into a rehearsal room with a mic and interface and get going immediately.

- **Get hands-on**
  The 'tech suite' approach can look impressive, but you should avoid any implied sense of '*Don't touch this, don't move this*', as that ignores a hugely important aspect of how music technology is learnt in practice – *by doing*. Entrust students with responsibility over the equipment they're using, and they'll repay it in kind.

Coding contains MULTITUDES

Pay attention, arts and humanities teachers – if you believe coding has nothing at all to do with your practice, think again, says **Rob Wraith**...

Coding is everywhere. It governs how our mobile devices, smartwatches and cars operate. It's what drives our websites, analyses our shopping habits and brings our smart TVs to life. So prevalent has it become that we don't even realise when we're interacting with it.

Code is, after all, the word we use to describe any set of instructions that contain rules for completing certain actions or outcomes. These instructions will typically be written in a programming language such as Java, Python or C#, and deployed in ways that enable our digital technologies to function.

Command creativity

Coding is also fun. Really, it is. The act of writing code can provide a genuine sense of achievement when you succeed in bringing together a set of commands in order to perform a task and remove the need for manual intervention in future.

What's more, this creative aspect of coding can encourage the development of essential skills and attributes that can be readily utilised and developed in the context of other subjects – such as problem solving, skills of analysis, patience and confidence.

Before looking at a few practical examples and how they can be applied, it should be noted that there are some all-purpose concepts arising from coding that are fast becoming essential areas of knowledge for navigating the wider world. Whatever your particular specialism or field of interest, it behoves us all to develop at least some understanding of data privacy, cybersecurity, digital rights and the wider societal implications of technological advances. The more well-versed we can be in these areas, the more likely it is we'll see the development of robust regulations to ensure that the products of coding are informed by ethical considerations.

So with that said, how can the knowledge and practice we learn from other subjects be usefully applied in the context of coding lessons?

Rules and circumstances

The writing of code to simulate a process will inevitably help you better understand the field that process is part of. Take the water cycle, for example – a core component of secondary phase geography. There are four main parts in the water cycle – evaporation, convection, precipitation and collection. Each of these is a specific action or outcome, but before they can be completed, a certain set of rules and circumstances have to met first.

The same principles apply to coding.

Utilising knowledge and practices gained in other subjects, and integrating these into coding lessons can significantly enhance the overall learning experience, provide additional support to students, and build valuable teaching and learning links across different curriculum subjects.

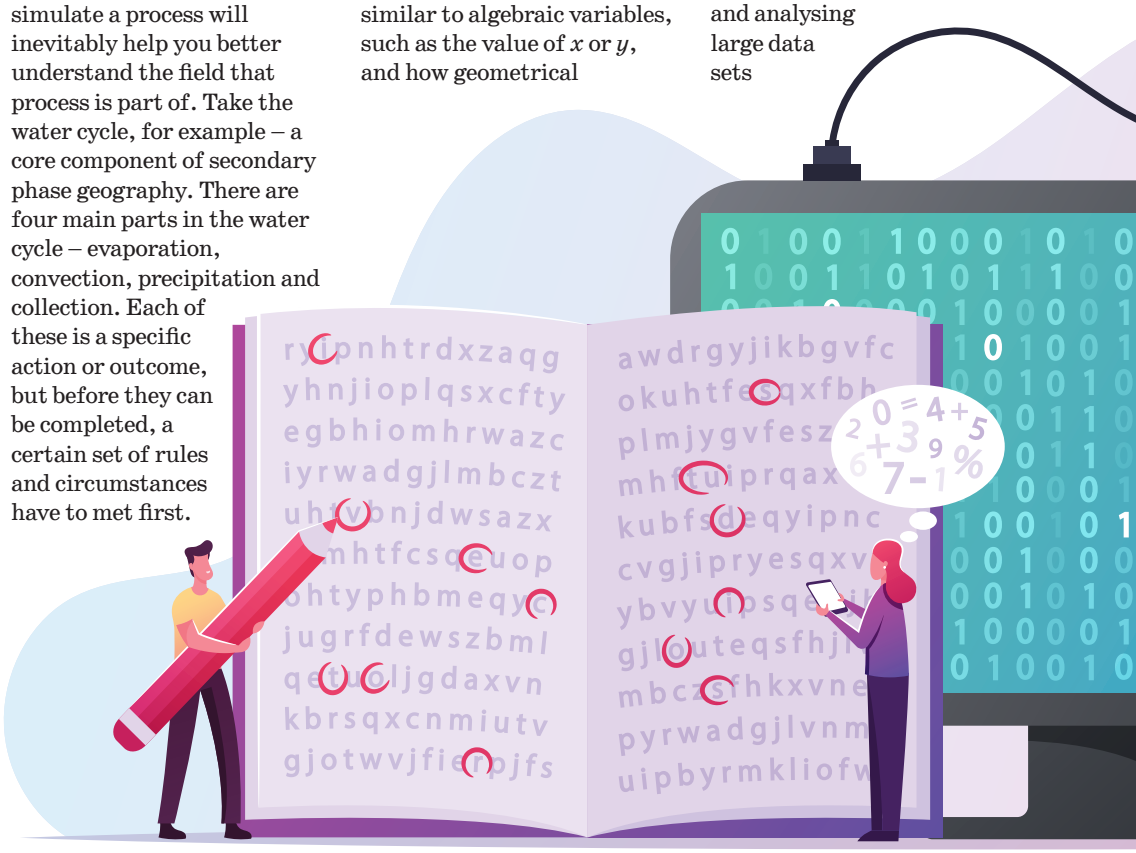
Here, I will break down some working examples of this that you may be able use in your own delivery.

Different disciplines

Mathematics: Use mathematical concepts like algebra, geometry, or statistics to illustrate coding principles. Explain how variables in coding are similar to algebraic variables, such as the value of x or y, and how geometrical concepts relate to the design and positioning of characters in games, as well as the calculation of trajectories to ensure that they're realistic.

Art and Design: Focus on using colour theory, balance and aesthetics. This could be linked to frontend web and app development and user interface/experience principles. Reference could be made to the hex numbers used to identify shades, as these are utilised in code to select and render colours.

Science: When teaching simulations or data analysis we can refer to scientific theories and phenomena. These can help to show how coding is used in modelling and analysing large data sets



to predict real-world scenarios, outcomes and events. A grasp of the scientific language commonly employed in modelling will support students in better understanding the outcomes presented.

MFL: Comparing coding languages to spoken languages can be a big help when explaining the syntax used within coding. Coding languages differ in the same way spoken languages do, in that both can refer to the same objects and functions using different terms and 'vocabulary'. This analogy can extend to grammatical differences between languages too, since programming syntax will similarly vary between one coding language and another.

Physical Education: Common coding concepts, such as algorithms, are now used more than ever in sports training to better understand the impact of injuries or illness on performance, and to hone in on specific areas for potential development.

Creative arts: Holding down the strings on a guitar to play chords can be compared to coding logic through examples such as 'if' statements. *If* a particular number of strings are held down and those strings are played, multiple notes will sound. We can also teach coding through music composition or the act of creating digital art. There are coding platforms available that will enable students to bring musical instruments together, control them and create music using programming commands.

Business and economics: We can explain how coding across a number of different applications can be utilised for business analytics. The code used to analyse data from market research can support the development of new applications designed to solve identified business problems. The code used to create websites can be made to gather information about a business' target audience and geographical location.

Environmental studies: Coding expertise within the context of sustainability projects is set to become a highly prized and sought-after skill. We can demonstrate just how important it is via lesson activities involving sensors of the type that authorities might use to monitor heat, wind or water levels, and how these can be made to trigger environmental defences. You could also reference key figures in the field of environmental science, and explore their use of coding and applications to simulate climate patterns, predict weather changes and analyse the impact of human activities on the Earth's ecosystems.

An interconnected discipline

By highlighting interdisciplinary connections in this way, we can make coding lessons more engaging and relevant to other areas of our students' lives. This will surely help them better appreciate just how important and powerful coding can be, and gain a greater understanding of how interconnected the discipline is with many other subjects and fields of study.

We want our students to develop a deeper understanding of coding itself, but at the same time we should encourage them to think critically and creatively. Reinforcing the many different ways in which coding cuts across subjects could well encourage a new generation of multidisciplinary programmers who possess an in-depth knowledge of, say, art history or geography, as well as the ability to combine that knowledge with skills in coding in all manner of imaginative and unpredictable ways.

We should try to regularly include these interdisciplinary connections in our lessons where we can – or at least often enough for them to become an established part of our standard pedagogy. This will encourage our students to take greater ownership of their learning, and start feeling comfortable with the idea of applying various coding practices to seemingly unrelated everyday scenarios.

CROSS-COMPATIBLE

Five ways to include other subject knowledge and practice into coding lessons.

1. Mathematics
Include mathematical concepts such as sequences, patterns and operations within your delivery via various coding exercises

2. Science
Demonstrate how coding is used in scientific research, data analysis and simulations to model scientific phenomena and analyse experimental data

3. Languages
Discuss the translation of human intentions into machine-readable code, similar to how translating between different languages bridges the gap between language and coding

4. Environmental studies
Demonstrate how sensors are designed to trigger the running of code to perform specific actions when pre-set thresholds are met

5. UI/UX Design:
Deliver coding in the context of user interfaces and user experiences, demonstrating how code can be used to highlight suggested items based on a user's previous activities

ABOUT THE AUTHOR
Rob Wraith is head of learning technology and digital learning at NCG – a group of seven colleges across the UK; for more information, visit ncgrp.co.uk

"We can't lecture them"

Chemistry teacher and online comedian **Shabaz Ali** reflects on what students are taught about social media at school

I started teaching in 2017, and can still vividly remember the reaction when my new school at the time found out I had an active YouTube presence. Their worry was that the kids would find me and comment on my videos, but I told them that I planned to continue posting; that my social media use had no effect on my teaching, and was eventually able to reassure them.

As it turned out, my YouTube uploads slowed down a lot once I qualified, though my pupils later inspired me to make more, after finding the ones I'd posted previously (which wasn't hard). These were kids who were hugely talented in many different areas, and would often post their own videos showcasing their respective skills at art, music and all these other practical disciplines – but they rarely seemed to encourage each other in showcasing their talents.

'Quick fix' scrolling

When lockdown happened, I could see how hard the situation was on our pupils, especially those from backgrounds where home wasn't necessarily a nice place to be at times. Seeing that class divide inspired the observations I write about in my book, *I'm Rich, You're Poor*. I was seeing these distinct patterns of behaviour and changes in kids' personalities, which seemed to accelerate during lockdown. My students were becoming even more reliant getting those 'quick fixes' of social media scrolling and looking to influencers as role models.

Those influencers weren't just causing the kids to question how much money they had – they were now comparing nearly every aspect of their lives with what they saw on influencers' videos. So my response was to make videos mocking influencers, and all the careful filtering, altering and curating that surrounds what they do.

> **"There's still progress to be made – but we're getting there"**

I wanted to avoid simply saying in the book that 'social media is bad' – and I've always avoided saying that in the themed talks and assemblies I've since given on the subject at my school and others in the local area.

That's partly because I can't, in good faith, use social media myself while condemning it, but also because social media *isn't* just bad. It can be good, brilliant even – but for many people, and especially older generations, it's an easy scapegoat to point to for explaining why so much has gone wrong across wider society, instead of addressing real problems – like the ongoing austerity measures, and numerous other issues currently affecting education.

Filtered and altered

If we want to meaningfully talk to young people about their social media use, then we can't lecture them. Before delivering my own assemblies on social media, I'd watch some given by colleagues – who would often go straight in with, '*Let's talk about your Facebook privacy settings.*' They'd refer to platforms by the wrong names, and even then, they'd be platforms the kids typically didn't use anyway. Telling pupils how dangerous X or Facebook could be was never going to work.

When I present on the topic of social media, I'm doing so as someone who's personally invested in it. I open with, '*Social media is brilliant. I use it and I love it.*' I'll start with the positivity, and only then go into the issues surrounding internet safety, privacy and bullying, and show how we can all stay safe online while helping to make social media *better*.

Today's kids have grown up in a world where the impacts of the internet and social media are well known. They've seen what online negativity looks like, and its implications for bullying – but also how social media can be used to to build positive movements and communities.

To be clear, many people aren't yet using it well enough, and there's still progress to be made – but we're getting there. There's far more awareness now of just how filtered and altered influencers' lives actually are, which is great. People my age often couldn't see past how beautiful some personalities looked, and how perfect their lives seemed to be. There's now a much larger, and growing number of people who know those worlds aren't real.

ABOUT THE AUTHOR
Shabaz Ali is a secondary school chemistry teacher, comedian and author of the book *I'm Rich, You're Poor* (Dorling Kindersley, £14.99); he continues to post on Instagram and TikTok as @Shabazsays

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