vision

Looking at the future of learning

January-June 2010 FREE

‘Hands-on’ learning

Taking a participatory approach to teaching

Learning in 3D

Using 3D printers in education

Plus an interview with **Tim Rylands**, the inspirational teacher renowned for his use of computer games in the classroom

Getting creative with curriculum

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Digital Britain, digital schools

Supporting the use of technology in the classroom

Going green in the classroom

What impact do new ‘eco-schools’ have on learning about the environment?

futurelab
innovation in education

www.futurelab.org.uk flux.futurelab.org.uk

About Futurelab

Futurelab is a not-for-profit organisation that is dedicated to transforming teaching and learning, making it relevant and engaging to learners of all ages and backgrounds through the use of innovative practice and technology. We have a long track record of researching and demonstrating innovative uses of technology to enhance teaching and learning; of supporting education practitioners to adopt new teaching practices; influencing public policy in education; and developing and publishing reports and digital tools that have proved to be invaluable resources to policy makers and practitioners alike.

For further information, go to www.futurelab.org.uk.

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Welcome to vision

"It was completely liberating...we could have an idea, create it and then hold it in our hands" is how Dr Adrian Bowyer, engineer at the University of Bath, describes his response to using a 3D printer in this magazine's article about this technology. Dr Bowyer went on to produce a version of the printer that could reproduce itself – and so could offer this same liberating experience to others at low cost – because he inherently understood the value of 'hands on' learning. And it is this subject that comes to the fore of many of the articles in this edition of VISION...

It is most apparent in the article that describes young people's experiences of an enquiry-based approach to the curriculum, Futurelab's Enquiring Minds. One student, Jade, brought her studies on Jack the Ripper to life by enlisting her school's art department to soak a piece of leather in red paint (like evidence found at a crime scene) and followed this with a talk on the methods of disembowelment used, illustrated with a 3D model borrowed from the Science Lab! This might seem gory but, for this girl, who has an enduring interest in unsolved mysteries, this hands-on approach helped to make the learning altogether more 'real'. It's something that many schools appreciate and, encouraged by the government to pursue a more 'creative' curriculum, they are busy exploring different ways of developing independent learners, creative thinkers and able team-workers.

One solution seems to be to adopt a participatory approach to teaching and learning, where the whole class takes an active part in the learning process. This is exemplified by Futurelab's Fountaineers project which involved all 200 students and staff from a primary school in the design of an outdoor interactive fountain. Sue Roberts, the school's Headteacher, agrees that this approach to learning is extremely powerful saying, in the article on this subject on page 11, that, "it was the collaborative, participative approach by staff and children that was the most beneficial part of the project." This article also explores how drama and role play can be used to bring a holistic approach to learning across the curriculum - involving not only intellectual but emotional, social and physical learning. Patrice Baldwin, National Director of Drama for Learning and Creativity (D4LC), sums up the power of this type of learning when she says: "If you've done it through your body and with your emotions, you remember it."

But perhaps the final word on this subject should go to Jo Garnham, Operations Director with education consultancy Cape UK, who highlights the importance of 'hands-on' learning in the article on digital participation: "There are thousands of children who simply aren't excited by mainstream education, but you ask them to make a film and they're learning maths by working out aspect ratios, timings, image resolution and scale ratios for animation – it's amazing." Yes, I agree. The results really can be amazing, and I hope that this will become apparent through the examples featured in this magazine. Enjoy!

Stephen Breslin
Chief Executive, Futurelab

Contents

Imagine that you can link a printer to your PC but, instead of just printing sheets of paper, it makes real physical objects. This technology is here and can be – and is being - used by schools. Ideas and designs created by students can be transformed into a product that they can touch, hold and pass around.

Whilst 3D printing has been around for some time in industrial design and prototyping, the price and complexity has made it the preserve of commercial applications. Now, thanks to advances in technology and falling costs, it is finding a place in education as an important tool in design and technology teaching.

A 3D printer can be used to produce components designed in 3D software that would traditionally be made by starting with a solid block of material and then machining away the excess. The printer creates a solid object by building it up in slices with thin layers of material being deposited on top of each other. Typical machines use a molten form of the thermoplastic, acrylonitrile butadiene styrene (ABS) to construct the layers, creating a finished object in solid plastic.

The technology has created a wave of excitement amongst people who want to make their own products such as mobile phone cases, coat hooks or even car wing mirrors. Toby Borland, a researcher at the University of East London's SMARTlab, runs workshops where designers, artists and architects can try out their designs by manufacturing prototypes.

He points to the huge array of 3D design ideas created and shared on the web via communities such as Thingiverse and Google 3D Warehouse. Until now very few have been manufactured but 3D printing, alongside other technologies such as laser cutting, offer a simple means to change this. As more people spend significant time adapting commercial products to suit their personal needs, then we will see more custom-designed objects being manufactured. The ability to distribute design data in the way that we share music files will also enhance the possibilities of manufacturing on demand.

These fast-paced developments offer exciting opportunities for education. Most schools run 3D computer-aided design (CAD) software including the freely available Google SketchUp, and so students already have data that can be used with 3D printers. There are two different routes for schools and colleges who want to print in 3D.

The first option is a commercial, off-the-shelf 3D printer that is easy to operate and can print high quality products. However these printers are expensive to buy, costing upwards of £15,000, and with high raw material costs of around £300 per kilogram. The price has made them too expensive

for most schools to purchase but a government-funded network of 3D printers has been established across the country. The printers are available in nine regional support centres, and schools can use them for one-off projects or on a regular basis. The support centres have a brief to encourage use of the printers so they are generally free to use, and a range of advice and training is also on offer.

John Lee at Sheffield Hallam University's Centre for Design and Technology Education manages one of the support centres and hosts a printer manufactured by Dimension. He says that offering the 3D printer to schools as a central resource works well. It means it is used for the right applications, and the centre is able to build up knowledge of what 3D printing can offer.

For some projects, a product might be designed and made by more conventional means but with an integral part being produced by the 3D printer. For example, a project with older pupils involved using the 3D printer to create a complex part to hold a knife blade in place in a scalpel.

Sixth-form students studying CAD have been using the machine to produce small prototype cycle components. "Printing a product in 3D very quickly gives students a sense of feel, fit and sense. The physical manifestation and the scale help students to understand what the product is going to do. They can then take that information and redevelop it," says Lee.

Alan Patterson is working with schools across London offering consultancy on 3D printing. Last year, as Head of Design and Technology (D&T) at John Kelly Boys' School, he used 3D printing with A-level and BTEC engineering students. "Students are often trying to make quite complex products and traditional tools such as lathes, drills and CNC (computer numerical controlled) milling can be quite limiting in terms of shape. 3D printing allowed our students to achieve a higher level of sophistication – enabling them to think more freely because they could manufacture anything they could design," says Patterson.

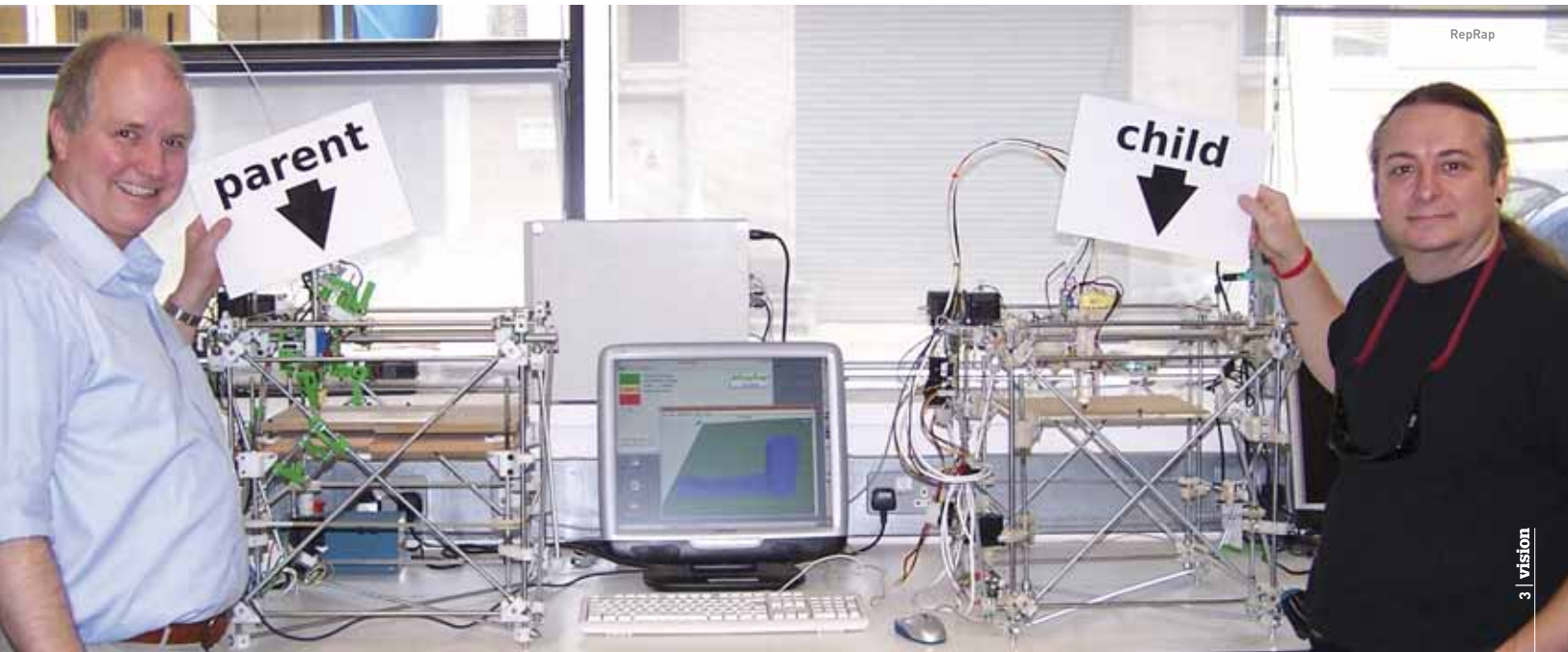
"The students can now talk in more depth about strength, rigidity and flexibility because they can see the outcome. They can see that a product might break or that it is not as rigid as it should be," he says.

Schools in Nottingham have access to a 3D Dimension printer run by the city's e-Learning Centre. Jamie Tinney, who manages the printer, says he is concerned that students and teachers are not closely involved enough with the technology. "It makes sense to share a 3D printer because of the high capital cost but it means that students do not become very sophisticated users of the software as they come here on small and infrequent projects. We don't charge schools to print products because we want to encourage them to use it, but it is expensive. Small items such as a case for a USB stick cost up to £2 each to print," he says.

The second and more affordable option for the schools is to use the RepRap (short for Replicating Rapid-prototyper); a machine that can largely reproduce itself by printing most of its own component parts. The RepRap was developed at the University of Bath by Dr Adrian Bowyer and instructions on how to build it yourself for less than £500 are available free online via open source software. Ready-built versions are available at around £750 and the cost of the raw material is only £40 per kilogram.

Sheffield Hallam University

"WE COULD HAVE AN IDEA, CREATE IT ON SCREEN AND THEN HOLD IT IN OUR HANDS"



RepRap

"When we first acquired a 3D printer it was completely liberating. As engineers, we could have an idea, create it on screen and then hold it in our hands. It allowed us to do so much more and to imagine so much more," says Bowyer.

Bowyer's team then designed a 3D printer that could make the parts to create another printer. The concept of a machine that can reproduce itself has caught the imagination of engineers, designers and educators around the world with RepRaps now being built and used on all continents.

"We wanted as many people as possible to have access to the technology and the first generation of the RepRap machine offered affordable 3D printing to all sorts of people. You have to buy a few standard parts like electronic chips but once you have, you can create a new machine," explains Bowyer.

A small engineering company, Bits From Bytes, has taken the RepRap design and offers both a self-build option and a ready-built machine, the RapMan, to schools and colleges. It is targeted at those who want their own 3D printer but are short of funds. It has seen huge take-up in the last few months, selling into around 200 schools.

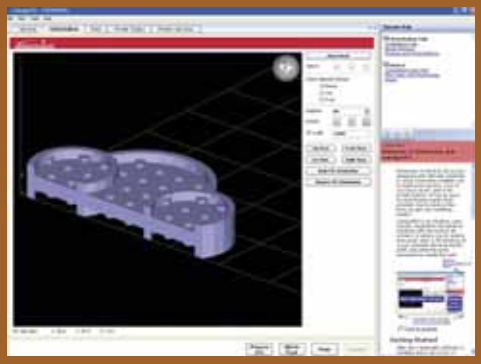
Bits From Bytes engineer Ian Adkins acknowledges that the RapMan has a "Heath Robinson appearance" but he argues that its design is a great learning aid. In contrast to the high-end machines that come in a sealed box, students can see exactly how it operates and are able to control and alter its parameters. It uses a range of plastic filaments as the raw material and, in the future, schools will be able to use the RapMan with materials such as soft resins to print textile patches onto clothes or to print with chocolate for use in food technology applications.

Dave White, Head of D&T at Clevedon School in North Somerset is using the RapMan on a project with Year 12 design students about product analysis, creating prototypes of products such as moulded plugs.

Although the RapMan enables schools to afford 3D printing, White warns that the technology does require lots of effort and enthusiasm from the teaching staff. He makes use of web-based forums to share information with other teachers and has created a set of teaching resources to use the printer with Pro/Engineer software.

A second generation RepRap machine is about to be released by Dr Bowyer and his team. The machine will be easier to build, smaller and more portable but with the ability to print bigger objects. And of course the new machine will be printable by the old machine. It will work with more raw materials, mix materials to create different characteristics, and print in silicone rubber as well as plastics to create rigid plastic objects with rubber parts embedded.

Most importantly, the new machine will print products with embedded electrical circuits. Bowyer says that his team has this working experimentally and are close to releasing designs for the RepRap machine that will do the same. "Once we can print electrical circuits then we will be able to create products even more simply," he says.



Links

Bits from Bytes - **www.bitsfrombytes.com** and **www.bitsfrombytes.com/wiki/index.php?title=Teaching_Resources**

RepRap, the Replicating Rapid-prototyper - **reprap.org**

SMARTlab Digital Media Institute - **smartlab.uel.ac.uk/new2009**

Thingiverse, digital designs for physical objects - **www.thingiverse.com**

Dimension 3D printers - **www.dimensionprinting.co.uk/html/printer_bst.htm**

CAD/CAM in schools - **www.cadinschools.org/page.php?m=158**

Technology update

This section offers a round-up of some of the exciting technologies that could make the leap from innovative novelties for pioneers to cornerstones of modern life for the masses. Could these technologies revolutionise our everyday lives? You decide...

Multitasking remote control


Panasonic

A new type of remote control – that combines pointing capability with keyboard entry – has been unveiled by Panasonic. The wireless Easy Touch Remote Controller offers both "tangible and intuitive" interactions by using sensors to recognise and interpret users' gestures and orientation. With a 'Grab n Go' feature (which means that it is automatically switched on when picked up), it is currently tailored towards multimedia applications such as flicking though photos or resizing images.

ex-blog.panasonic.co.jp/exhibition/en/2008/10/ceatec08_520.html

Big Brother's little brother


Vicon - Oxford Metrics Group
Microsoft Research

Soon you will be able to record your every move and never forget precious moments, thanks to a new camera that is worn around the neck. Originally developed by Microsoft Research to jog the memories of people with Alzheimer's disease, the ViconRevue (which has been licensed to Oxford-based motion-capture technology company Vicon), takes pictures automatically as often as once every 30 seconds and uses an accelerometer and light sensors to snap an image when a person enters a new environment. ViconRevue is currently available for the medical industry to aid people with memory loss.

www.vicon.com/company/releases/101509.htm

Seeing is believing


Brother Industries, Ltd.

Brother Industries, known for its printers, claims to have developed a new portable technology that projects images directly onto your retina. Still at prototype stage, it takes the form of glasses mounted with a projector that focuses light onto the retina and then moves the light at high speed so that images projected onto the retina appear as if they are actually in front of the wearer. Brother also claims that this Retinal Imaging Display (RID) can be used without fear of damage to your eyesight, as the light is very weak and safe.

www.brother.com/en/news/2009/rid/index.htm

Speak your mind


Ambient Corporation

A technology previously used to allow wheelchair users to control movements with only their thoughts is being trialled to give people who are unable to speak a voice. The Audeo, developed by Ambient Corporation, is a neckband that picks up nerve signals from the vocal cords and translates them into computerised speech. But users needn't worry about the technology voicing their inner thoughts – they need to think specifically about saying words in order for them to be picked up.

www.theaudeo.com/tech.html

Flat TV screens: a thing of the past?


© Matthias Heyde/Fraunhofer FIRST

The research institution Fraunhofer has recently unveiled what it hopes will be the future of television, the Immersive Dome. Similar to the screens used at planetariums, it uses six projectors to generate images on the interior of a dome-shaped screen and claims to put "viewers at the heart of the action". Initial plans for this new technology include it being used in theme parks, simulators, multimedia installations and home cinema.

www.fraunhofer.de/en/press/research-news/2009/08/immersive-dome.jsp

Finding music just got easier

Internet giant Google has launched a new feature that incorporates previews of audio files when you search for an artist, album, or song using the search engine – allowing you to actually hear the music with less clicks of the mouse. It is currently estimated that music-related searches make up around 6% of the total queries on Google, so this is expected to be a runaway hit with internet users.

www.googlemusicsearch.com

Want to stay abreast of new developments? Updated three times per year, inspirED (**inspired.futurelab.org.uk**) is a collection of online news and stories to inspire anyone interested in innovation in education. To subscribe to email updates, go to **www.futurelab.org.uk/subscribe.**

Getting creative with curriculum:

what do students think?

Steve Moseley takes his job very seriously, although his manner is never anything but relaxed. As Head of KS4 at Ashton Park School in Bristol he has overseen a rise in GCSE results from 38% A* to C in 2006, to 68% in 2009. But results are not the only thing that have given him pride in his work over this period, he has also been responsible for the introduction of a new way of learning into the school. He got involved in Enquiring Minds, a fresh approach to teaching and learning developed by Futurelab, because he wanted, "to get kids excited about learning" and he is certain that it has helped pupils' enthusiasm and confidence to increase. "You can see it," he asserts, "it's tangible."

He is not the only one who believes that this enquiry-based approach to curriculum has made a difference; so do his students. "Enquiring Minds is like a unique lesson. You can walk into Enquiring Minds and know that you are not going to have the same thing every week. You are presented with things that you can do, but you're not made to do them," explains Jade, a Year 9 pupil at the school who, in common with all students, took part in Enquiring Minds lessons for three 50 minute periods per week throughout the previous year.

"When we first started Enquiring Minds it was pretty hard for everyone because they were not used to working so independently, they were used to teachers telling them, 'you've got to do this, you've got to do that,' otherwise you're going to get told off. But with this, you have to do it on your own. At first no one was actually used to having to work on their own all the time. Near the end it got a lot easier because they had

got used to what they had to do and how they had to do it," says Harvey. However, this move to working independently was achieved gradually, as his classmate, Josh, explains. "We did three big projects, we did more and more work each time. We had groups of four, then groups of two so we did half each, and then we did one big project on our own."

Developing independent study skills wasn't the only effect, as Cameron (Cam) explains. "It wasn't all fun and games. It was a nice atmosphere in the room. Even the naughty kids got on with their work. Even I got on with my work, and that's what made it good. It was a break from 'Do this. Do that.' In Enquiring Minds it was 'Cam, you might be able to do this. You could do that.'"

Choice was an aspect of Enquiring Minds that the students particularly liked. Not only for the topic they studied but also for how they demonstrated their learning.

a rating of 1 to 5 on elements such as vocabulary used, clarity and design - although always with an explanation of why a mark was given and how a higher one could be achieved. "People didn't feel that they had to give a 5 because it was their mate," Jade assures, "With Enquiring Minds you could give them a 1 then say, look, if you do this, this and this then next time I'll give you a 5. You didn't feel pressured because it was your mate standing up the front."

Despite the production of individual enquiry projects, students helping each other with ideas and positive criticism is core to the whole approach of Enquiring Minds. They appreciated having others offering ideas, and supporting their development, but also how it made them gel, often working with people outside their usual group. "At the end of Year 8," believes Harvey, "we were stronger as a group." At an individual level it also boosted their ability to work

"IT GIVES YOU EXTRA CONFIDENCE THAT YOU CAN DO THINGS ON YOUR OWN"

"I had five ideas about how I could do it: I could make a model, which I did; I could make a PowerPoint; I could make a slideshow; I could write loads of words, like a fat essay saying about it. I reckon that's the thing, you get to choose what one you would rather do," says Cam. "You could be more creative," Harvey adds.

Jade was certainly creative for her project on Jack the Ripper which she chose due to her interest in unsolved mysteries. Not only did she do a PowerPoint presentation, she also enlisted the Art Department to soak a piece of leather in red paint, like evidence found at a crime scene, and followed this with a talk on the methods of disembowelment used, illustrated with a 3D model borrowed from the Science Lab. Some more conventional projects chosen by other students include waste from supermarket packaging, erosion (which was chosen after building a sand castle at the beach and watching the effect of the wind on it), and cancer (where the student's grandfather had died of the disease).

Students were also involved in evaluating each other's work. A standard format was agreed for providing feedback, giving

independently, as he goes on to explain, "It gives you extra confidence that you can do things on your own. That you don't always need the teacher there with you."

With several of them choosing to present their new-found knowledge to the class they sometimes moved into the role of teacher themselves. "It makes you feel smart because you're the only person who knows anything about it, and you know all the answers to all the questions. It makes you feel in charge of everything," thinks Josh. Or as Amy put it, "You feel like a teacher."

As working relationships and roles within the class shifted, so the relationship with teachers also changed. Trust is key. "With Enquiring Minds you are trusted. You think, 'They are going to trust me to get on with this'. The relationship was a lot better, because they are putting the effort in, and if you put effort in too, you know the teachers are going to respect you for it," explains Jade.

It was taught as a discrete, timetabled lesson, but is it a way of working that could be adopted across the school? Whilst there

What is Enquiring Minds?

Enquiring Minds, developed by Futurelab and funded by Microsoft, explores how students' ideas, interests and experiences can inform the teaching and learning in schools. At a time of curriculum reform in primary and secondary schools, it provides guidance and research to help support schools through this process of change. Enquiring Minds shows how schools can develop enquiry-based approaches to the curriculum, teaching and learning, and offers a range of guidance, research evidence and resources for educators.

For further information and a FREE guide, go to **www.enquiringminds.org.uk**.

was general agreement that teachers could give students greater responsibility for their work, it was also felt, as Harvey puts it, that: "they don't have the environment." Jade adds that the approach can't be used, "if you haven't got choice." As she explains: "With Enquiring Minds you are given an option on how you learn. With English and Maths you are not given an option on how you learn." However, research has shown that a small number of teachers have begun to use this approach in their subject teaching.

The enthusiasm for what had been an integral part of the curriculum for all Year 8 pupils was obvious, with teachers and students perceiving Enquiring Minds materials as a valuable resource for supporting curriculum change. It is the kind of approach to a more creative curriculum that the 2008 reform of the National Curriculum for secondary schools in England and many reports, including the recent Rose review, suggest schools should be pursuing. If Cam had his way, they certainly would. "Enquiring Minds is a lesson that should be in every school in England. And all over the world," he enthuses.

Enquiring Minds: A new report

A new report from the Enquiring Minds project 'Innovative approaches to curriculum reform', is now available. With a series of case studies from schools that have been involved in attempts to change their curriculum, it synthesises some of the main research findings emerging from the project. Throughout, the report focuses on what it might mean to change the curriculum, and explains the consequences of doing so in the case study schools featured.

To download a copy, go to **www.enquiringminds.org.uk/year4report**

Enquiring Minds: Getting started

The Enquiring Minds guide - which provides detailed information about the Enquiring Minds philosophy, a description of the project, and practical advice and tips about how to use the Enquiring Minds approach in the classroom – is available to download FREE from the Enquiring Minds website (printed copies are also available on request).

www.enquiringminds.org.uk/guide

Enquiring Minds activity: Through someone else's eyes

Purpose
Connecting with aspects of students' interests and experiences and encouraging them to examine those things from different perspectives, in order to better understand the forces that shape their world, can be challenging.

This activity allows teachers to explore the familiar area around their school from different perspectives and think about how others in the community, including the students they teach, might be affected by it. It could support teachers in connecting with their students and planning enquiry activities with their experiences as the starting point.

Suggested activity
You will be taking a walk around an area close to the school and considering it from the perspective of your students and others.

Before you start, agree an area to walk around and a selection of people through whose eyes you would like to consider that area, eg pupil, parent, ex-pupil, town planner, local policeman, bus driver, local shopkeeper.

Now take a walk around your chosen local area. Take a digital camera with you.

- Stop at various points.
- Take a photograph of each point you stop at.
- At each point consider what you might see from the perspectives of the people you have chosen.
- Record your thoughts.

Back in school

- Examine the pictures you have taken.
- How does the local area affect each person you were thinking about?
- How might the local environment affect your students on their journey to and from school?
- What themes or areas of study do these images and discussions suggest you should explore with students?

This exercise can also be extended with pupils. Take them out so that they can take their own photographs, show them the photographs you have taken and discuss with them what they see and how that place makes them feel. Plot photographs onto a local area map and do some emotion mapping with the pupils eg ask them to colour the map according to how each particular area makes them feel. This gives students an opportunity to share their thoughts, ideas and experiences and can provide an insight into issues and themes worth exploring further.

For more exercises like this, go to **www.enquiringminds.org.uk/professionaldevelopment.pdf.**

Lifting the Myst

Tim Rylands used to be a primary school teacher in North Somerset but he is more famous for his use of computer games, particularly Myst, to engage learners in the classroom. However, his use of games is really just the tip of the iceberg - his innovative approach to teaching is much celebrated, and now he spends some of his time inspiring others to take a similar approach. VISION went to meet him when he delivered a day-long ICT seminar to primary schools in Kent...

It has been an intense day but there is no sign that Rylands is powering down - his eagerness to share insights and celebrate the achievement of the young people with whom he and his co-presenter Sarah Neild have the privilege of working is profound: "We get to travel the country seeing magic happen." By way of example, he plays a recording of a teenager at a Monmouthshire pupil referral unit (PRU) reading a piece of writing inspired by a seascape in Myst IV. The boy's account is a fabulous piece of writing by anyone's standards - expressive, descriptive and reflective - but what really sets it alight are his final astonished words: "I didn't know I could write like that - I'm totally proud of that!"

Currently Rylands spends about a third of his time teaching in schools around the country, with the rest spent with teachers supporting them in their work. His current enthusiasm is for the Wii simulation game African Wildlife Safari: "It casts children in the role of photojournalists touring the Serengeti National Park in search of interesting animals and animal behaviour. In addition to the challenge to observe and capture interesting action, children have access to scientific experts providing explanations of what is going on such as elephants' tendency to form a defensive circle around their young."

He illustrates his description with images of sessions at Chew Magna Primary, the school where he last taught full-time. The pictures demonstrate another crucial tenet of his philosophy that teachers need to be able to dovetail high- and low-tech approaches in their teaching. "I am keen that both digital and analogue should co-exist. Here," he says, pointing at the pictures, "you see children that have spent time on virtual safari and who then create a fictional creature we've dubbed the 'Camelephantelopelicanary' using Switcheroo Zoo – but they then go out and about in the school grounds searching for evidence of this creature." Rylands' former musical writing days means that he describes this creature in a rather unique way: "A strange and wonderful thing; its body is really quite shoddy – it's all held together with string," setting a challenge that is both engaging and fun. He points to an image of children in pith helmets proudly holding up some curious finds: "This group has found part of the animal's hump. And here you see them putting to use what African Wildlife Safari taught them; filming each other using handheld devices plus sending the results simultaneously from their mobile phones to their classmates back inside the building using Qik software." All proof positive of his belief in the co-existence of on- and off-line tools to support learning.

Another digital resource he often uses is Fighting Malaria website with its 360 degree tours of a Malawian clinic. (It is an important issue in his life, having contracted the disease twice during his time in Africa.) But Rylands is careful not to let the technology, particularly games, take over proceedings: "Although I am using games, I always encourage teachers not to introduce them as such and do the simple thing of having them opened up in advance so that nothing interrupts children's absorption into whatever world it is they're faced with. The idea in part is to get children away from issues of plot and into a frame of mind to consider much more engaging matters."

If he is certain of one thing, it is that it is incumbent on schools and teachers to meet children and young people's enthusiasm for interactive technologies half way. "It is still too often the case that youngsters have to power-down when they come into school. That said, I do not want the schools I work in to be misrepresented here. I am very resistant to the idea that we are parachuted into schools to help them. What is so encouraging is working alongside teachers and pupils that are entirely 'up' for what we have to offer and are able to see the benefits they can get from raising levels of creativity."

The conversation does inevitably end on the subject of Myst, acknowledging the fact that it can take a small investment of time for a teacher to become familiar with it. But, as Rylands points out: "I can think of less pleasant kinds of class preparation. And, when teachers are glued to the game and supposed to be elsewhere, they can always respond with 'but I am doing my planning, dear!'."

Links

Tim Rylands' blog - **www.timrylands.com/blog**

Fighting Malaria - **www.fightingmalaria.info**

Qik - **qik.com**

African Wildlife Safari - **www.nintendo.com/games/detail/EOCMwcSLfkoaFB2bzPGKWs9y3vsu3CBA**

Switcheroozoo - **switchzoo.com**

In today's shifting education climate, few people would assert that a teacher standing in front of a class is the only, or even the most, effective way of helping children to learn. Encouraged by the government to pursue a more "creative" curriculum, in both primary and secondary schools, teachers are exploring different ways of developing independent learners, creative thinkers and able team-workers. A participatory approach to learning is increasingly coming to the fore, where the whole class works as a team and the teacher learns alongside the pupils, taking the role of a guide or facilitator, while pupils take responsibility for important aspects of decision making.

When this kind of approach is supported by new technology, which excites and engages many children, it helps to draw them in further. New technology, for instance, was at the heart of Fountaineers, a collaborative project between Luckwell Primary School in Bristol, Stakeholder Design and Futurelab. The aim was to design a new 'intelligent fountain' for the school playground, which, using a range of sensors, could respond to the behaviour of people around it – for instance, the water starts to gush if a child runs past it at speed. Pupils led the project themselves, deciding what they wanted the fountain to do, how it should look and where it should be placed, learning to use some new computer programming tools in the process.

"They were asking the teachers questions – like, how does a sensor work? – and we didn't always have the answers," says Sue Roberts, the Headteacher. "Teachers and children were exploring together and the teachers were learners too."

Because this was a whole-school project, the children worked in mixed-age groups, which had social as well as educational benefits, Sue Roberts says. Children were teaching other children, which reinforced their own learning, and even those with mild behaviour problems proved adept at working with younger children.

curriculum to be more skills-based, giving the children more opportunity to tell us what they want to learn about and giving them more control of their learning."

Drama and role play – both championed in the recent Rose review of the primary curriculum – can be a powerful tool in

that participatory learning based around what children are interested in is enormously valuable. Drama, she believes, provides an ideal context: "If you look at what children were doing before they set foot in a school, they were creating imagined worlds – often

"WORKING IN ROLE HELPS CHILDREN TO ACCESS LANGUAGE, MAKE DECISIONS AND ENGAGE WITH CHARACTERS"

"We've ended up with a lovely fountain, with lots of possibilities, but it was the collaborative, participative approach by staff and children that was the most beneficial part of the project," says Sue Roberts. "Partly as a result, we've redesigned our

supporting a hands-on, participative approach to learning. Patrice Baldwin, Director of Drama for Learning and Creativity (D4LC), a joint initiative by Norfolk County Council Children's Services and National Drama, agrees

with other children, sometimes with an empathetic adult. Schools do well not to ignore this kind of emotionally-engaged learning – it is part of the way in which children rehearse and learn being successful."

In school, a whole class can create an imagined world together, "agreeing to suspend disbelief and keep a pretend world going, with the teacher in role too," Baldwin continues. If you are studying the rainforest, for instance, and you want the children, "to care about it, not just be vaguely interested," she advocates setting up an imaginary community of people and presenting them with a threat to rainforest life which they have to solve together. The teacher facilitates, drawing on drama techniques such as 'hot-seating' (where someone in role as a character sits in the 'hot-seat' and the class asks them questions) or 'freeze frames' (silent tableaux where children are asked to represent characters at a significant moment) to further children's thinking, but the outcome is determined by the children themselves.

One of the strengths of the drama-based approach is that the imagined situation lifts children out of themselves and compels them to put themselves in someone else's shoes, helping to develop a sense of empathy. It is also a holistic approach to learning, involving not only intellectual but emotional, social and physical learning. "If you've done it through your body and with your emotions, you remember it," says Baldwin. "It's alive – you can be in the moment. It's not just page 16, then page 17."

Many schools use drama and learning 'through the body' as a way of trying to bring texts to life and get inside character. The Globe Theatre in London does this in a highly specialised way in its 'Lively Action' workshops for primary, secondary and college students. These sessions draw on techniques used by actors in rehearsal so that, for instance, physical work on archetypes led by the Globe's movement specialist might be used to help pupils engage with a piece of Shakespeare, looking at how characters behave and how they change.

The Globe is also working on literacy with primary schools in Southwark, using the story of King Lear. Pupils take the role of 'retirement consultants' who have to advise the wayward and irascible king and try to solve his problems. "Working in role helps children to access language, make decisions and engage with characters," says Fiona Banks, Head of Learning and Teaching Practice at Globe Education. "It's a very liberating and a very quick way of working, where you are immediately in a situation which is very detailed."

Working 'in role' lies at the heart of Mantle of the Expert, a drama strategy pioneered by Dorothy Heathcote and now becoming very popular in primary and secondary schools across the country. Mantle of the Expert involves a whole class taking on the role of high status 'experts' in a particular area, and being given a challenge or problem to solve. Pupils are fully immersed in role, and take on different jobs to address the problem, taking forward their own learning as they do so, with the teacher, also in role, acting as guide and co-worker.

One of the strengths of this approach is that it lends itself not only to literacy, but to subjects right across the curriculum. Jane Smith, advanced skills teacher at Kingstone School in Barnsley, teaches cultural studies (history, geography, RE, ICT and drama) to Year 7 and 8 pupils and has become a passionate advocate of Mantle of the Expert, after specialist training. In a project last year, with Creative Partnerships, pupils were given the task of producing resources to teach others from Year 7 'what it means to be Jewish'. The project stemmed from a novel, The Boy in Striped Pyjamas, but fed into a range of subjects such as maths, history, RE and ICT, as the pupils arranged visits to a local Jewish museum, designed websites and hosted a Jewish cookery programme. Much of the work was supported by technology, with pupils filming their cookery and using handheld video cameras to record evidence and interview people in the museum.

Pupils' understanding of 'Jewishness' was deepened by the project, Smith says. "I think they'll remember it, because of doing it, as if they really were that person. They're so wrapped up in it they almost forget they are learning. There are no issues of discipline – they just love it."

Drama can also be used to stimulate the exploration of science-based controversies, as required by the How Science Works components of science GCSE courses. Gordon Poad, Director of Cap-a-Pie Associates, a drama-in-learning organisation based in County Durham, has developed a 'Dramatic Enquiry' method, combining drama in education with philosophy, which gives learners a compelling, imagined motivation for engaging with philosophical enquiry.

For instance, in a project by Thistley Hough High School in Stoke-on-Trent and Cap-a-Pie Associates in association with Creative Partnerships, Year 9 pupils were given the imagined scenario of a world crisis in the near future, when a law is passed requiring all 16 year-olds to report for genetic screening, as a means of eradicating disease. One girl has evaded the screening programme and has been brought to trial, in what is seen as a test case: in the Dramatic Enquiry, pupils created and enacted this trial, to explore the science of genetic diseases and the ethical dilemmas surrounding them.

Many subject departments were involved in the project and Poad believes its major achievement was in getting pupils and teachers "to work outside their comfort zones and departmental boundaries, to take risks and to be creative in developing truly multi-dimensional learning experiences for all".

Technology can be harnessed to encourage risk taking and propel young people into new and imagined worlds. Imitating the dog is an experimental theatre company which makes creative use of film and video in its own productions, and in its workshops introduces sixth-formers to blue-screen technology as a part of drama. In a workshop on The Tempest, for example, students create a short film of themselves on a storm-tossed boat and then perform in front of it, echoing or counteracting movements in the film. The approach is ideal for the classroom, requiring only projector, projection screen and camera, and the company is now running workshops to help teachers make best use of the equipment.

"It's a method which allows you to experiment a lot and you don't have to find a location," says Simon Wainwright, co-founder of imitating the dog. "There's a magical element to it – you can see yourself in other landscapes. It's another tool to create a world."

Teachers may need some initial help from drama practitioners and/or technology specialists to get them started on these kinds of activities. But teachers who can embrace the new creative opportunities for participatory learning in the curriculum will find themselves, alongside their pupils, on a rich learning journey, building new worlds within the four walls of the classroom.

THE DRAMA-BASED APPROACH LIFTS CHILDREN OUT OF THEMSELVES AND COMPELS THEM TO PUT THEMSELVES IN SOMEONE ELSE'S SHOES

Jane Smith

These photographs document a class of Year 2/3 in 2005 working as an expert team of archaeologists uncovering the tomb of Queen Boudicca at the site of an ancient Iceni village.

The children acted out the burial of Queen Boudicca with her daughters, and the discovery of the tomb 2000 years later by an archeological team.

Useful websites

Fountaineers - **www.futurelab.org.uk/projects/fountaineers**

Drama for Learning and Creativity - **www.d4lc.org.uk**

Globe Education - **www.shakespeares-globe.org/globeeducation**

Mantle of the Expert - **www.mantleoftheexpert.com**

Creative Partnerships - **www.creative-partnerships.com**

Cap-a-Pie Associates - **www.cap-a-pie.co.uk**

imitating the dog - **www.imitatingthedog.co.uk**

A new 'hands-on' mobile exhibition

SPARK is an exciting new mobile exhibition from Futurelab which is designed to showcase new and emerging technologies that can support innovative practice in education. The exhibition brings together a range of technologies from a variety of organisations to provide a hands-on experience that supports practitioners to explore and interact with the technologies and consider how they can be used in the classroom. SPARK features both current technologies that have been used in the classroom as well as emerging technologies that have the potential to support learning. Each exhibit is accompanied by further information that illustrates its relevance to education and suggests ways of using it for learning and teaching.

For further information, go to **www.futurelab.org.uk/spark.**

Going green in the classroom

Sustainability plays an important role in modern life and education is no different. In 2004 the government announced its Building Schools for the Future programme, which aims to rebuild or refurbish all secondary schools by 2020 and includes an aim "to minimise their carbon footprint". But how much influence do these newly built 'eco-schools' have on the way children engage with green issues? And how do 'normal' schools make green issues part of their everyday teaching?

Children are naturally interested in their environment. Schools have recognised this fact and have built green issues into their lessons and extra-curricular activities. Environmental charities such as the Royal Society for the Protection of Birds (RSPB) offer support to schools (they, for example, employ 160 people to deliver their education work to around 10,000 schools throughout the UK). The Society's education team offers schools visits to their 40 nature reserves, and runs a number of hands-on projects including the Big Schools' Bird Watch which invites children to keep a record of the birds that they observe on their school grounds.

But their main concern is that children don't get enough chance to experience nature first-hand. "The RSPB believes that all children have the right to experience the natural environment," says Andy Simpson, Head of Youth and Education for the RSPB. "The problem is that our subject driven education system has moved away from out-of-classroom learning."

Kingsmead Primary School in Northwich, Cheshire, is a good example of a school that does support outdoor learning. The school's grounds encourage children to spend much of their time outside. It has an 'Eco-Walk', made of willow domes, a pond, a kitchen garden and orchard plants that provide vegetables and fruit for healthy school dinners. The school has also planted hundreds of trees which will eventually provide a habitat for wildlife and shade for the children.

Indeed the school's eco-friendly construction was designed with the environment in mind. Opened in 2004 and designed by Bristol-based agency White Design, its eco-friendly features include a butterfly-shaped roof with a central valley gutter which collects rainwater to flush the toilets and a sustainable urban water drainage system. Its classrooms have tall windows and roof lights which provide plenty of natural daylight and reduce the need for electric lighting. Up to 15% of its electricity is supplied by solar panels, while a 'biomass' boiler – which is fuelled by wood pellets rather than gas, coal or oil - heats the school.

For Catriona Stewart, Headteacher at Kingsmead, teaching about the environment is extremely important: "There needs to be a strong ethical and moral dimension to education and learning, if you want to have a moral and ethical electorate when they grow up," she says. "Our mission statement is caring for ourselves, other people and our environment - and everything we do in our school is measured against those three things."

Extra-curricular activities include the popular Environment Club where pupils tend to the gardens, harvest potatoes, fruit and vegetables, weave the willow domes and look at the biodiversity in the school grounds. There is also an eco-group which gives pupils a voice on how the school can be run in a more sustainable way. It comprises an elected group of children from Key Stage 2 as well as a teacher,

a member of the administration team, a parent and a governor. It also includes the school's road safety and recycling officers.

Pupils can also bring in their own suggestions for green activities. For example, they came up with the idea to introduce bird feeders to attract more birds into the school grounds. The children like their school and often pass on what they learn to their own family. "It is a really nice school to go to, because the teachers are lovely and the lunches are great and healthy," says 10 year-old Tom. "Before starting school at Kingsmead, I would probably not have recycled anything, but now I recycle loads. We have a massive box for paper, plastic, cardboard and clothes. I now think about not leaving lights on and saving electricity."

Another school built to high ecological standards is the St Francis of Assisi Academy in Liverpool. It is situated in Kensington, one of Liverpool's most deprived areas, and replaces an underperforming high school. Capita Architecture designed the academy which opened in November 2005. Among its many eco-friendly features is a translucent roof, made of ethylene tetrafluoroethylene (ETFE), which is much lighter than normal glass and provides natural daylight. Again, solar panels provide electricity, and collected rainwater is used to flush the toilets. A sedum roof, monitored by the National Wildflower Centre, functions as an outdoor classroom space, and students designed and planted the school's garden with the assistance of the Groundwork Trust.

Green themes are incorporated in the children's project work and each year a week is dedicated to teaching sustainability issues. An eco-council, set up by students, helps with the school's environmental management by, for example, monitoring recycling and suggesting improvements to the governors. Furthermore, healthy eating is part of the school's green agenda and it organises its own catering.

The students' feedback on the new school has been very positive according to Richard Woods, Senior Associate Director at Capita Architecture in Cardiff. The pupils' GCSE results have improved since it was rebuilt and, in 2007, it was ranked number one in the league table of secondary schools that have improved their pupils' education the most. However Woods thinks that good school design can only go so far: "I think an eco-friendly building without good teaching can do nothing," he says. "It's just a support for good teaching. I think an eco-friendly school without good teaching will achieve little."

The Commission for Architecture and the Built Environment (CABE) agrees and has produced a downloadable leaflet with plenty of ideas for eco-friendly teaching that all schools can incorporate into their lessons. Building new sustainable schools or retro-fitting them with alternative energy sources is expensive. While such a building can enhance education, examples of 'normal' schools show that engaging children with environmental issues does not rely on expensive architecture, but on good teaching and inventiveness of the staff.

The charity Eco-Schools encourages schools to engage children with green issues by giving out awards each year. One 'normal' school that has taken part in this award scheme is Helston Community College in Cornwall. Apart from the installation of a small wind turbine (which was destroyed by a storm in 2008), it does not boast any eco-friendly modifications. However the college has been running other green activities under the name 'Ecowarriors'. This project was originally set up to raise awareness of green issues across the campus but it was subsequently extended into the local community, working with 'Ditch the Plastic' (a Helston-based campaign to reduce the number of plastic bags distributed by shops in the town) to, among other things, design their first cotton bag. It has also involved activities such as undertaking a litter survey of the local housing estate and then working with the community to determine ways of helping to reduce littering.

"AN ECO-FRIENDLY BUILDING WITHOUT GOOD TEACHING WILL ACHIEVE LITTLE"

Lesley Content - Ecowarriors

Capita Symonds

Learning to Learn

Capita Symonds

The project gained them the Eco-Schools' Bronze award in July 2008. In the same year each student set themselves a green community target and supported the college's 'Green Handprint' of five projects, undertaking activities such as: conducting litter surveys in the town; producing anti-littering posters for the National Trust at Penrose; and supporting the pre-Flora Day celebration tidy up. The college also raised more than £900 for the Precious Lives Appeal (which is run by the Children's Hospice South West and raises money for a children's hospice to be built in Cornwall) by holding a green day and recycling aluminium cans - for which they received the Eco-Schools Silver Award in June 2009. "The commitment of staff and students to the environment has definitely changed since we began these projects and we always encourage students with a positive 'every little thing we do makes a big difference' attitude," say Lesley Content, science teacher at the college.

As the examples outlined in this article show, children are interested in sustainability issues and are keen to learn about the environment they live in. The way a school is built can certainly help, but it is also important that schools integrate their sustainable design features into lessons, making connections, and inspiring and motivating their pupils to get them involved. But, above all, it would seem that it is important to stay positive about the future of our environment and 'do your bit', regardless of whether or not you have eco-friendly resources. As William Scott, Professor of Education and Head of the Education and Sustainability research programme at the University of Bath, points out: "What teachers in schools have to enable young people to develop is a sense of hope. They have to work, openly and honestly, exploring the issues, but also pointing to examples of the human species being resilient and creative, illustrating that when we put our minds to something and work collaboratively, then problems can be solvable in a whole host of ways."

"BEFORE, I WOULD PROBABLY NOT HAVE RECYCLED ANYTHING, BUT NOW I RECYCLE LOADS"

RSPB

Links

Kingsmead Primary School in Cheshire - **www.kingsmead.cheshire.sch.uk**

St Francis of Assisi Academy in Liverpool - **www.st-francisofassisi-liverpool.org**

Helston Community College in Cornwall - **www.helston.cornwall.sch.uk**

Royal Society for the Protection of Birds (RSPB) - **www.rspb.org.uk**

Friends of the Earth - **www.foe.co.uk**

Sustainability and Environmental Education (SEEd) - **www.se-ed.org.uk**

Eco-Schools international award programme - **www.eco-schools.org.uk**

British Council for School Environments - **www.bcse.uk.net**

Sustainability and Schools project - **www.sustainability-and-schools.com**

Commission for Architecture and the Built Environment (CABE) and their resources for schools who want to go 'green' - **www.cabe.org.uk/publications/green-day**

FREE handbook to support design of outdoor spaces

This Futurelab publication focuses on the use and utility of outdoor space for play and learning, and aims to support those thinking about redesigning their outdoor spaces as part of the Primary Capital Programme or other initiatives.

To download it or to request a FREE copy, go to **www.futurelab.org.uk/outdoorlearningspaces**.

Assistive technologies in education

John Galloway, an advisory teacher for ICT and responsible for special educational needs (SEN) and inclusion in the London borough of Tower Hamlets, has a favourite story to demonstrate how technology has helped a student with a disability. In this case, the student had dyspraxia – a condition that manifests itself in poor gross and fine motor skills, making writing difficult: "Right through his secondary career he used a laptop with Dragon voice recognition software, and he's now gone to Balliol College at Oxford University to do maths."

For learners with disabilities, assistive technology can have a profound impact, providing access to skills and resources that were previously not available. Fortunately, such technology, which used to be expensive and could only be bought from specialist suppliers, is now becoming much more widely available, says Galloway: "The gap between generic technologies and specialist technologies is closing. So when you go and buy a railway ticket, you use a touch screen. Not so long ago, a touch screen was something reserved for people with special educational needs."

These days, technology is available to help with a wide range of physical disabilities (such as visual or hearing impairment), communication disorders (such as autism) and learning disabilities (such as dyslexia and dyspraxia).

People with mild visual impairment, for example, can use magnification software to adjust the size of text on the screen, or hardware to magnify the text on a written page. Blind people can use screen readers that will read out the text on a screen, including menus and dialogue box options, or use Braille embossers that translate, and print out, written text as Braille.

Assistive technology need not be expensive, says Barker: "A lot of people think adaptive technology is going to cost a lot of money. But sometimes making some simple changes in the control panel is all that is needed, and it costs nothing. For example, for someone who doesn't have good mouse control, you can slow the mouse down, so if you roll it a long way the cursor only goes a little way." A computer's settings will also allow you to control the size and colour of the font displayed and to adjust the sound volume.

Sometimes a technology comes along that hasn't been designed with disability in mind but turns out to be the perfect technology for a particular group of learners. The teaching of spelling has always posed a challenge for deaf children as, when they see a word written down, they need to remember not just how to spell it, but what it means as they will only know it in sign language. After an initial successful pilot two years ago, Longwill School for the Deaf in Birmingham now gives Sony PlayStation Portables (PSP) to every child who joins the school. The PSPs, which have a video camera attached, are used to record and play back video footage. Because the children use British Sign Language (BSL) rather than English as their first language, the PSPs have allowed them much greater freedom of communication. The PSPs have proved the ideal solution, says Alison Carter, the school's Deputy Head: "All the vocabulary goes onto a PowerPoint presentation. The children stand in front of the interactive whiteboard and film their teacher signing the word. She can sign about spelling patterns, or if the word ends in '-ed', she can explain that it is in the past tense." The children can then take the PSPs home and memorise the spellings and the meanings together.

The devices have been put to a wide range of other uses: allowing the children to compose essays or keep diaries in sign language; filming children during PE activities to give feedback; creating bedtime stories in sign language that can be shared at home; and improving communications between the school and home. The school is now sharing its expertise with other schools for the deaf throughout the country. "It's taken the deaf education field by storm," says Carter. "In terms of teaching and learning and for home-school liaison and language development, you cannot beat it."

"EVERY SCHOOL SHOULD HAVE A DISABILITY ACTION PLAN ABOUT MAKING THEIR SCHOOL ACCESSIBLE TO EVERYONE WHO USES IT"

Even people with severe paralysis are capable of interacting with a computer, says Alex Barker, Advice and Information Officer at AbilityNet, a charity that provides advice and help on accessibility solutions. "For people without useful hand or arm movement, as long as they have good use of the eyes and head, they can use an eye gaze system, which works on the basis that if you can move your eyes left and right or up and down, you can control a computer."

For people with learning disabilities such as dyslexia or dyspraxia, technologies like text-to-speech software, word prediction software and voice recognition software can be transformational. A child who has struggled to transfer the thoughts in their head to a screen or paper can find that the ability to speak their words into a computer, or to have the text read out to them, finally enables them to realise their potential.

But it would be wrong to give the impression that all is plain sailing. A lack of awareness of the needs of learners with disabilities can put them at a disadvantage. Conditions such as dyslexia or dyspraxia can often go undiagnosed, says Jane Scaysbrook, a special needs assessor, either because teachers lack the skill to recognise them or because there is a refusal to acknowledge that the condition exists. The result, she argues, is that children who could benefit from a particular technology such as voice recognition are often denied it.

Virtual Ability, Inc

Schools, colleges and universities have obligations under the Disability Discrimination Act (DDA) to provide appropriate access, including access to learning resources, for disabled people, but Galloway thinks that many schools still lag behind: "Every school should have a disability action plan about making their school accessible to everyone who uses it. Not just the pupils, but parents, governors and visitors."

At a time when schools and colleges increasingly expect learners to use the internet and virtual learning environments (VLEs), visually-impaired people can be at a particular disadvantage. Julie Howell, Director of Accessibility at web consultancy Fortune Cookie, explains: "The technology that blind people use is reliant on websites being coded to a particular standard in order to work and that means things like making sure any images have a description hard coded into the image so a blind person knows what an image is and why it's there. For a partially-sighted person it's absolutely crucial that they're able to change the settings of the page, set the text to the size they need and change the colours."

Schools can avoid this problem by working with suppliers to make sure their websites and VLEs follow web accessibility guidelines as set out by the Web Accessibility Initiative (www.w3.org/WAI). But it can be all too easy to introduce a new technology into the classroom or seminar room without thinking through the implications for disabled learners: the virtual world Second Life is being adopted as a learning tool by some colleges, but some disabled learners find it difficult to participate, given its dependence on mouse clicking and keyboard use, and sometimes the use of voice. Volunteers have set up the 'Virtual Ability Island' within Second Life - and within Teen Life, its offshoot aimed at 13-17 year-olds - to support people with disabilities. Nevertheless, some barriers remain which are difficult to overcome.

Another major issue, says Galloway, is the lack of support in some schools. "You might give a pupil a specialist keyboard and a specialist mouse, but unless the staff then provide the pupil with the resources to use with them, it's pointless." Part of Galloway's job at Tower Hamlets is to provide training for staff at all levels to make sure they're sufficiently skilled to work with a child supplied with a particular technology. But Tower Hamlets is unusual, says Galloway; there are few similar roles in other areas of the country.

For schools and colleges wanting to provide assistive technology to students, the key to success, argues Galloway, is to carry out multiagency assessments: "I worked with a young woman whose only access was through a foot switch – her only assured movement was through her right foot. But that required me with my expertise in the technology, the occupational therapist with her expertise around the positioning, a representative from the company providing the hardware, and a speech therapist to all work together."

Links

AbilityNet - **www.abilitynet.net**

Inclusive Technology - **www.inclusive.co.uk**

Longwill School - **web.longwill.bham.sch.uk**

Royal National Institute of Blind People - **www.rnib.org.uk**

Getting creative

It is essential for learners to be creative, to generate new ideas and to be experimental in the application of those ideas. In this section, we celebrate those that do not always take the safe and proven route, but instead are committed to trying something truly innovative. Here are just some of the exciting creative ideas that have made us sit up and listen recently...

Peter Vanderwarker

Spirit in the sky

Phoenix, Arizona in the USA is home to a new sculpture by artist Janet Echelman which has been designed to "work with the desert winds" in that region. Her Secret Is Patience, which is suspended 145 feet above the city's Civic Space park, takes the form of a three-dimensional multilayered net that casts shadows onto the ground below (which the artist says were inspired by Phoenix's cloud shadows that captivated her on the first visit to the sculpture's proposed site).

www.echelman.com

Galerie Fortlaan17 - Dirk Pauwels

Spinning around

The Nemo Observatorium by Lawrence Malstaf is a 'localised cyclone' made from thousands of pieces of polystyrene flying about through the air. Observers sit undisturbed in the centre – as if literally in the eye of the storm. Whether focusing on the ever changing patterns of particles whirling about or looking past the flurry of material off into the distance, the piece was designed to have a meditative, calming effect on those who sit within it.

www.bamart.be/pages/detail/en/3474

Bill Fontana

Sounds of the city

In the City Hall of San Francisco, Bill Fontana has created Spiralling Echoes, a sound installation which has been designed to "bring the city" into this civic building. Four mobile transducers inside the dome focus beams of sound into the space below, bringing sounds from the outside world (including bird song, fog horns and crowds) indoors.

www.sfartscommission.org/gallery/?p=117

University of Tokyo

Getting all touchy-feely

Scientist Takayuki Hoshi created the Airborne Ultrasound Tactile Display - which offers 3D multisensory creations using animated holograms and localised ultrasound – while at the University of Tokyo. Examples include virtual rain drops that you can both see and feel, and a ball that you can feel bouncing off your hand.

www.youtube.com/watch?v=Y-P1zZAcPuw

Kosaka Laboratory

Sweet smell of success

Back to the Mouth is an Xbox 360 based videogame with a novel breath-sensing light gun that has been developed by Takuya Iwamoto at the Kanazawa Institute of Technology. It is based on the idea that players can change their breath chemistry by consuming different food and drink, and so defeat the adversaries that they encounter – for example, eating garlic to destroy a vampire. Bizarre as this may sound, it could lead to us eating foods that we have previously disliked in order to win the game!

www.youtube.com/user/KosakaChannel?gl=JP&hl=ja#p/a/f/0/KL95WK76rb8

Jean-Jacques Birgé

Rabbit rabbit rabbit

Antoine Schmitt and Jean-Jacques Birgé have joined forces to compose and choreograph an opera which is performed by 100 Nabaztag 'smart rabbits' (the cute wi-fi enabled creatures that respond to communications by moving and flashing lights). The score, which is transmitted by wi-fi to the rabbits, controls the ears, speakers and lights in each rabbit but with varying delays of between zero and ten seconds – the result being that each rabbit is doing the same thing but not at the same time. Birgé and Schmitt hope that this light-hearted performance will help to explore the issue of control between individuals and the group.

nabazmob.free.fr/nabazfilm.html

Digital Britain, digital schools

The Stella Maris, a futuristic airship, is eerily silent. All ten of the crew have been struck down with a mysterious illness, and it's up to one 15 year-old schoolgirl to solve the mystery and steer the ship safely to the nearest island. But before she can do that, she'll need to create her own avatar, and equip it with clothes, tools and even a hair style.

Steamfish is a cutting-edge virtual reality game developed by Y Productions that helps students to learn about the science and ethics of clinical trials. It aims to engage young learners by presenting them with a video game experience that they can help to create themselves, explains Eleanor Lang, General Manager of Y Touring, part of Central YMCA, which has commissioned the game.

The game is a modern re-telling of how early scientists discovered and treated scurvy in sailors. Putting students into a virtual world and allowing them to create game content themselves makes a complex issue much more immediate, says Lang. "We originally commissioned a play exploring these issues, but having children actively involved in a quest extends and deepens their understanding enormously, and also taps into the things they're naturally interested in outside the classroom," she says.

Research suggests that such projects are still relatively few and far between. The National Foundation for Educational Research (NFER) recently conducted a nationwide survey into how schools and colleges use digital technology and social

media in the classroom. "What we found was that far too many technologies are just being used for presentational purposes, while relatively few young people are being given the opportunity to actively author, edit and publish digital content," says Matthew Walker, a researcher with NFER and author of the report. "However, early adopters have found that involving children in the creation and control of content offers enormous learning opportunities and can also engage children who might be put off by the traditional forms of education."

That's certainly the experience of Cape UK, a consulting group that works with local education authorities to support creativity and development in schools. One of the organisation's recent projects was Film FX, where secondary school children were given mobile phones and helped to make short films about subjects close to their heart. "There are thousands of children who simply aren't excited by mainstream education, but you put a mobile phone in their hands and ask them to make a film and they're learning maths by working out aspect ratios, timings, image resolution and scale ratios for animation – it's amazing," says Jo Garnham, Operations Director with Cape UK.

And the project is within the reach of schools, financially speaking – Garnham says that handsets cost just £99 each, and films were edited on a regular Mac computer. "All together, you could do this in a school today for less than £1,000," she says. "I think the act of using something they're interested in outside the classroom is often more important than it being the latest, greatest handset."

The challenge for educators, of course, is how to ensure that any such investment in digital technology (which isn't insignificant for a school) is applied constructively in the classroom. On the one hand, technology should be used in a way that students find engaging and relevant. But the content must also be linked into the curriculum, and have specific learning outcomes. The key is to approach technology creatively, and consider how technology can shape the curriculum, rather than just using technology to do the things that you would have done anyway. In a recent literature review on digital literacy and participation, Futurelab urged educators to consider how technology could be embedded within the curriculum to enhance learning and to ensure that children acquire the skills, knowledge and understanding to participate fully and safely in the digital landscape.

NFER advises educators to carefully consider three questions before embarking on any digital content project. First, what technology will you use and how will that technology shape what you teach? Second, what are the specific learning outcomes and goals of the project? Finally, are staff and students fully committed to the project, and will there be time and resources to support people using the technology?

There is a wide range of options depending on the answers to those questions, says Walker. For example, blogs are a perfect technology for creative writing and literacy, and enabling peer review, while wikis are an excellent way of learning about collaboration. Students can use podcasts to provide personalised revision aids or to record exemplar readings from language classes, or they might use video and film to explore topics in depth.

The key is to plan fully how you will exploit whatever technology you use, to ensure that children gain not only curriculum-based knowledge but also digital literacy. "Technology is all about enabling communication between people, so you might have classes, school years or even different schools collaborating on content, with feedback and peer evaluation," says Dan Moorhouse, Head of Humanities Learning at Park Lane High School in Halifax. "That's great but it's important to balance that with the idea that there are risks and responsibilities that come with creating and controlling content." However, it's important to ensure that children themselves are supported to think critically about these risks and responsibilities as, after all, that's a significant facet of what it means to be digitally literate.

Students at Park Lane High School regularly create films and podcasts which Moorhouse uploads to the school intranet for peer review, and to the YouTube website. "In a subject like history, letting students create their own digital content is a great way of bringing the subject to life, especially for teenage boys," says Moorhouse. "We often present them with lots of materials and ask them to select sources, sequence them and create mini movies or build websites that incorporate interviews and interactive timelines, which we then publish online, either internally on the intranet or on a teacher-administered YouTube account," he says.

"RELATIVELY FEW YOUNG PEOPLE ARE BEING GIVEN THE OPPORTUNITY TO ACTIVELY AUTHOR, EDIT AND PUBLISH DIGITAL CONTENT"

Examples such as this are hotly debated at Learning Today (www.learningtoday.org.uk), a Special Interest Group (SIG) where teachers discuss ways to use digital technology innovatively to improve engagement in the classroom, and, most importantly, to enhance learning and drive critical digital literacy. "As a teacher, you want to improve engagement, but it's also important that students acquire the skills they need to approach media and technology critically, to think about where information comes from, how technology can share but also conceal information and that you shouldn't necessarily take everything you see at face value," says Angela Colvert, a senior lecturer at Roehampton University and a member of the Learning Today SIG.

Colvert recently ran a highly successful digital learning project with Year 6 pupils based on an alternative reality game

Viv Trafalgar

Angela Colvert

Viv Trafalgar

(ARG). This is an online game that relies on existing communication technologies – mobile phones, message boards and webcams – rather than a software application.

The project was based on the novel Krindlekrax, in which a mysterious crocodile sneaks into a school through a network of underground sewers. The Year 6 pupils were asked to bring the story to life as an ARG, which would be played by Year 5 pupils the following term.

The children brainstormed ideas and decided to start with a community website for the residents of Lizard Street, where the novel is set. They then developed websites for specific characters, where they could write in character. The next step for the children was to imagine what happens when something newsworthy takes place, so they started by writing online newspaper articles, and then looked at creating message boards, where the 'authorities' would be able to share information with the community. They even filmed some 'mysterious' webcam footage showing the creature hiding in the shadows.

The game started when the Year 5 students received an email asking for help with the mystery. It lasted for two weeks, during which time the Year 6 students published their content and wrote online in character on emails, websites and message boards.

The project was primarily focused around creative writing but the children also learned about history, biology and geography, to make their story more realistic. "More than anything, they learned a lot about digital literacy and critical engagement," says Colvert. "They really thought about things like how message boards are different to instant messaging, because on a message board you have more time to think and can present longer arguments. We also talked about how on a webcam, it's more immediate, but they had to choose their words carefully and think about body language. I think that was probably one of the most important things they've learned."

Early adopters of digital media in the classroom agree that the key to success is using technology in a way that adds meaning to the curriculum. "You can't just stick the children in front of a computer and expect them to develop these skills," says Colvert. "It was really important for them to use the technology to actively engage with the material, because that's when they start to really think about what that technology means, in terms of how information is shared, and sometimes hidden."

If done well, allowing students to create their own digital content can help them to discover an enthusiasm for the curriculum that wouldn't otherwise be there, adds Moorhouse. "History is one of those subjects that some students will always consider to be boring," he says. "But if you start showing them how to access that knowledge through digital media, and how to share their work online, suddenly they're keen to learn. It's made an enormous difference."

New research on digital participation

Futurelab is undertaking a programme of research on digital literacy and digital participation. More specifically, it involves working with teachers to develop practical classroom approaches to digital literacy and supporting teaching practice that aims to furnish young people with the skills, knowledge and critical understanding that they need if they wish to participate fully and safely in an increasingly digital world. The project responds to curricular reform at Key Stage 3 and to the findings and recommendations of the Rose Review of the Primary Curriculum and will result in a number of outputs by the spring of 2010 including case study exemplars to support the inclusion of digital literacy in school subjects, and a handbook for teachers detailing approaches to digital literacy and offering further guidance.

For more information, go to **www.futurelab.org.uk/projects/digital-participation.**

Events

Learning and Technology World Forum

11-13 January 2010

London, UK

A forum for sharing best and debating future practice in education and skills, this event attracts participation from across the world and features an exhibition of new technologies and how they might be applied to education from Futurelab.

www.latwf.org

BETT

13-16 January 2010

London, UK

Hailed as "the world's biggest educational technology show", BETT routinely attracts around 30,000 visitors from the ICT in education sector. Increasingly international and free to attend and register, you will need to pre-register and pre-plan to make the most of this bustling event – though don't forget to visit the Futurelab stand J11 where you will no doubt be inspired by a range of new and emerging technologies such as games, augmented reality and web 2.0 tools.

www.bettshow.com

Learning Technologies Exhibition and Conference

27–28 January 2010

London, UK

This conference, which showcases organisational learning and the technology used to support learning at work, boasts more than 130 exhibitors, 60 free seminars and over 3,000 visitors.

www.learningtechnologies.co.uk

The Building Schools Exhibition and Conference (BSEC)

24-25 February 2010

ExCeL London, UK

For those interested or involved in the government's school building programmes - Building Schools for the Future, City Academies and the Primary Capital Programme – BSEC may be a useful event to attend. Focusing on the construction, maintenance and design of all schools - new, refurbished and old – it offers an opportunity to network with others similarly concerned with school design and build.

www.buildingschools.co.uk

CeBIT

2-6 March 2010

Hannover, Germany

Hoping to attract "all users passionate about technology", CeBIT is the world's largest trade fair showcasing digital IT and telecommunications solutions for home and work environments. Why not go along and find out about the latest technologies?

www.cebit.de

The Education Show

4-6 March 2010

Birmingham, UK

The Education Show is the UK's largest showcase of educational resources, best practice methods and CPD training. Free to attend, each year over 15,000 visitors test, sample, discuss and compare thousands of resources, designed to meet a huge range of educational needs.

www.education-show.co.uk

INTED2010

8-10 March 2010

Valencia, Spain

The general aim of this conference is to promote international collaboration in education and technology in all educational fields and disciplines.

www.iated.org/inted2010

Naace Annual Conference

16-18 March 2010

Blackpool, UK

Billed as the "definitive ICT Conference in the UK", this event brings together key players from all over the world, together with those from government and industry, and provides a forum to share best practice and exchange ideas.

www.naace.org/910

Mobile Learning

19-21 March 2010

Porto, Portugal

The IADIS Mobile Learning 2010 International Conference seeks to provide a forum for the presentation and discussion of mobile learning research. This year the focus is on the transition from content consumer to content creator.

www.mlearning-conf.org

Going Global 4

24-26 March 2010

London, UK

Entitled 'World potential: making education meet the challenge' GG4 will review trends and implications; explore models for change; draw on case studies from across the world; examine the barriers; and deliver frameworks for action across the following areas:

- staff and student mobility
- global partnerships
- global citizens
- policy and leadership.

www.britishcouncil.org/goingglobal.htm

Conference in Games and Virtual Worlds for Serious Applications

25-26 March 2010

Braga, Portugal

This event aims to encourage an exchange of knowledge and experience in this cross-disciplinary area. Bringing together delegates from across the world, this conference explores the application of variety of games and virtual worlds in settings such as health, education, training and defence.

www.vsgames2010.org

Game Based Learning Conference

29-30 March 2010

London, UK

From the organisers of Handheld Learning, this event aims to create stimulating, challenging and provocative dialogue between the education, gaming, social media and consumer electronics sectors.

www.gamebasedlearning2010.com

SITE Conference

29 March–2 April 2010

San Diego, USA

SITE represents educators interested in the creation and dissemination of knowledge about the use of information technology in education. This annual conference offers an opportunity to share ideas, to explore the latest research, development and applications, and to network with the leaders in this important field of teacher education and technology.

site.aace.org/conf

Computer/Human Interaction (CHI) Conference

10-15 April 2010

Atlanta, USA

Computing is increasingly a part of all areas of modern life and CHI offers an opportunity to gain an insight into the ways in which computing can improve all of our daily lives, showcasing the technologies, designs and ideas that will form our future digital world.

www.chi2010.org

International Educational Technology Conference and Exhibition

26-28 April 2010

Istanbul, Turkey

IETC2010 aims to provide an environment for experts to discuss state-of-the-art technologies being used to support learning in schools, industry and universities. Virtual environments, CSCL, m-learning, e-training and e-learning will be topics of particular interest.

www.iet-c.net

Blended Learning Conference 2010

16-17 June 2010

Hertfordshire, UK

This two-day conference attracts delegates from across the globe who want to discover and share the innovations in blended learning which are happening in the UK and at higher education institutions around the world.

www.herts.ac.uk/about-us/learning-and-teaching/learning-teaching-institute/conferences/blended-learning-conference-2010/home.cfm

SIGGRAPH

25-29 July 2010

Los Angeles, USA

The SIGGRAPH conference and exhibition is the premier international event on computer graphics and interactive techniques. SIGGRAPH 2010 is expected to draw thousands of professionals from five continents to Los Angeles.

www.siggraph.org/s2010

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