VISION

Looking at the future of learning

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futurelab

About Futurelab

Futurelab is passionate about transforming the way people learn. Tapping into the huge potential offered by digital and other technologies, we are developing innovative learning resources and practices that support new approaches to education for the 21st century.

Working in partnership with industry, policy and practice, Futurelab:

- **incubates new ideas, taking them from the lab to the classroom**
- **offers hard evidence and practical advice to support the design and use of innovative learning tools**
- **communicates the latest thinking and practice in educational ICT**
- **provides the space for experimentation and the exchange of ideas between the creative, technology and education sectors.**

A not-for-profit organisation, Futurelab is committed to sharing the lessons learnt from our research and development in order to inform positive change to educational policy and practice.

How to get involved

The UK has a wealth of expertise in the education, technology and creative sectors that can contribute to improvements in the quality and use of digital learning resources. Futurelab mobilises collaboration between these sectors to develop compelling new tools and practices.

If you are interested in innovation, technology or education, Futurelab invites you to contribute to a digital revolution in education by signing up to the Futurelab mailing list. To stay abreast of new thinking in education and to be kept informed about Futurelab's activities (and, of course, to receive future editions or further copies of this edition of VISION), simply go to www.futurelab.org.uk/register or e-mail vision@futurelab.org.uk with your details and the subject title 'Subscribe: mailing list and e-newsletter'. Please also let us know by e-mail if you would like multiple copies of VISION to distribute to your members or at a conference you are organising.

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Welcome to VISION

We are witnessing a user-driven revolution. From Wikipedia to World of Warcraft, MySpace to YouTube, millions of people around the world are contributing to the design of new products and resources. New communities of innovation spring up every day, making use of new technologies to create their own music, news stories and games levels. Imagine if we were to enable this level of participation and democracy in our education system. How might this model of collaborative, community-based learning change our ideas about formal education?

In this edition of VISION, we explore the issue of 'voice' – that of the learner, the teacher, institutions and industry. How can we harness the collective expertise and enthusiasm of these groups to stimulate a culture of innovation in education? If the computer games industry can get millions of children to see themselves as player-developers, how can we enlist learners to become co-developers in their own learning? How do we encourage teachers to take risks and act as innovators against a backdrop of strict accountability?

This is a time of tremendous opportunity, with new technologies offering the potential to change how, where, when and with whom learning takes place. If we do not exploit this potential, we will find ourselves with an education system that is irrelevant to those it is supposed to serve. If we don't tackle young people's growing disillusionment, we might find schools springing up on Second Life, packed with Residents who have turned away from formal education in favour of the active learning experiences offered in the virtual world.

The case studies in this edition of VISION suggest that learning is becoming more participative and that a distributed model of educational change is emerging, in which small steps at a local level are making a huge difference. A growing number of schools are recognising that they don't need to seek permission to innovate; a growing number of teachers are finding the space and tools to try new approaches; and, as a result, a growing number of learners are finding their voices heard.

These organisations, groups and individuals haven't waited for the right moment, the perfect conditions or extraordinary opportunities. Instead, they have taken common occasions and made them great. Attitudes are contagious and theirs are certainly worth catching.

Annika Small
Chief Executive
Futurelab

Should we allow Big Brother in schools?

We are witnessing the increasing use of surveillance technology in schools. Does this mean that our children are safer and benefiting from more effective systems, or are they, as some argue, less free than they ought to be?

One of the curious things about technology is that it can change an entire environment almost by stealth. Take, for example, the internet. Its arrival as a mass medium, which seemed sudden to many people, didn't happen because a central authority decided that the world needed a global computer network. Instead, it happened because all sorts of unrelated individuals and organisations decided it would be useful to join the network-in-progress. Those millions of decisions have brought us many benefits – but they have also brought us high-speed worldwide virus infections, new forms of identity theft, and much easier plagiarism.

Similarly, a set of independent decisions now being made by schools could snowball and have a similar significant, yet unexpected effect. This is the increasing use of surveillance and biometric technologies such as CCTV, webcams and fingerprint and iris scans in school libraries, attendance systems, cafeterias and school playgrounds.

The decision to use such systems is often made for administrative reasons as schools update their library or other systems, and is seemingly thought so uncontroversial that sometimes parents are not consulted for their opinions. Yet privacy activists and others concerned with children's rights, as well as parents, are concerned that we are rushing into a vastly changed school environment with insufficient consideration as to the consequences.

What are children's rights?

Specific rights have been conferred upon children by the United Nations Convention on the Rights of the Child, which Britain ratified in December 1991, although the UK has never incorporated the convention into domestic law. Three articles are particularly relevant to the discussion about using biometric and surveillance technologies.

- Article 5 gives parents the right to be involved in decisions about their children, and also gives children the right to seek advice from their parents.
- Article 12 grants children the right to be fully consulted in all decisions made about them.
- Article 16 grants children the same rights to privacy and family life as adults. These same rights are also granted in the European Convention on Human Rights, Article 8.

Today's children are in general much more closely monitored than previous generations were. More than 4.5 million CCTV cameras have been deployed in the country at large monitoring public safety, and cameras have also proliferated in schools - fuelled by both concerns for staff and pupil safety and zero-tolerance policies regarding issues such as drugs and bullying. Queen's School in Wisbech has even gone so far as to put cameras in the toilets (outside the cubicles) at a reported cost of £100,000 as an anti-bullying measure and to prevent pupils from hiding there rather than attending class. Cameras are also moving into the classroom. Lancashire's Sunnybank Preparatory School installed webcams in 2004 so that parents could go online and see their children at school. A February 2005 DfES study of Princeville Primary School, Bradford, which is equipped with 41 cameras surveying all teaching and public areas, suggested that teachers might be able to use the CCTV footage to observe and improve their own classroom technique.

LEAVETHEMKIDSALONE ESTIMATES THAT 3,500 BRITISH SCHOOLS HAVE IMPLEMENTED BIOMETRIC SYSTEMS AND HAVE FINGERPRINTED MORE THAN 700,000 CHILDREN

Many people see nothing wrong with using biometrics to automate school processes and monitor pupils closely. Safety is so much of a consideration for many parents that the Future Foundation found in a 2004 survey that 75% of parents were in favour of being able to track their children via GPS devices – unremovable watches. The campaigning organisation LeaveThemKidsAlone, set up by David Clouter, a concerned parent in Cambridge, estimates that some 3,500 British schools have implemented biometric systems and have fingerprinted more than 700,000 children. LTKA also estimates that 20 schools per week are adopting such schemes, with encouragement from central Government via financial incentives such as allowing these systems to be bought using e-learning credits.

Library fingerprinting is the most common biometric system, but other uses are beginning to crop up. St Thomas of Aquinas school in Edinburgh uses swipe cards to take attendance in every classroom. Stirling High School has trialled fingerprinting with a view to using it in a school entry system, the library, and class registration. The Venerable Bede school in Sunderland installed an iris scanning system in its cafeteria. It was removed when it processed only five pupils a minute instead of the 12 the vendor had promised, but staff are hoping to reinstate it if the speed can be improved.

Some of these systems are being introduced to speed up legal requirements such as twice-daily registration. Others, such as fingerprint access to school libraries, are add-ons to existing systems that, in their default state, operate with barcode tags. The claimed benefits vary. Junior Librarian, the most commonly used fingerprint library software, is claimed to make checking books out quicker and more accurate and to simplify administration, since children can't lose their fingerprints as they can library cards. One of the benefits of iris scanning in cafeterias is supposed to be keeping secret which children are entitled to free lunches (often a stigma among young people). All these things have alternatives, even the latter; some US schools manage this by giving each child a barcoded card.

Most people – school governors, teachers, librarians – seem to see the decision to install biometric systems as purely administrative. "It never occurred to me there was anything wrong with it," is a common reaction to the suggestion that the systems are controversial in some quarters. Other, more compelling, reasons have also been given for introducing surveillance technologies in schools. Comments about Micro Librarian Systems include the suggestion from Deputy Headteacher Nikki Lamond from the Eye Primary School in Peterborough that it makes children more independent in the library. Tony Davies, Headteacher at St Matthew's Primary School in Cambridge, told the Cambridge Evening News, "The kids don't have to worry about losing their library card and it's really easy to use." He also told the BBC that, after having the system explained, most parents ceased to object. Finally, Scunthorpe Headteacher Angela Hewson, at Eastcroft Church of England Primary School, has called the system "fun" and said that "children were excited and enthralled" by it. Even the children themselves have divided opinions about the use of surveillance technologies in schools, a poll taken for BBC's Newsround website revealed.

"AS A PARENT, I CONSIDER SCHOOLS FINGERPRINTING MY CHILD AS AN UNJUSTIFIED, DISPROPORTIONATE AND UNNECESSARY INVASION OF HER FUNDAMENTAL RIGHT TO PRIVACY"

There are two issues that concern parents and other activists. First, the taking and storage of the biometric data itself. Second, the lack of consultation beforehand. The second of these issues is as contentious as the first, even though the DfES said in September 2006 that, in its view, schools do not need to ask permission.

His daughter's school's failure to ask consent, however, was what made Clouter concerned enough to set up LTKA to rally opposition. "As a parent," he says, "I consider schools fingerprinting my child as an unjustified, disproportionate and unnecessary invasion of her fundamental right to privacy under Article 8 of the Human Rights Act and Article 16 of the UN Convention on the Rights of the Child."

The Information Commissioner's office is drawing up guidelines for the use of biometric data outside of police work, but for the moment seems to be leaning toward agreeing that parents don't have to be consulted. Under the Data Protection Act, it's the subject's consent that is needed.

In early September, David Smith, the deputy Information Commissioner, told The Register, "The Data Protection Act is about the pupil's rights, not the parents' rights over the children's information." Yet, in other rulings, as The Register pointed out, the ICO has determined that, although children can sign up for posted direct marketing materials without their parents' permission, consent is required before they can hand over detailed personal information. "How," asks Clouter, "can a 4 year-old give informed consent?" Schools, objectors argue, ask permission for everything else. Why not for using biometrics?

England's Children's Commissioner, Sir Al Aynsley-Green agrees but suggests that it is crucial for children themselves to be consulted: "For young people to feel safe and secure in school it is important they understand the implications of the technology and be well informed about how any data collected about them is to be used. They should also have the right to consent, or not consent, to such measures being implemented."

But the lack of consultation and consent wouldn't be an issue if these parents – and politically active privacy advocates – didn't have serious concerns over the use of the technology itself.

IT specialists list a number of technical concerns. First of all, they are concerned about the security of the collected data over time and where else it might end up. Vendors say that the systems do not store complete biometrics, but parents still worry that the data stored today could eventually constitute a privacy risk for their children.

Terri Dowty, a former teacher who runs Action on Rights for Children, is particularly concerned, in the light of the tracking databases created by the Children Act 2004, that legislation may allow a wide range of Government, medical and social workers access to all children's records. These are exempt from the Data Protection Act, leaving both schools and parents without the power to prevent it.

THE USE OF BIOMETRICS MAY NOT BE CONSISTENT WITH POSITIVE TEACHER-STUDENT RELATIONSHIPS

Furthermore, the biometric recognition systems incorporated into these school administration systems are not necessarily proprietary systems that are used exclusively for these purposes. The fingerprint module in Junior Librarian, for example, is bought in from a third-party company that supplies its technology to a range of other vendors for many other uses. Isn't it possible that today's database of children's fingerprints, sometime in the future, could unlock some completely different application and set of data? There are certainly known analogies for this sort of thing: just recently, it was discovered that commonly available standard hotel minibar keys can unlock the supposedly heavily secured electronic voting machines supplied for US federal elections by Diebold.

"YOUNG PEOPLE SHOULD HAVE THE RIGHT TO CONSENT, OR NOT CONSENT, TO SUCH MEASURES BEING IMPLEMENTED"

Initiatives such as the ID card will make the use of biometrics as identifers increasingly important and pervasive. If, says Dowty, children get in the habit of using biometrics casually for relatively trivial purposes, "how will they learn to guard their information carefully when we have ID cards and biometric passports?

If anything, they should be taught to be very careful about where they put their fingerprints and iris scans, and so on. Because you can't replace them." After all, she adds, one of the key reasons that biometrics are being used in security systems is that they are supposed to be especially secure. But the more – and more casually – you use them, the easier it is for them to be stolen or copied. In other words, if someone finds out your password, you can replace it with another - but if your biometric is compromised, you can't get a new iris or set of fingers.

Dowty, as an ex-teacher, also makes a point that suggests that the use of biometrics may not be consistent with positive teacher-student relationships: fingerprint scanning and other automated systems remove what she feels is an important few seconds of personal contact between a teacher and each pupil. In those seconds of engagement, the teacher might notice that the pupil is unhappy or troubled; but if nothing else the teacher acknowledges that pupil in a human way. Remove that personal contact and "it increases the alienation in big schools," she says.

Perhaps we should also ask about the greater implications for children's learning. With the increasing emphasis on personalised learning - education matching the needs of the learner rather than the other way round, and empowering learners to develop skills in ways that are relevant to them – could it be that the use of these technologies might inhibit or even restrict their learning experience? Clouter agrees but makes the point on a wider social scale: managing school necessities like lunch money and library cards, he argues, is part of how children learn to take responsibility for their adult lives.

"IF THE DATABASE WAS TRANSMITTED UNINTENTIONALLY TO THE WRONG RECIPIENT OR WAS STOLEN IN A BURGLARY, THE PSYCHOLOGICAL EFFECT ON PARENTS WOULD BE MASSIVE"

In 1897, the American educational theorist John Dewey wrote, "I believe that education is the fundamental method of social progress and reform." Consider that in the light of other national trends: pervasive CCTV cameras, the advent of the national identity card and its accompanying national population register to track all British residents from cradle to grave, as well as increased law enforcement powers brought in after the terrorist attacks of 2001 and 2005. National identity cards are controversial now, but privacy advocates argue that biometric and surveillance systems in schools will act as a softener so that, by the time the next generation is grown up, identification and tracking systems will seem natural.

The present generation of parents has had no such conditioning. Simon Davies, executive director of Privacy International, has long argued that schools are taking an unrecognised risk.

"There is something extremely personal about a biometric," he says, "and if there was a single disaster like information being placed into the hands of the wrong people, if there was data loss resulting in death or injury, or if the database was transmitted unintentionally to the wrong recipient or was stolen in a burglary, the psychological effect on parents would be massive."

So, for the time being, the jury is out – indeed the jury has not even been appointed. Some people are so convinced of the benefits that they are using the technology right now, while others are concerned enough to establish activist groups to give a voice to their concerns. Maybe the time has come for a debate on this issue so that we can all fully understand both the positive and negative aspects of using surveillance technology in schools – and then, at least, we can all make an informed choice as to whether or not to sign up.

Links

- Privacy International: **www.privacyinternational.org**
- Liberty: **www.liberty-human-rights.org.uk**
- Children's Commissioner (Al Aynsley-Green): **www.childrenscommissioner.org**
- Action on Rights for Children: **www.archrights.org.uk**
- The Information Commissioner's Office: **www.ico.gov.uk**
- LeaveThemKidsAlone: **www.leavethemkidsalone.com**
- Children's Rights Alliance: **www.crae.org.uk**

From young person to active citizen

How can we support young people to feel part of and able to influence society?

The Make Poverty History campaign in 2005 was a key moment in the lives of many young people. Often accused of being apathetic or uninterested in political issues, teenagers and twentysomethings were vociferous in their support for the campaign. White wristbands were everywhere; more than 200,000 people attended a Make Poverty History rally in Edinburgh; and in an Oxfam survey of 16-25 year-olds, 84% said that the campaign had made an impression on them – compared to only 35% who said the same of the general election.

The success of the campaign in capturing young people's imaginations suggests that they are not apathetic but simply disengaged from the formal political system. As Joseph Ammoun, an executive council member of the English School Students Association (ESSA), points out, thousands of young people are involved in projects like the Millennium Volunteers, and in organisations like ESSA and the UK Youth Parliament. There is "growing disillusionment," he says, with the formal political system, but it's not the same as apathy.

Neil Selwyn, Senior Lecturer in Social Science at Cardiff University, agrees. Young people, he suggests, are more civic-minded than previous generations, and are often actively involved in single-issue and non-formal political causes. He sounds a note of caution, however: "We mustn't lose sight of the narrow range of young people who are turned on by these issues - especially in terms of class - and also the sustainability of this engagement. Signing an online petition or attending a charity concert doesn't really constitute engagement."

THERE IS "GROWING DISILLUSIONMENT" WITH THE FORMAL POLITICAL SYSTEM, BUT IT'S NOT THE SAME AS APATHY

So, how can we harness some of this energy and enthusiasm? How do we encourage young people to become active citizens, whether it's by joining a political party, getting involved in single-issue campaigns, or doing voluntary work for a charity?

While formal citizenship lessons were introduced in 2002 as a way of addressing the issue, their success has been patchy and the quality of lessons has been criticised by Ofsted. Jessica Pykett, a Learning Researcher at Futurelab, has been researching formal citizenship lessons in schools, but believes that informal citizenship education is crucial, because it enables children to grasp the wider context in which they live their lives. She observed one lesson, she says, in which race and social class were discussed: "One boy thought that the cultural make-up of Britain as a whole was the same as that found in his local area." This suggests that learning about citizenship can help to broaden a sense of identity that would otherwise be very firmly rooted in pupils' own locality and their own personal experiences.

One approach to enabling children to take part in citizenship activities is to encourage 'learner voice', through engaging children more actively in their own education, a philosophy that informs the DfES' personalised learning initiative. A three-year ESRC project called Consulting Pupils about Teaching and Learning found that, when carried out properly, consultation was an effective way both of involving children and making change happen – in this case, improvements to the school. In one project, called Students as Researchers, children themselves were given the opportunity to research the views of their fellow pupils.

The best method of consulting children, says Julia Flutter, a Research Associate at the University of Cambridge who worked on the project, was to use a mixture of surveys, group discussions and one-to-one interviews; that managed both to elicit a wide range of views and to obtain more in-depth insights into what children wanted. While it was important to manage expectations, she says, it was also important to show that children's views could have an impact; in one example, where children were consulted as part of the Building Schools for the Future (BSF) project, the girls came up with the idea of a "safe space" they could go to during playtime, and this was included in the final design of the building.

"RESEARCH SHOWS THAT STUDENTS IN DEMOCRATIC SCHOOLS ARE HAPPIER AND MORE IN CONTROL OF THEIR LEARNING, AND SUBSEQUENTLY ACADEMIC ACHIEVEMENT IMPROVES"

There is evidence, says Flutter, that students involved in consultation projects go on to do more active work in the community. A common concern, however, is that while consultation initiatives can be effective in engaging children who are middle-class or particularly academic, it can be difficult to access the voices of children that do not fall into these categories. Schools need to be aware of this and make special efforts to address it.

Anna Leatherdale, Director of the Phoenix Education Trust, a charitable organisation that aims to give school students a greater say in influencing their education, says that only 8% of students attending ESSA's annual conference believe their school councils (often dominated by more articulate and confident children) to be effective. She believes that consulting a wider range of students, including those who are more disaffected, does work. On the whole, she argues, children understand that if they are listened to, and their views acted upon, they will offer reasonable and realistic suggestions: "Research shows that students in democratic schools are happier and more in control of their learning, and subsequently academic achievement improves."

One of the Trust's achievements has been the creation of ESSA, an organisation run by and for school and further education students aged 11-19. ESSA encourages school students to find ways, says Ammoun, of "giving young people more of a say, not just in their schools but in education in general"; one pilot project is looking at the use of citizens' juries in schools as a method of involving young people in decision-making.

Some of the more successful projects run by schools have involved working with the wider community. A recent report from

The Carnegie Trust, 'Inspiring schools: Case Studies for Change', shows the ways in which students can be actively engaged in citizenship projects. In the Greig City Academy, for example, groups of students have taken part in police consultations on youth crime, while others have worked with the local Traders and Stakeholders Association, putting on events such as a carnival fair (organised by the students) to attract more people into the area to shop.

TECHNOLOGIES CAN ALSO BE USED TO HARNESS YOUNG PEOPLE'S INTEREST IN POLITICAL ISSUES

Another way of engaging children is to make political structures themselves more accessible, and maybe the most effective way of doing this is through technology. If we are to take young people's own concerns and interests as a starting point, then we need to understand that teenagers now manage their social relationships very differently from teenagers of a generation or so ago. The use of text messaging, instant messaging and social networking sites such as MySpace are all part of the daily social interactions of many teenagers.

If corporate advertising can reach young people through viral e-mails or videos on YouTube, then these technologies can also be used to harness young people's interest in political issues. The UK Youth Parliament, for example, uses internet forums to enable its select committees and regional committees to stay in touch

with each other, while the Executive Council is elected via the internet. Democracy itself is becoming digital; Pykett says that the children she observed were fascinated to discover they could e-mail their MP or the Prime Minister. Increasingly, the websites of local councils and public bodies enable citizens to make comments about services or gain access to information about the work they're doing. The internet can, argues Pykett, be a way of "revolutionising the geography of education" – of opening a window onto the rest of the world.

DO WE, AS A SOCIETY, FEAR GIVING YOUNG PEOPLE TOO MUCH POWER?

Selwyn agrees that technology can be useful as a way of helping people communicate and become exposed to other points of view, but sounds a note of caution: "Often the root causes of a problem such as disengagement with citizenship issues are not technical – they are social, economic, cultural and so on. As such technology on its own will do little to change things."

The idea that children and young people should be given a say in matters that affect them is now common political currency, and forms a central part of the Government's Every Child Matters initiative. Yet there is also public ambivalence about young people's role as active citizens. When 19 year-old Lucy Tate from Pontefract became Britain's youngest ever magistrate, the appointment, instead of being welcomed, was largely criticised because of her youth. Do we, as a society, fear giving young people too much power?

Pykett argues that there are justifiable concerns about giving young people too much representation: "Where children are 'empowered', the risk is that they are also therefore responsible, accountable and culpable for the decisions they make, and must deal with any repercussions. This would seem to take away the notion of childhood as a time to experiment and make mistakes." It can be naïve, argues Pykett, to suggest that "all voices are equal, because if this were the case, there would be no need for education, and opinions would be as valuable as justified argument."

Citizenship education, whether formal or informal, has to be about enabling students to become more reflective, and giving them the tools they need to make informed decisions about their lives – without burdening them with too much responsibility. For schools, argues Selwyn, the task of producing active, engaged citizens is not one they can face alone: "Formal lessons can provide a framework or even an inspiration, but they are meaningless unless they correspond with young people's real lives outside of the artificial setting of the school."

Links

- **www.citizenshipfoundation.org.uk:** an independent charity which aims to empower individuals to engage in the wider community through education about the law, democracy and society
- **www.sapere.net:** a guide to philosophy for children in the UK, promoting the role of philosophical enquiry in education
- **www.togetherwecan.info:** the Government's plan to enable people to engage with public bodies and influence the decisions that affect their communities
- **www.thebigboost.org.uk:** The Big Boost (lottery-funded programme) which makes awards to young people to set up and run projects to make a lasting difference to them and their communities
- **www.byc.org.uk:** the British Youth Council, encouraging young people to work together to take collective action
- **www2.commonpurpose.org.uk:** runs educational programmes and activities for leaders of all ages, sectors and backgrounds
- **www.beingheard.org.uk:** designed with the aim of inviting young people to engage with political issues and political decision-makers
- **www.citizen.org.uk:** promoting informed, active citizenship and greater participation in democracy and society through a combination of community projects, research, education, discussion and debate
- **www.phoenixeducation.co.uk:** providing help to develop democratic educational practices within schools and Local Authorities

Sculptures created by pupils and their families at Luckwell Primary School as part of their citizenship studies

World Power League

World Power League helps children aged 11-16 years old to reflect on what is meant by the concepts of citizenship and politics. Originally an idea from artists Lucy Kimbell and Barby Asante, it was developed with support from Futurelab into a prototype technology. In practice, it is a website that enables students to vote for people they wished had more power, as well as for those they wished had less. Because the World Power League can contain people from all walks of life – including the students themselves – it shows that politics is not just about the Houses of Parliament, but the relationships between people in their daily lives.

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

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...

BAE Systems

Now everything is clear

Stanford University

Scientists at Stanford University have developed a novel biocompatible material that promises to transform eye care. Known as Duoptix, it is a hydrogel, or polymer that holds a lot of water. The material is transparent and permeable to nutrients, including glucose, and so its most likely application is in the production of artificial corneas. It is also hoped that Duoptix could be used to develop more comfortable extended-wear contact lenses as well as in replacements for inner-eye lenses which have been damaged by cataracts.

www.stanford.edu/dept/news/pr/2006/pr-cornea-091306.html

Marvel-lous material

The possibility of 'being Spider-Man' is now a little more likely, thanks to researchers from BAE Systems' Advanced Technology Centre. They have come up with a new material which has properties similar to that of the underside of a lizard's feet. The material, which is made by coating a sheet of polyimide with large quantities of stalks with splayed ends, has been tested on glass – with the result that an area covering 60cm^2 can support the weight of a small family car. But it may be some time before you can use this technology to mimic the arachnid superhero, as further research is required to perfect the material.

www.baesystems.com/ocs/sharedservices/atc/index.htm

University of Applied Sciences

New technology could spell the end for dull meetings

A team of developers from the Digital Media department of the Upper Austria University of Applied Sciences are busy designing 'the office of tomorrow'. The original aim behind the project was to develop novel interfaces for collaborative workspaces, and so to enhance traditional face-to-face meetings. The outcome is something they are calling a 'collaborative environment' which uses an interactive table and interactive screens such as digital flipcharts, among other innovations. Following exhibitions at SIGGRAPH's ETech and Disney's New Technology Forum in 2006, the team have uploaded a gallery with photos and drawings to their website so that others can also visualise the future of workspace.

www.officeoftomorrow.org

Philips

Illuminating stuff

Philips Research has launched a range of textiles, known as Lumalive, which make it possible to carry advertisements and graphics which constantly change on clothes, furniture and other textile-covered surfaces. Flexible arrays of coloured light-emitting diodes (LEDs) are fully integrated into the fabric and so it is claimed to be practical for daily use. The electronics and batteries are also integrated into the material and are invisible to the wearer as well as observers. The German fashion designer Anke Loh has already used this fabric in her autumn 2006 collection – and Philips hopes that others will now follow suit.

www.research.philips.com/initiatives/photext/index.html

Averting disaster the PC-way

Tsunami Harddisk Detector

In certain parts of the world tsunamis pose a serious life threat which can be significantly alleviated by reliable warning systems – although unfortunately many countries cannot afford such facilities, partly because they require expensive maintenance. The Tsunami-Harddisk-Detector looks set to change all that. It utilises your existing computer hardware to detect earthquakes, which can lead to tsunamis. But the most significant point, since it is a software solution, is that it can be distributed free of charge.

www.ninsight.at/tsunami

Adding up to faster airport security

We could all enjoy faster and safer air travel in the future, thanks to a project to apply complex maths to ensure that data gathered by the airport scanners is translated quickly and accurately into a dynamic 3D image. Mathematicians at the University of Manchester aim to maximise the effectiveness of an innovative new 3D scanner developed by Rapiscan Systems. Currently, most airport scanning machines give security staff a flat, one-dimensional view – and so it is hoped that this new technology could make it easier to identify the contents of a bag.

www.manchester.ac.uk/aboutus/news/pressreleases/airportsecurity

The new basics

The skills we will need in the future will be, or at least look, different from those we've needed in the past. John Morgan, Senior Researcher at Futurelab, explores what form these new basics might take in the 21st century and looks at past and present changes to the curriculum.

In the 1980s one of the most influential books about education was called 'Fifteen Thousand Hours: Secondary Schools and Their Effects on Children'. The 15,000 hours was the average amount of time children spend in schools between the ages of 5 and 16. The background to this study was the widespread feeling in the 1970s and 1980s that schools weren't providing children with the basic skills needed to 'get on and get up' in our society. This was most famously expressed in the then Prime Minister James Callaghan's speech in 1976 that launched the 'Great Debate' in education, which focused on the extent to which schools were producing students with the skills needed in the economy: "I am concerned... to find complaints from industry that new recruits from schools sometimes do not have the basic tools to do the job that is required." He went on to stress his concern about the lack of school-industry cooperation, the anti-technological bias in the school curriculum and the standards of numeracy and literacy amongst school leavers. In other words, schools were not enough concerned with the 'basics'.

In the 1980s and 1990s educational policies seem largely to have been concerned with getting 'back to basics'. The National Curriculum was widely seen as restoring a focus on numeracy, literacy and the study of classic texts and national history. However, throughout this period there were also voices that argued for increased modernisation of the curriculum – one that was much more in line with the needs of children who will live and work in the so-called 'knowledge economy' of the 21st century.

THE NEW ECONOMY NEEDS PEOPLE WHO ARE INNOVATIVE, FLEXIBLE, CREATIVE AND WHO HAVE HIGH LEVELS OF EMOTIONAL AND SOCIAL INTELLIGENCE

This call for a modernised education system reached its peak following the election of Tony Blair's Labour Party in May 1997. The focus of the Government was to be 'education, education, education'.

This policy was explained in a 1996 pamphlet entitled 'The Skills Revolution' which argued that: "If we are to face the challenge of creating a high tech, high added-value and high wage economy, we can only do so by skilling our people."

This is not just the view of one political party. This has become one of the accepted truths of our age; no political party seriously dissents from the view that better skilled students will result in higher Gross National Product (economic growth) and therefore a happier and better society.

THE NEW ECONOMY NEEDS PEOPLE WHO ARE INNOVATIVE, FLEXIBLE, CREATIVE AND WHO HAVE HIGH LEVELS OF EMOTIONAL AND SOCIAL INTELLIGENCE

In our changing world, it is not enough to focus on basic literacy and numeracy (though of course these are the bedrock for everything else). The new economy needs people who are innovative, flexible, creative and who have high levels of emotional and social intelligence. This requires a curriculum that allows these skills and abilities to develop. This is reflected in the recent QCA Futures programme, which seeks to stimulate debate about the aims and purposes of the school curriculum: "Employers consistently identify the kind of people they want in their workplaces. They want people who are literate and numerate and have information technology skills. They look for people who can build and maintain relationships, work productively in teams and communicate effectively. They look for problem-solvers, people who take responsibility and make decisions and are flexible, adaptable and willing to learn new skills."

There are signs that this type of thinking is becoming the 'new common sense' about curriculum, and is reflected in various initiatives to reform the school curriculum. An example is the RSA's curriculum Opening Minds: Education for the 21st Century (www.rsa.org.uk/newcurriculum). Opening Minds challenges current curriculum and teaching and learning practices, and makes suggestions about what an alternative school curriculum might look like. It starts from the assumption that there is a growing divide between the current school curriculum and the experiences and demands of the outside world – Opening Minds argues that it is not a matter of changing ways of teaching but about the content of the curriculum, which it argues is fundamentally out of date, slow to react, fragmented and ill-suited to children's needs.

The Opening Minds curriculum recommends the abandonment of subject areas and their replacement by a set of competences that students will acquire through a range of experiences. The focus is on understanding and doing rather than acquiring a body of knowledge. It makes use of new technologies to promote flexible learning and teaching styles and the release of creative energy – in other words, it promotes independent rather than 'receptive' learning.

The impetus for the Opening Minds curriculum was the RSA's report 'Redefining Work', which looked at how work and career patterns were likely to change over the next two decades. The report concluded: "It is already clear that in the knowledge economy and society of the future, people with a good education and high skill levels will be best placed to take advantage of the opportunities offered them and to handle successfully an increasingly complex world," adding that "we are still educating people for a world that is disappearing."

The message is clear: schools that concentrate on teaching a body of knowledge need to change their focus. Students still need access to knowledge, but the subject curriculum is not able to provide the skills necessary to do this. Opening Minds focuses on the competences which individuals require in order to adapt to the 21st century. They are:

- learning
- citizenship
- relating to people
- managing situations
- managing information.

Opening Minds has attracted a good deal of interest and comment. The signs are that many educators see it as an exciting and innovative attempt to re-imagine education because it focuses attention back on the learner and challenges a National Curriculum widely criticised for being weighed down with content. It is future-oriented and skills-based. As such, it's likely that we will see similar attempts to devise alternative curricula in the near future.

SCHOOLS, WITH THEIR FOCUS ON TEACHING A BODY OF KNOWLEDGE, NEED TO CHANGE THEIR FOCUS

However, at this point, a note of caution needs to be introduced. Twenty years ago, in the midst of tumultuous social change, the RSA published a collection of essays called 'Education for Capability' which called for a radical restructuring of education, based on the acquisition of capability and competences. This would entail not only the "familiar basic skills, but also practical ability, the ability to get on with others, skill in solving real life problems" as well as calling for a "creative revolution in learning". Sound familiar? The failure of this 'manifesto' to take off, despite being signed by

influential figures such as organisational behaviourist Charles Handy and military historian Corelli Barnett, raises some important questions about how schools and curriculum change (or not). One possible explanation is that reports like this and curriculum visions such as Opening Minds are simply ahead of their time. They can see what is coming, but schools, teachers and politicians are too slow to react to the forces that are reshaping the world. Another explanation is that these visions are the result of 'think-tanks' with an interest in promoting radical change – that is, after all, why they exist. Another response is to suggest that there is no simple connection between social and economic change (society) and what happens in schools (culture). That is to say, it's not a case of schools simply responding to external forces such as globalisation or new technologies.

This is not to say that we should forget all about the possibility of radical change in education systems and curricula, and it is certainly not meant as a criticism of the work of the RSA, which has produced some of the most provocative and innovative thinking regarding the direction of educational policy. It does, however, warn against the danger of thinking that schools will simply get swept along by large-scale forces such as globalisation and economic change. Instead, it suggests that a delicate balance needs to be struck between educational vision (where we want to go) and the altogether more piecemeal and unpredictable process of change in schools. By way of illustration, we might think back to the early 1980s, which in Britain at least was a time of optimism and excitement about the potential of information technology to restore economic growth and solve the problem of unemployment. There were moves to introduce 'computer literacy' in schools (the 1980s version of the new basics). However, such moves were not in line with the experience of many young people growing up in parts of the country where there was little sign of the emergence of the 'sunrise industries', in other words, those that are growing quickly and expected to be increasingly important in the future. This suggests that any curriculum needs to recognise people's current experience in addition to reflecting what life might be like in the future.

A DELICATE BALANCE NEEDS TO BE STRUCK BETWEEN EDUCATIONAL VISION AND THE ALTOGETHER MORE PIECEMEAL AND UNPREDICTABLE PROCESS OF CHANGE IN SCHOOLS

In spite of the complexity of curriculum change, we still need to think about what we mean by the 'new basics' in the 21st century and to imagine how education might be shaped in the future to support them. At the heart of these discussions is the challenging question of what we mean by the 'good society' (after all, all education systems are based on a view of what this difficult phrase means). To give a current example, just because the economy now needs fewer trained scientists does that mean that we shouldn't require young people to learn the technical aspects of science? Or should we suggest that a healthy democracy requires citizens who have an understanding of how scientific knowledge is produced? One thing is certain however. The question of what the 'new basics' are should be an open one – one that is debated and struggled over by as many people as possible.

The Leitch Review of Skills

The Government commissioned the Leitch Review to identify the UK's optimal skills mix in 2020 to maximise economic growth, productivity and social justice, and to consider the policy implications of achieving the level of change required. An interim report, 'Skills in the UK: The Long-term Challenge', was published in December 2005 and found that:

- over a third of adults of working age in the UK do not have a basic school-leaving qualification
- five million adults have no qualifications at all
- one in six adults do not have the literacy skills expected of an 11 year-old and half do not have these levels of functional numeracy.

It is expected that the Leitch Review will report its conclusions and recommendations to the Government before the end of 2006. For further information, go to **www.hm-treasury.gov.uk/independent_reviews/leitch_review**

Enquiring Minds

Futurelab's three-year research project, supported by Microsoft, to pioneer personalised learning in practice is trialling a new curriculum in two Bristol schools. The Enquiring Minds curriculum encourages young people to draw on their own experiences to produce knowledge that is meaningful to them. The approach will involve Year 7 and 8 pupils, and will allow teachers and pupils to negotiate the content of their learning, gradually enabling students to take more control over how they learn.

The new curriculum, along with a draft handbook and other resources for educators who would like to see how this approach could be implemented in practice, is available to download from the Enquiring Minds website:

www.enquiringminds.org.uk

Personalisation Portfolios

What shape might technologies take to support personalised learning in the future?

Personalisation, where learning is tailored to students' needs, interests and aptitudes, is a powerful approach to education but, for many teachers, putting it into practice can be a challenge. So how can we achieve personalisation that is based on the active involvement of learners and what role might technology play in this process?

Learner control and 'learner voice' are important aspects of personalisation. Learners – anyone – can only achieve an authentic 'voice' to the extent that they know themselves as individuals. The voice of someone who does not know themselves may not be a personal voice, but rather the voice of a stereotype; a role; a subculture – someone else's voice. Personalisation without a real knowledge of the learner's needs, interests and aptitudes is largely meaningless: it could be merely the replication of peer group norms, giving the appearance of something personal without the substance.

So, for learners to gain control over their own personalised learning, they have to truly understand their own needs, interests and aptitudes - otherwise their learning will have to be 'personalised' for them, perhaps by others who may not know them well enough to do this. Achieving the self-knowledge needed for authentic personalisation can sound frighteningly introspective. But it need not be so.

Technology, which is often seen as impersonal, can help us to deepen our self-knowledge – through self-observation and reflection. Recording what we do, at the time of doing it or shortly after, is widely used within personal and professional development, and portfolio technology is increasingly used to help with the storage of personal records, recalling them for reflection, and the storage of the reflections as well. For example, portfolio tools designed for personal development planning are currently available to assist us when considering a new career. They can help us to assess our competence in the areas needed for entry to that career, figure out which skills need improving, and then find out which courses are most appropriate for helping us to fill the gaps in our competence.

Many young people are already engaged in technology-assisted activities that could lead to them developing deeper self-knowledge. For example, every day, thousands record, reflect on and comment on their own and others' daily lives, through blogs and other social software. These activities neither require an introspective personality nor any special skills or motivation – young people are often simply looking to interact with a peer group.

Many of these activities could be adapted to help young people to determine their needs, interests and aptitudes, and thus help with personalisation. Use of even the more basic kinds of social software could be the starting point for individual reflection and social comment – and thus for learning about themselves. Students could, for example, rate a course for their peers, providing comment - and so insight - for both themselves and others. They could take this a stage further, asking "why did I (not) do well on that course?"

ONE WAY OF RECORDING THE PEOPLE WE ENCOUNTER WOULD BE TO USE CAMERAS TOGETHER WITH FACE RECOGNITION

Consider the ways in which information can now be gathered automatically. Take satellite navigation to start with. If mobile phones can use their location to send a stream of position data to a data store, which can be used in conjunction with

learners' portfolio systems, the hard work of recording and tracing what events have happened, when and where, on any given day would be made much easier. Of course this information could be highly sensitive, and young people would naturally want to ensure that it is only used for approved purposes involving approved people. But given this constraint, there are many kinds of functionality which could result. Serendipitous meetings could be arranged on the spur of the moment, for example when travelling on the same train as someone with a mutual interest. Educators and learners could store notes related to very specific places, which could easily be accessed by people close to those places. Thus, a physical landscape could be populated with learning resources. It is easy to see how this could help students of, for example, natural history, architecture or urban design.

Beyond having access to where we have been, information about who we have met on the way could be vitally useful to jogging the memory and recollecting what actually happened. One way of recording the people we encounter as we go about our daily lives would be to use cameras together with face recognition. There are already systems available which claim to recognise particular faces in photos, after the systems have been trained on examples of photos of those particular people. So, all you would need to do is point your mobile phone or digital camera at someone you already know, and press a couple of buttons.

Voice recognition would be another way for students to gather information about conversations they've had, particularly if the technology were sophisticated enough to put a name to a voice and determine what was being said. Such systems might well be used to pick out key words which have been flagged as being of particular personal significance. In a learning context, learners could note words of particular significance to the learning outcomes. This could then mean that the flagged words could provide an automatic index to the sections of an audio file that are likely to be of particular interest to the student. This kind of indexing of audio files could prove invaluable, avoiding the enormous burden of listening through hours of recordings.

Wearable and other mobile devices too have the potential to help us to record what we and others are doing. Sensors for pressure, position or flexing, either built in to clothing or handheld, could distinguish basic categories such as sitting, walking, running. This could be time-indexed to further enrich the automatic record of what we have been doing.

VOICE RECOGNITION WOULD BE ANOTHER WAY FOR STUDENTS TO GATHER INFORMATION ABOUT THE PEOPLE WITH WHOM THEY HAVE SPOKEN

Of course these technologies would need to be flexible, to enable different types of portfolio for different learner preferences and to ensure that the different types of media stored are not fragmented. Assuming that this can be achieved (which it can), they offer the capacity to increase the amount of information that young people can access about themselves, their activities and their surroundings. The easier it is for them automatically to record their actions and words, as well as those of the world around them, the easier it is to create useful records of their lives – although a cultural shift may be required in all of us to accept this approach (as it is not without social implications). The application and use of this information can go beyond the increasingly common practice of reflecting on their skills and abilities. It can help to clarify preferences, motivations and personal values, and can be stored by the portfolio systems as 'ethical profiles'. These could then help learners to understand better their own identities, leading to personalisation that could potentially play a part in many spheres of their life. As well as helping learners to choose courses and institutions that are more closely in tune with who they feel they are and want to be, this ethical approach could support choices of activity, job, career, consumer behaviour, and investment of time as well as money.

All of this technology already exists. Whether, and when, it is used to enhance young people's ability to learn about themselves, and thus to contribute to authentic personalisation where the learner is in control, will naturally depend on cost, popularity and the development of educational approaches that embrace this technology. If a Web 2.0 approach is taken, where it is made easy to reuse information in different contexts, then it becomes increasingly likely that people will think up compelling motivations for gathering it – and we could well be looking at an education system that not only calls for personalised learning but one where innovative technology supports its implementation.

Getting creative

Creativity is central to a thriving, imaginative and innovative world. It is crucial to education, not just in terms of the approaches and tools used to teach, but also in the act of learning. Without it, life could stagnate and new ideas may not, in fact, be truly innovative. With that in mind, this section celebrates some exciting and truly innovative creative ideas from around the world.

Singing sock puppets

Ever felt that you need a soft and furry music tutor? Interactive Designer Matthew Irvine Brown has created a sock puppet as part of his Masters degree in Interaction Design at the Royal College of Art which is just that. As the mouth is opened and closed on these prototypes, a flex sensor is bent that makes the puppet 'sing' up and down a scale. The puppet can be tuned to any scale, and so could be used to help illustrate relatively complex musical theory - such as the differences between blues, chromatic and pentatonic scales - through play.

www.irvinebrown.com

XS Labs 2006

What a yarn!

The Krakow weaving is an electronic, colour-changing Jacquard weaving with conductive yarns, thermochromic inks and a circuit board. The figures in the weaving change colour from black to transparent so that, like our memories of them, they disappear over time. The weaving was developed by XS Labs, a design research studio that develop artifacts which react to our bodies and our environments, including prototypes in electronic textiles and wearable computing.

www.xslabs.net/work-pages/krakow.html

GRL

Light up the world

For graffiti that is visible all day long, use LED Throwies, glowing lights that can be arranged in patterns or words and attached to any magnetic surface. This open source graffiti technology, which was developed by Graffiti Research Lab, consists of a lithium battery, a 10mm diffused light-emitting diode (LED) and a rare-earth magnet taped together. As well as making your mark on walls, you can also use your LED Throwie to write in the air with light, put them on your bike as an additional reflector or put them on surveillance cameras to make them more visible at night.

graffitiresearchlab.com

Jin-Yo Mok

Sounds like a good idea

SoniColumn is an interactive sound installation, in the form of a column-like cylinder, that can be played by touch. Grids of LEDs installed inside the column are lit up by the users' touch and emit unique, chime sounds. Users can crank a handle, which is located a few feet away from the installation, to make the column slowly rotate and so play the light patterns and sounds of their touch. SoniColumn is part of multimedia artist Jin-Yo Mok's The MusicBox Project, which reproduces his childhood experiences with a small music box.

geneo.net/sonicolumn

Jane Mulfinger and Graham Budgett

Regrets, I've had a few

Regrets, the brain child of Graham Budgett, Jane Mulfinger and Carl Magagnosc, is an interactive archive, public artwork and study regarding the human capacity for remorse and regret. It effectively 'shares the burden' of remorse or discontent communally and allows for a poetic montage of emotion. People can anonymously confess their remorse and regret to the project's website and roaming units, which wirelessly relay them to a central database to be matched with other similar regrets. The result will be an interesting sociological databank that will be made available to wider audiences on websites, via public displays and on the radio.

www.regrets.org.uk

Drawn installation. OFFF festival, Barcelona.

Bringing drawings to life the modern way

Drawn is an installation for hands and ink by Zachary Lieberman, recently shown at the Ars Electronica festival. Users are videoed drawing simple pictures in black ink. The drawing is then digitally processed into elements and projected. These elements can then be spun, rotated or moved 'by hand' on the projection as hand movement is tracked. Inspired by early filmic 'lightning sketches', in which animation techniques were used to create the illusion of drawings escaping the page, Drawn presents a modern update: custom-developed software alters a video signal in real-time, creating a seamless and even magical world of spontaneous and improvised performance of hand and ink.

thesystemis.com/drawnInstallation

Teacher innovation

Creating something new can be a risky business. Whether the materials are bricks and mortar or ideas and skills, you have to expect the unexpected. But it doesn't have to be painful; some schools have shown how it is possible to innovate within the current education framework, utilising the support that is available to help bridge the gap between where you are and where you want to be...

As a concept, innovation in education is nothing new. Fresh ideas and perspectives, mixed with the odd eureka moment, are scattered both throughout history and current practice. Adapting to the changing needs of society has long been on the Government's agenda. Yet a 'top-down', large-scale approach is not the only way of instigating change. Teacher innovation can – and does - come in all shapes and sizes; from simple changes to the curriculum, timetable or physical environment through to major projects involving the development of equipment or technology, links with the wider community and even the creation of virtual learning experiences.

The frustrating – and exciting – thing about teacher innovation is that it means different things to different people. An ever-changing landscape littered with metaphors; for some it's about flying by the seat of your pants, for others, a step-by-step strategic approach, planned and executed with precision. Matthew Corrigan, Vice Principal, and Matt Burrell, e-College Manager, both of Eggbuckland Community College in Plymouth define it as "bravery and abandonment: challenging what is currently happening in schools; having the conviction to jettison what is unnecessary and develop that which moves teaching, learning and achievement forward." Helen Boyle, Advanced Skills Teacher from Campion School Northamptonshire, describes it as "a journey... thinking outside of the box and other expected boundaries." Then there's Nigel Akers, Vice Principal of Djanogly City Academy Nottingham, who sees it as finding "new ways of learning, different ways of teaching and alternative approaches to school organisation and management." Whatever your approach or definition, Peter Hicks, Headteacher of Broadclyst Community Primary School, sums it up nicely by suggesting that innovation is about "investing in human capital: the relationship between one's personal qualities and one's personal capabilities."

So why do some teachers view the road to innovation as a difficult track to negotiate while others make their way along it with only a small leap of faith? "It's about attitudes, emotions and perspectives," explains Tony Fisher from The University of Nottingham School of Education. "The reality is that teachers have never had more potential in terms of tools to be innovative. There is nothing fundamentally wrong with the system, because some people can make it work, but many teachers feel the stakes are too high."

"YOU CAN INTRODUCE EXACTLY THE SAME THING IN SEVERAL PLACES AND GET TOTALLY DIFFERENT RESULTS"

The technological age has brought about endless possibilities for advances in teaching and learning; an unprecedented range of choices which, in theory at least, should lead to teacher innovation – especially in the use of IT. But for many educators, as Fisher points out, the space to innovate still seems enclosed by the thorny hedge of accountability. "Many teachers feel caught between a rock and a hard place; having been told what to do, much of their autonomy has been taken away. On a professional basis, that makes life difficult; how people feel about their work is important – as is their level of confidence. There has been a lot of technical, rational thinking: if we do X, then Y happens and it's fixed. Teaching and learning is much more complicated than that; you can introduce exactly the same thing in several places and get totally different results."

So how can we support more teachers to take the plunge and innovate? Is there a recipe for successful teacher innovation? While every innovative project is unique, each seems to consist of 'home-grown' ingredients – local expertise and skills – mixed with innovative tools; then spiced with collaboration, and dressed with lashings of positive thinking.

Just take a look at Peter Hicks' technological innovation at Broadclyst: a mix of the latest IT systems and a powerful belief in the potential of every child - given the right environment. "Our 'Classrooms of the Future' use ICT in a pervasive way; treating it not as a discrete subject, but as a generic skill like reading and writing. Every child has their own e-mail address, web page, file space and access to the internet – at any time of the day or night - and, in Year 6, daily use of TIMMS™ (a Total Interactive Multi Media System). We've also recently employed ITechE, an Immersive Technology Envelope, and all our assessment and planning is done online using the-educator.co.uk, giving teachers back the time to do what they do best – teach."

The proof? Apart from a waiting list of five years and excellent SATS results, perhaps it boils down to the positive relationships and innovative ethos that seem to thrive at Broadclyst. True, you need good leadership; but as Hicks explains, it can't be done alone – it's about 'people power'. "Together we've created a truly dynamic place where natural curiosity abounds... where children develop the skills of reasoning as well as personal qualities that will enable them to be of genuine value to themselves and others." Dubbed the 'School without Walls', the team's achievements are made all the more poignant when Broadclyst students demonstrate the ITechE environment – which contains, among other things, a miniature version of the London Planetarium. "Imagine being able to stand in a street in ancient Rome in the year 725AD; to walk alongside the Great Pyramid at Giza whilst it's being built; to look inside the human heart; to stand on the summit of Everest; to look beyond the stars."

"FUNDS WERE GENERALLY AVAILABLE TO KICK-START INITIATIVES, THOUGH THEY DID NEED TO BE SOUGHT OUT"

For all those teachers still window-shopping, it's cheering to know that Broadclyst's projects were all bought within the school's existing budget. Nevertheless, catering for larger numbers may require a different financial approach. Nigel Akers' hugely successful, high-tech learning environment at Djanolgy Academy, with its 1,700 students, is one case in point. With a huge array of positive change - to the curriculum, the timetable and the type of services they offer (which include counsellors and a resident professional dance company) - the next question has to be, where did the money come from? Nigel Akers' answer gives some insight into both the philosophy and the means. "We found that 'thinking big' was often more successful than being tentative and 'thinking small'. Funds were generally available to kick-start initiatives, though they did need to be sought out, applied for and re-applied for when the first, second or third attempts failed."

Although some teachers may not initially be bowled over with the idea of business partnerships, Djanolgy's ICT achievements could help to change their minds. "We've also worked on projects with BT, Intel, the e-Learning Foundation, New Deal for Communities, Toshiba and Microsoft, which led the Academy to win national awards for the innovative use of ICT."

While such an 'all-out' approach has worked for Djanolgy, Helen Boyle's blend of innovation may be a better starter for the uninitiated. "It's terribly exciting; we're creating an alternative competency-based curriculum, using the RSA's Opening Minds; designed to address personalised learning, improve transition and equip learners with the skills to cope in the 21st century." Despite her evident passion, Helen Boyle has kept her enthusiasm in check, and perhaps, therefore, has gained her colleagues' support, by breaking the project down into manageable chunks. "In the next couple of years when the Year 7 students arrive, instead of having 14 or 15 different teachers, they will have approximately five; making for a smoother process." So what actually happens when you 'open minds'? For obvious reasons, Boyle turns to her students for a response, and Amie King, from Year 9 who did OM in Year 7, explains. "Opening Minds was a great experience! It boosted my confidence and helped me to find out who I am and how I work. I now find it easier to get better grades." It's not surprising that Ofsted are hoping to showcase them at an innovation conference planned for 2007.

Niker Akers

Eggbuckland Community College

CO-CONSTRUCTION [BETWEEN TEACHERS AND STUDENTS] IS A POWERFUL VEHICLE FOR INNOVATION

In addition to introducing change slowly, the sense of satisfaction that follows each small triumph is more likely to permeate into all areas of the school - and enthuse others - if it's been created in response to an existing problem. Especially when, as Matthew Corrigan's and Matt Burrell's example from Eggbuckland illustrates, it involves better use of that precious commodity: time. "We developed an electronic Individual Learning Plan (e-ILP) to replace an unwieldy, paper-based one. The web-based software, created in conjunction with a local software company, the European Social Fund and our local Pathfinder project not only provides a detailed picture of the whole student, it has also reduced workload." Having a clear set of objectives also helps to ensure success. "It's of clear benefit to all; we wanted a living, student-friendly document that's customisable, accessible to all, and links to the current MIS (Management Information System), and this is what we've got."

Perhaps aware that some 'watched pots' of teacher innovation never boil, Eggbuckland's innovators also offer ideas for preparing the ground; to 'propagate' inspiration. "If you develop a learning culture with a growing research base and celebrate success, then complement this with a passion for raising standards, you will have the seeds of innovation." Emphasising the importance of working alongside students, they are keen to stress that teachers are not the sole innovators. "Many students have 'hidden' but high-level skills and interests that are far removed from conventional pedagogy and practice. Co-construction is a powerful vehicle for innovation."

Which brings us back to the idea of innovation as a journey, with Helen Boyle's advice for encouraging colleagues onto the 'road less travelled': "Rather than look at the obstacles and why it can't be done, think about how it will be achieved to the benefit of all. Try to regularly communicate with everyone, not only a few concerned staff. Presenting evidence and reviewing progress helps to spread the idea amongst those who are more wary."

So what's the bottom line of teacher innovation? That depends on your view. If you like cooking, it's accepting that you can't make omelettes without breaking eggs. And if you like travelling, it's accepting that not all roads lead to Rome. But, as Peter Nivio Zarlenga, the American Businessman and author on business strategy said, "We will not know unless we begin."

Educational innovation on the web

- The Innovative Teachers' Network: **www.innovativeteachers.com**
- The Virtual Workspace: **www.virtual-workspace.com**
- Enquiring Minds, an innovative approach to teaching and learning: **www.enquiringminds.org.uk**
- The Opening Minds curriculum: **www.thersa.org/newcurriculum**
- Centre for Innovation in Mathematics Teaching: **www.cimt.plymouth.ac.uk**
- Rethinking Education: **www.rethinkinged.org.uk**
- The Learning Discovery Centre, Northamptonshire County Council: **www.learningdiscovery.org.uk**
- The 10 Minute Film School: **www.exposure.co.uk/makers/minute.html**
- The East Midlands Broadband Consortium: **www.embc.org.uk/learning**

Teachers as innovators

Futurelab is embarking on a research programme to identify what can be done to encourage teachers to apply more innovative and creative uses of digital learning resources in UK schools. Through reviews of existing evidence, and evidence gathered from key stakeholders, the research programme will identify:

- where innovation with digital learning resources is occurring in UK schools
- the factors contributing to such innovation
- the methods for sharing and disseminating innovative practice.

As a core element of this work, Futurelab is creating a map of innovation in teaching and learning with digital resources. This map will highlight where innovation is taking place throughout the UK, and will provide examples of practice that are used to investigate the factors that both support and hinder innovation within education. To help to develop this resource, please send your examples of innovation to **innovations@futurelab.org.uk**.

For further information, go to
www.futurelab.org.uk/showcase/teachers_as_innovators

Events

BETT

10-13 January 2007

Olympia, London, UK

www.bettshow.co.uk

BETT is widely accepted as **the** ICT in education event, with over 600 leading educational suppliers and over 28,000 visitors. Embedding ICT is at the heart of the Government's five-year strategy for children and learning, and BETT is billed as a must for those wishing to keep abreast of the issues and the products relating to ICT in education.

Global 3G Evolution Forum

22-25 January 2007

New Otani Makuhari Hotel, Tokyo, Japan

www.3gmobileforum.com

This conference will gather together the world's leading 3G pioneers, strategists and regulators to showcase the future of third generation and beyond technologies and services. The latest opportunities in 3.5G and 4G and complementary or competitive new technologies will be explored.

Learning Technologies

31 January – 1 February 2007

Olympia 2, London, UK

www.learningtechnologies.co.uk

The 2007 conference theme is 'learning for organisational performance' and will focus on the technologies and methods available to both organisations and individuals to maximise performance at work through learning and development.

Building Schools Exhibition and Conference (BSEC 07)

20-21 February 2007

Harrogate International Centre, UK

www.buildingschools.co.uk

This conference has been designed to address the major issues in the implementation of the Government's Building Schools for the Future programme. Up to 1,000 delegates are expected to attend, including policy and decision makers from within Government and education, as well as architects and those from the construction industry.

CeBIT

15-21 March 2007

Deutsche Messe AG Exhibition Center, Hannover, Germany

www.cebit.de

CeBIT is among the world's leading IT and telecoms trade fairs. In just one and a half decades, CeBIT has grown from its origins as part of HANNOVER MESSE to become the world's leading event for information technology, telecommunications, software and services.

3rd IEEE International Workshop on PervasivE Learning (PerEL 2007)

19-23 March 2007

New York, USA

wwwra.informatik.uni-rostock.de/perel2007

This event aims to address the issues of pervasive computing in combination with new types and possibilities of learning, teaching and working. It covers both the technical as well as the non-technical aspects of pervasive learning, forcing innovative learning environments by utilisation of wireless communication and wearable computing.

Education Show

22-24 March 2007

NEC, Birmingham, UK

www.education-show.co.uk

With over 600 exhibitors expected to display their resources, the Education Show is designed to provide educators with an opportunity to review the widest selection of resources under one roof. The seven feature zones showcase resources for pupils from pre-school through to 19 and beyond.

CAL '07

26-28 March 2007

Trinity College, Dublin, Ireland

www.cal-conference.elsevier.com

The Computer Assisted Learning biennial conference, CAL '07, will debate the alleged disruptive nature of technological development in the area of learning at the individual, institutional and national level in an attempt to learn from the past while designing for the future.

DIGITEL 2007

26-28 March 2007

National Central University, Jhongli, Taiwan

digitel2007.cl.ncu.edu.tw

There is a rapidly growing interest in the design of digital games and intelligent toys for learning. These games and toys make it possible to integrate individual and social activities in new ways, and so to reframe long-standing questions, ideas and approaches to learning.

International Conference on Weblogs and Social Media

26-28 March 2007

Boulder, Colorado, USA

www.icwsm.org

Recent years have seen a flourishing of social media - the promise of the WWW coming to fruition. Across the world, individuals can share opinions, experiences and expertise at the push of a button. Creating web content was for years the domain of tech-savvy people; now the barrier has been torn down.

Society for Information Technology and Teacher Education (SITE)

26-30 March 2007

Crowne Plaza Riverwalk San Antonio, Texas, USA

www.aace.org/conf/site

SITE represents teachers who are interested in the creation and dissemination of knowledge about the use of ICT in teacher education. The conference offers opportunities to share ideas, explore the research, development, and applications, and to network with the leaders in the field.

Computer/Human Interaction (CHI) Conference

28 April - 3 May 2007

San Jose, California, USA

www.chi2007.org

Participants take the next step in computer-human interaction; beyond our comfortable methods; beyond our exciting and innovative technology; beyond our established scientific frameworks and reputations; beyond the common ground of professional and national cultures; and beyond our far-flung social networks.

6th Creativity and Cognition Conference

13-15 June 2007

Washington DC, USA

www.cs.umd.edu/hcil/CC2007

This event is focused on the theme of cultivating and sustaining creativity: understanding how to design and evaluate computational support tools, digital media, and socio-technical environments that not only empower our creative processes and abilities, but that also encourage and nurture creative mindsets and lifestyles.

ED-MEDIA

25-29 June 2007

Vancouver, Canada

www.aace.org/conf/edmedia

The World Conference on Educational Multimedia, Hypermedia and Telecommunications (ED-MEDIA) is becoming a key event for those who play a role in learning communities, learning organisations and educational institutions, by bridging the worlds of practitioners, research, industry and leadership.

SIGGRAPH 2007

5-9 August 2007

San Diego Convention Center, California, USA

www.siggraph.org/s2007

Digital innovators, creative researchers, award-winning producers, provocative artists, energetic executives and adventurous engineers. SIGGRAPH gathers together this worldwide community in San Diego to explore the products, systems, techniques, ideas and inspiration that are creating the next three generations of computer graphics and interactive techniques.

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