vision

Looking at the future of learning

Jan-June 2009 **FREE**

Informal learning

Unstructured out-of-school learning – how valuable is it?

Plus an interview with **Sir Al Aynsley-Green**, Children's Commissioner for England

Computer games

Can they find a home in education?

Neuroscience and learning

How might our understanding of the brain impact on education?

Positive Activities for Young People

Supporting vulnerable young people

Planning for the future

How is this best done and what tools are available to support us?

futurelab
innovation in education

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A not-for-profit organisation, 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.**

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Welcome to vision

We are all increasingly waking up to the importance of learning that takes place beyond the school walls. Developments in technology mean that we are now able to learn and communicate when and wherever we want, and this is reflected in a myriad of Government policies from Extended Schools to Home Access. But what is the real value of the learning – and play (after all, the Children's Plan sets out how important this is) – that takes place out of school? Could it be that we are missing the point and, instead of organised 'school-style' learning encroaching on children's out-of-school time, maybe formal education should be recognising the value of more spontaneous and unstructured learning?

Perhaps we should start by asking learners themselves. They are, after all, the people at the centre of it all and, as we hear from Sir Aynsley-Green, the Children's Commissioner in his interview on page 13, it's crucial that we encourage young people to have ownership of and involvement in their own education. After all, we can only develop learning experiences that are relevant and appropriate for 21st century learners once we have truly understood what it is that they need and want.

The articles featured in this edition of VISION investigate the role of out-of-school learning, whether informal or more formal (as in the Government's Positive Activities for Young People programme), and consider the role that children's voice has to play in education, particularly when used in partnership with the adults in their lives – we are not, after all, advocating anarchy, but just a more co-dependent relationship between adults and children. We are also exploring the current state of play regarding computer games in the classroom, following on from Tanya Byron's review which stated that games and online worlds offer "unprecedented opportunities to learn, develop and have fun". The answer, it seems, lies in a rich and collaborative dialogue between the games industry and the education community. Only then can we look forward to a time when we can offer learners games that rival, in terms of engagement, those they play at home.

On the subject of looking forward, this time around VISION asks what impact our increasing understanding of how the brain works could have on the future of education, and we consider how schools, in the light of rapid social and technological change, can plan effectively for both the long- and short-term future.

Finally, it is a privilege to be able to talk to the many inspiring people featured in VISION and to be in a position to communicate their interesting projects to a wider audience – and we hope that you enjoy reading about their activities and hearing their opinions. If you do, all we ask is that you pass this copy of VISION on to others who are likely to be similarly interested. Enjoy...

Stephen Breslin
Chief Executive
Futurelab

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Positive about young people

For those who recognise the value of the play and learning that young people do outside school, the long summer holidays should, in theory, provide an ideal opportunity to undertake some interesting and rewarding activities. But for teenagers with limited resources, few developed interests and a lack of family support, the summer weeks can pass in interminable boredom. So, what difference can support offered by the Government in the form of Positive Activities for Young People (PAYP) make?

PAYP began life in 2003, a Government programme designed to support young people, particularly those most at risk of social exclusion and committing crime, to avoid getting into trouble over the summer months. Each local authority was funded to provide a range of activities, in collaboration with the local Connexions Partnership as well as the youth service, Youth Offending Teams and voluntary organisations.

Activities included sports (from football and netball to canoeing, climbing and abseiling), arts (including crafts, design, music, dance, drama and video), and education and personal development (eg alcohol abuse, sexual health, drugs, careers, citizenship and volunteering).

Initially the PAYP programme ran for three years, providing evidence of increased school attendance after structured holiday activity, reduced youth crime, and improved community cohesion. A DCSF (Department for Children, Schools and Families) study also found a very strong positive correlation between PAYP and educational attainment in school.

Since then, PAYP has gone from strength to strength, with £46.5m Government

funding in 2007/08 (compared with £25m in 2003/04), and a pledge to double this to £94m in 2010/11. Many local authorities have extended the provision of positive, structured activities to Christmas and Easter holidays, and some now offer term-time activities as well.

"PAYP is an idea whose day has come," says Anne Weinstock, Director of the Youth Task Force, who played a leading role in shaping the Government's 10-year strategy for positive activities, 'Aiming High for Young People', launched in July 2007. Taking part in these kinds of activities is a way of "building the emotional muscle that allows you to confront setbacks, to get through traumas," she says.

"Many of the young people I've worked with have grown up in neighbourhoods where they're not taught about teams – everyone is fighting for survival, in literal and metaphorical ways, and many have strong feelings of racism which are just born of ignorance. Being involved in structured activities (particularly when they're residential) helps them to learn to respect people from different communities. They learn to be part of a team, and some may learn skills of leadership; quite a number of these young people end up working as youth professionals."

The activities may be what hook the young people into the programme - the chance of a free trip to Thorpe Park, a camping holiday, a day's kayaking – but they are not in themselves the real value of PAYP. Dr Nadia Wager, Principal Lecturer in Criminal Psychology at Bucks New University, carried out an evaluation of Buckinghamshire's PAYP programme in 2007, observing activities such as a very successful motor mechanics course for teenagers, some of whom had been convicted of joy-riding offences or excluded from school. "The key thing was not so much the skills they were learning, but the role models, the relationships they made with the people working there. It was a very structured environment, with real respect and trust - and these young people were treated with respect, some probably for the first time in their life," she explains.

Although PAYP programmes are open to all young people aged 8 to 19 years old, they focus on the more vulnerable (who may be referred to them by Youth Offending Teams, Connexions or behaviour improvement programmes in schools), with local authorities also funding 'key workers' to spend time and build relationships with those most at risk.

Buckinghamshire, for example, funds five full-time key workers, each with a caseload of 30 young people, whom they may see one-to-one or in small groups on a weekly basis. "If you're 15 and you're not very good academically, a lot of youngsters feel like giving up," says Philmore Miller, a key worker. "We try to motivate them, to provide some sort of hope. Sometimes you become the more rational adult in their life – because they may not have that at home."

"Trying to put your own point of view across is not always the best way," says Shahid Akhtar, another key worker. "You have to work with them in a way that suits their lifestyle and not be too imposing." Indeed, giving them plenty of choice – choosing activities, choosing how to organise themselves – is crucial, and may not be something they will all have experienced in school. "Some of these young people have never been away from their neighbourhood and the idea of choice is alien to them," says Anne Weinstock. "But having choice teaches you about other choices you can make, eg you can choose whether you get involved in a gang or in substance abuse."

Giving these vulnerable young people a voice is important too; knowing that what they say matters. "You need to take their point of view," emphasises Julianne Hall, a Bucks key worker. "At times you may not be able to deliver everything they'd like, but they need to feel they're being listened to and not ignored."

"THE KEY THING WAS NOT SO MUCH THE SKILLS BEING LEARNT, BUT THE ROLE MODELS AND THE RELATIONSHIPS BEING MADE"

Pennywell Youth Project

Pennywell Youth Project

Building a rapport with an adult through out-of-school activities can only help young people to get on better with their teachers in school, according to Dr Felicity Wikeley, Senior Lecturer in Education at the University of Bath, who conducted a report on out-of-school activities for the Joseph Rowntree Foundation in 2007. "All the young people we surveyed had a very different view of the adults involved in out-of-school activities than they did of their teachers (even if it was the same person), and their engagement was very different. Children who get the opportunity to work with adults in a different way can negotiate relationships with teachers more easily, because they have a better understanding of how to negotiate with adults."

Anne Weinstock's hope is that programmes such as PAYP, as well as the development of extended schools over the next few years, the Building Schools for the Future programme and the new diplomas, will all help to bring teachers, young people, members of the community and other professionals closer together and ease the cultural divide. "I hope it will build bridges," she says. "Things are changing already, and they will continue to do so."

A case study: Pennywell Youth Project, Sunderland

At 14, Sophie Smith was not getting on well in school and was spending a lot of time "sitting about on street corners". Then she and her friends were approached by youth workers from the Pennywell Youth Project, and began to take part in holiday activities, such as climbing, gorge-walking and bowling. At 16, she left school and worked as a volunteer with the project. Now aged 25, Sophie is a youth worker at the Pennywell Youth Centre and is studying for a Certificate of Education so that she can teach there.

Getting involved in the project, she says, "changed the way I thought about things, and where I was going. The activities helped us to become engaged and the youth workers were really friendly, they helped you do anything you wanted to do."

Gordon Langley, Pennywell Director, believes part of the project's success is finding activities that young people want to do that involve "lots of conversation", such as bike riding, building rafts and sitting round a camp fire. Activities need not be expensive, and can work much better in groups no bigger than 12, he says, so that young people can discuss things and build new friendships.

Listening to what young people want is also crucial, he says, "and you need to act quickly on their suggestions". The Pennywell Youth Centre was built five years ago, after much consultation with young people, and was officially opened by them. It now includes a pet shop, garden centre and café, providing opportunities for work experience. About 100 young people use the centre every day, and in five years there has been no graffiti or vandalism.

"We have to have some boundaries," says Gordon Langley. "We have two rules here: you must enjoy yourself, and you must not mess about."

Both images: Pennywell Youth Project

Designing for Social Justice: People, Technology, Learning – a new report

The best way to ensure that learners from all sectors of society have real access, without barriers, to a technology-enhanced education is to involve them in the design of educational technologies. A new report from Futurelab, 'Designing for Social Justice: People, Technology, Learning' instigates debate about the importance of collaboration between learners, educators and technology developers, and explores the role that digital technologies can play in reducing inequality in education.
To download it FREE of charge, go to **www.futurelab.org.uk/openingeducation.**

You can also download a complementary CfBT Education Trust supported handbook 'Designing Educational Technologies for Social Justice', which gives users guidance on how such ideas can be applied in practice.

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...

This robot's not for turning

Segway Inc - RMP

Developer of personal transportation devices Segway has come up with the Robotic Mobility Platform (RMP) which uses Mecanum wheels, enabling it to move sideways without having to turn. Showcased at RoboBusiness 2008 back in April, this 'mini robot' caused quite stir, demonstrating how it can move about with ease in small, confined and congested spaces. Each RMP model is battery powered and comes with an onboard charging system. It comes at a price though, with the cheapest version fitted with Mecanum wheels starting at $21,000 USD.

www.segway.com/business/products-solutions/robotic-mobility-platform.php

The next big thing?

www.twine.com

Twine is an online tool that enables you to keep track of your interests. It can be used to collect and share bookmarks, notes, videos and a range of other content. Twine – which you can use on your own or with groups of other like-minded people - has been designed to organise your content, learning as you use it and recommending new things in which you might be interested.
To provide a taster of what's on offer, the top 100 twines, or interest groups, in autumn 2008 (ranked on the popularity and volume of items contributed) included the credit crunch, Web 3.0, the US election, science and climate change.

www.twine.com

Choo choo – all aboard the Google App Engine

http://twitter.com/abecciu

Google's new App Engine has been designed to let you run your web applications on their infrastructure, and it's free of charge (up to 500MB). You build your applications (using App Engine applications) and then upload them ready for your users to use. If this sounds too good to be true, the consensus in the world of IT is that it's not. Experts across the web seem to agree that Google App Engine is simple and useful, with some suggesting that it could lead to shrink-wrapped web applications that can be set up by anyone. But many other players look set to join the platform-as-a-service race, not least Amazon with its Elastic Compute Cloud. Watch this space...

code.google.com/appengine/docs/whatisgoogleappengine.html

Desk research

CRAFT

Computer scientists and engineers work in close collaboration with psychologists and designers at CRAFT (the Centre for Research and Support for Training and its Technologies) at the Ecole Polytechnique Fédérale de Lausanne (EPFL) in Switzerland to research and develop technologies and furniture to enhance learning and support collaboration. Examples of novel designs include Wizkid, a robotic computer that uses gesture-based augmented reality interaction instead of classic input tools such as the keyboard, mouse and remote control, and Reflect, a noise sensitive table that monitors conversations via microphones and displays a visual representation of them using colour LEDs.

craft.epfl.ch/page66200.html

Getting touchy-feely

Jean-Pierre Gary

Designer Jean-Pierre A Gary has come up with the Visibrator, a sweater that uses proximity sensors to make mobile phone motors that are contained within the garment vibrate. The idea, developed initially to support the visually impaired, is that the motors start vibrating when you get close to other objects. Still at prototype stage, the designer hopes that this garment will prove that technology can be used to develop clothes that are both stylish and innovately useful.

pixelpopulater.com/visibrator/

Audio-visual blogging

Cameron Browning

We're all now familiar with the concept of blogging – an online 'diary' and conversation in the form of words, pictures and the occasional video – but we're increasingly seeing a proliferation of blogs in the form of video. Developer Cameron Browning's blog is an example of this phenomenon, offering as he puts it "a living digital document" of his life and work. It would seem that this is a natural way to not only hear about, but also see somebody else's world.

Want to stay abreast of new developments? Futurelab has just launched inspirED, a collection of news and stories to inspire anyone interested in innovative approaches to teaching and learning, updated three times a year. You can subscribe for e-mail reminders via inspired@futurelab.org.uk or www. futurelab.org.uk/subscribe. See the current issue at inspired.futurelab.org.uk.

BUILDING EDUCATION FOR THE FUTURE

There are many possible futures, some of which are more probable than others. A key challenge for those concerned with education is to identify, and influence, which path the future will take, and to plan and manage effectively so that they are well prepared for this future. So how, in this world of rapid social and technological change, can schools best do this and what tools are available to support them?

Beyond Current Horizons (BCH) – a joint research project between Futurelab and the Department for Children, Schools and Families (DCSF) – is one way of successfully planning for the future. The tools that will result from the project – available in spring 2009 - will improve understanding of what the world will be like after 2025, assisting the planning not only of curricula, but also of teacher training and even school design.

BCH has commissioned a number of research papers that consider the challenges facing the future planning of education. The first of those research papers – 'Future Issues in Socio-Technical Change for UK Education' – suggests that some future trends are very likely, even if others are as yet unclear. For instance, Moore's Law – that computing power doubles about every two years – will continue. Another assumption is that we will continue to see a major 'disruptive' technological development once every decade that transforms the IT-related industries. Other suggestions are that

computing and biosciences will move closer together, with the possibility that a computing system could be built from networks of living neurons. It is also very likely that 'smart drugs' will be widely available to improve cognitive abilities.

From these examples it becomes clear that both science and technology will become even more important to society, and that a wider general understanding of related basic principles is essential if the UK is to remain a major economic nation. Schools will consequently need to provide all students with a higher general understanding of science than is presently the case. There will also need to be improved comprehension of 'systems thinking', which will only be possible if pupils also attain a higher level of scientific literacy and mathematical competence than they do today.

Children, Schools and Families Committee. Sheerman wants schools to think more about producing well-rounded citizens with the skills and outlook to thrive in a future society: people who are interested in the world around them.

School planning that takes a 50-year perspective particularly impresses Sheerman and his select committee – he mentions Knowsley as an education authority that has done this. Sheerman urges schools to think seriously about what competencies they want to produce amongst their students – and not merely to rely on past experience of what was done and how.

In Sheerman's view, schools and education authorities should consider more than the needs of the UK economy and how they can help produce workers for the

schools," says Mawson. "It's not just about structures. [It's about] the relationships within schools and with key players in the surrounding areas."

This view is echoed by Andrew Cozens, Strategic Adviser for Adults' and Children's Services for the Improvement and Development Agency. Cozens says that making schools a part of their community with shared use of facilities is a fundamental aspect of the purpose of a school, and so must be a core consideration when designing new schools. "You go to a totally new facility, which looks wonderful and as soon as you get people in, you realise it doesn't work," warns Cozens, thinking of some of the newly-built schools he has walked into. Speaking as somebody who was involved in one of the first phases of Building Schools for the Future, he is making the

SCHOOLS SHOULD CONSIDER MORE THAN THE NEEDS OF THE UK ECONOMY AND HOW THEY CAN HELP PRODUCE WORKERS FOR THE FUTURE

Stephen Heppell - Visiting Professor of New Media Environments at Bournemouth University and an advisor to education authorities on future planning – believes that, in general, insufficient thought is currently being given within education institutions to social and technological development, and, consequently, how that should influence planning.

Heppell suggests that it is important to go beyond envisioning how technologies will interact with society, to consider how we want them to interact and what preferred objectives can be achieved. "What has happened in the past is that people have harnessed technology to do the things they always did – for example, using technology to pass exams a little better, without criticising what the exams were testing," says Heppell, "or to teach more students at a time." Too often schools try to carry on doing what they always did, merely using technology to be more productive in doing so. "Existing practice is not questioned enough," he argues.

Planning should become more strongly values-based, argues Barry Sheerman, Chairman of the House of Commons

future. It is equally important to plan for the desired social outcomes in terms of the personality of those citizens and to help them shape their place in tomorrow's world. "You have to navigate your future," stresses Sheerman. "You have got to have that imagination to know what you aspire to. When he was Education Secretary, David Miliband always talked about transformation – about the capacity to transform the lives of children attending the schools, to transform the community and the capacity to transform the environment, through sustainability. Transformation has to be the key concept."

Many of the principles stressed by Sheerman and Heppell can and should be applied more widely today, says Lord Mawson. He was a founder of the highly regarded Bromley-by-Bow Community Health Centre and set up Andrew Mawson Partnerships to promote more coordinated development of schools and other community resources. Mawson believes that moving schools forward, particularly failing schools, must involve rooting them more firmly within their communities. "It's about people and relationships, if you want to change those very difficult

point that, without thinking about the people who will use the school – pupils, staff and the local community – and the type of education they want, the vision will simply not become a positive reality. "One of our programmes involved getting architects to spend a lot of time speaking to children, parents, teachers and heads, thinking about how schools work and how they might work in the future," says Cozens.

So, it would seem that planning for the long-term future of education – particularly

Bromley-by-Bow Centre

All images: Bromley-by-Bow Centre

if values-based and in partnership with a variety of people - can also help us to address more short-term issues, such as designing a school under the Building Schools for the Future programme. However, it is important that the debate around what the future should look like goes beyond the boundaries of education. As part of Beyond Current Horizons, a website called Million Futures (www.millionfutures.org.uk) has been set up to invite comments from the general public outlining their hopes, fears and dreams for the future. Then there's the 'Horizon Scanning Centre' on the Foresight website - developed and funded by the Department for Innovation, Universities and Skills (DIUS) - which contains a toolkit to help with developing a clearer concept of what the future looks like, and a European Union Foresight website which provides assistance with future visioning, including an example of the planning of Manchester as a knowledge city. All of this much wider thinking can then be taken into consideration when planning the future of education – whether it be 'what should education look like and what form should it take in 2025?' or 'how should I design my new school next year?'.

The writer LP Hartley famously observed that the past is a foreign country where they do things differently, and there is a danger that the same can be said of the future. If the future is to be made less foreign, and less daunting, then we need the tools to help us to tread the path that we want to take. Happily, many of those tools and support already exist – we just need to make time in our day-to-day lives to use them.

Further reading

- 'Future Issues in Socio-Technical Change for UK Education' by Dave Cliff, Claire O'Malley and Josie Taylor is available at **www.beyondcurrenthorizons.org.uk/findings/research-challenges/cross-challenge-papers**
- The Foresight website, which includes the 'Horizon Scanning Centre' is at **hsctoolkit.tribalctad.co.uk/content/view/136/2/**
- Million Futures is at **www.millionfutures.org.uk**
- A Foresight exercise in planning for Manchester as a knowledge city can be studied at **forlearn.jrc.ec.europa.eu/guide/7_cases/manchester.htm**
- Stephen Heppell's blog and information on his consultancy work on schools is published at **rubble.heppell.net/places** and **www.heppell.net**
- 'Future schooling in Knowsley' is accessed at **www.knowsley.gov.uk/education/future_schooling**

Planning effectively for the future - Beyond Current Horizons

Beyond Current Horizons is a joint research project between Futurelab and the Department for Children, Schools and Families (DCSF) that aims to ensure that the UK education system has identified and prepared for a wide range of potential social, technological and cultural futures. This is being tackled through three main activities:

- building a base of evidence through a programme of research, identifying emerging trends in society, technology and education
- engaging stakeholders and the public in debates on the purpose and nature of education
- developing tools to support strategic decision making.

These tools will be available in spring 2009 and will be announced on the Beyond Current Horizons website and in the bi-monthly BCH e-newsletter. To subscribe to this e-newsletter, e-mail **bchnewsletter@futurelab.org.uk.** For online discussions on the project go to **blog.beyondcurrenthorizons.org.uk.**

For further information, go to **www.beyondcurrenthorizons.org.uk.**

Where do children learn? 'School' may be the obvious answer, but although schools may be good at delivering a prescribed curriculum, learning doesn't stop when the bell goes at 4pm: children go home and play, read books, watch television, play computer games and socialise on the internet. All that time they're learning things that aren't necessarily in the National Curriculum. That spontaneous, unstructured learning – what the Institute of Education academic Frank Coffield describes as "fundamental, necessary and valuable in its own right" – is often referred to as 'informal learning'.

The informal learning experiences open to children vary greatly, depending on factors such as class and ethnic background, and these experiences may be valued very differently by different schools. Less spontaneous out-of-school activities, such as violin lessons and museum visits, are more likely to be valued as having a connection to the formal curriculum than, for example, folk tales or downloading music from the internet.

Driven by an increasing awareness of the importance of personalised learning, policy makers are now starting to look at ways of harnessing the benefits of informal and out-of-school learning. The Government's Aiming High for Children initiative recognises the importance of the home environment and out-of-school support as contributors to educational achievement, while the Extended Schools programme aims to provide study support, sport and music clubs for children in primary schools outside school hours.

So why are informal and out-of-school learning valuable? Kate Bullock, a Senior Lecturer at the University of Bath, has researched the out-of-school activities of Year 6 and Year 9 children, and found that the children's attitude towards these activities – which included more organised activities such as sports, drama, dance and

youth clubs as well as informal learning – was very different from their attitude towards school. The adult leaders of out-of-school activities were respected as experts and role models in a way that most teachers were not. In some of the activities, such as judo, the children learnt alongside children of different ages, and even adults, all with varying degrees of ability. "That was quite an eye-opener for the young people," says Bullock. "They had skills that other people didn't have. They learnt that expertise is not age-related, if you work at something, you can get good at it."

These out-of-school activities gave children a confidence in their own ability, argues Bullock, and were better than schools at setting targets that engaged the children: "In the out-of-school activities, the goals were very clear: 'If you want to be a better cricketer, you have to improve your bowling, and this is exactly what you need to do to improve your bowling.'"

A characteristic of out-of-school settings is that they start with an assumption that the child is capable of acquiring new skills, and they already have valuable skills and knowledge to contribute and on which to build. At the Knowle West Media Centre (KWMC) in Bristol, the Archimedia project engaged a group of young people in the development of a new site to replace KWMC's existing building. The youth core group were involved in every stage of the construction process, from selecting the architects to helping create the design brief – valuable skills that they may not get a chance to acquire in schools. The experience has helped them to engage with adults on more equal terms, changing their understanding of educational relationships and consequently affecting engagement with teachers and school staff. These teenagers now act as consultants to other organisations who want to involve young people in decision-making processes.

Another important characteristic of informal learning is that it is quite often done without adult involvement and, as such, is often not even considered to be learning (though, of course, it is). Jim Gee, Mary Lou Fulton Presidential Professor of Literacy Studies at Arizona State University, has researched children's use of video games and found that they are supporting the development of valuable skills such as problem-solving and collaboration.

"Learning teaches you how to solve problems, how to persist, how to put up

with failure, how to innovate, how to try out new solutions when the first ones aren't working," says Gee. Games are an example of informal learning that is very good at helping people acquire all those skills, he says – and he points out that, in today's world, the ability to learn new skills and retrain for different jobs is essential: "Adults need to remain child-like, open to new experiences and new learning in a way they never have had to before."

In fact, children's mastery of games shows that they can learn quickly and effectively provided they are sufficiently motivated: "The kid who looks at algebra and says 'This is too hard', and then goes home and plays a game that is just as complex and enjoys it, shows that the problem is that we're not making algebra engaging," says Gee. But this is not limited to games – it is typical of most out-of-school learning. As education academic, Julian Sefton-Green, puts it: "The kinds of knowledge and the modes of learning exemplified in out-of-school informal learning are very relevant to learning how to become a modern kind of worker."

ADULT LEADERS OF OUT-OF-SCHOOL ACTIVITIES WERE RESPECTED AS EXPERTS AND ROLE MODELS IN A WAY THAT MOST TEACHERS WERE NOT

If educators are to make use of children's informal learning experiences, then they need to take a more student-centric approach – to understand what the child is gaining from the experience, and why it is important to them. One of the challenges of this is that it is sometimes the fact that

it takes place outside school that makes it valuable. Emma Agusita, a Researcher at KWMC, is working with a youth group at the centre and a group of sixth formers from a North Somerset school to look at how social media technologies might be used effectively for learning. The initial reaction of some of the sixth form students, she says, was to question bringing an activity young people really enjoyed outside school into school: in terms of wanting to keep the two separate.

Futurelab's 2008 Ideas Incubator attracted some innovative proposals for creating links between a formal educational setting and the home or out-of-school setting. The ShoutBox idea from Mobile Pie enables children to use the applications on their mobile phones such as the camera to record their activities outside school and share them with friends and others on a social networking site. When a prototype was tested with a group of 14-16 year-olds, it engaged the interest of both students, who loved having the opportunity to share their interests, and their teachers, who were surprised at the range of activities the students were undertaking – from playing the guitar to working out the Rubik's cube – and felt that they saw their students in a new light.

Dream Catcher, an idea put forward by Ruth Churchill Dower, addresses the issue of how parents can become more involved in the experiences of their children in early years settings. Churchill Dower is Director of Earlyarts, a professional development organisation for people working creatively with children, which wanted to find a way to involve parents in their children's play and help them to understand more about their children's ideas, dreams and fantasy worlds.

The idea is to create a small video camera or PSP-type device that would be worn by the child like a wristwatch. When switched on, a character called 'The Dream Catcher' would invite the child to record snippets of an activity, such as singing a song, telling their own stories or playing their favourite games. At home, the parent and the child could listen to or watch the recording together, using the snippets as starting points to talk about the child's ideas and what the child had done that day in nursery. Equally, Dream Catcher could be used to record activities at home, so that the early years setting could learn more about the child's home culture. Churchill Dower sees Dream Catcher as having particular value for refugee families, those who have little English, or families with children who have special needs: "For children whose cultures or languages are not well understood, Dream Catcher can help us to understand a bit more about them, and the setting's care for them can be refined to meet their needs."

It will be a long time before children's informal learning experiences are valued as highly as their formal ones. But by harnessing the confidence, independence and motivation children acquire through informal learning, schools have a real opportunity to transform the experience of formal learning. As Gee points out, the idea that the job of the teacher is to pass on information to children is outdated: "The model that information is scarce is gone. What's scarce is the ability to use that information in functional ways, make good judgements about it and leverage it for your goals. So, schools have to be about creating communities of passionate learners with lifelong learning abilities."

Further information

- Knowle West Media Centre: **www.kwmc.org.uk**
- Archimedia project: **www.kwmc.org.uk/index.php?department=1**
- Dream Catcher: **www.futurelab.org.uk/projects/informal_learning_ideas/dream_catcher**
- Shoutbox: **www.futurelab.org.uk/projects/shoutbox**

Adult informal learning – new research

Futurelab is investigating the role that digital technologies play in adult informal learning. We are carrying out research into adult learners' needs and aspirations, what drives them to learn new things in their leisure time, and the role of digital technologies in supporting these activities.

For more information, go to **www.futurelab.org.uk/projects/adult-informal-learning.**

Knowle West Media Centre

Children should be seen and heard

Sir Al Aynsley-Green was appointed the first Children's Commissioner for England in 2005. As such, he leads the organisation 11 MILLION, which works to make sure children's views are listened to by those in authority. Here, through a discussion with Futurelab Senior Researcher, Tim Rudd – who has himself researched and written about learner voice - Sir Al explores what children in England think and care about today, and its implications for education and learning.

Sir Al: Firstly, it might be helpful to explain that I've been looking at the changing view of children in society and the importance of their voice in society. I have been really interested in the history of children over the centuries, from Roman times to Victorian Britain through to contemporary society. One important development is the UN Convention on the Rights of the Child (UNCRC), three articles of which provide a very important moral compass for the voice of children: Article 12 states that children have the right to say what they think should happen when adults are making decisions that affect them and have their views taken into account; Article 29 states that education should develop each child's personality and talents to the full; and Article 31 states that all children have the right to relax and play. Secondly, the statistics on 'NEETs' – post-16 year-olds not in education, employment or training – show that the voice of children is not being taken seriously enough.

Tim: So, how might we improve this?

Sir Al: I have worked with many schools all across the country around the importance of listening to children and there's no doubt from our research that a crucial stage is when children are 8 through to 11 years old. How children adapt to a very different environment is a key challenge, they are very apprehensive about starting secondary school. In my position, I am lucky enough to be able to enter any school to interview children in private, and I have also talked to young offenders to ask when things started going wrong for them. Anecdotally, they said it was around the ages of 8 to 11, when transition seemed to be a very important issue in their minds. I want to try to encourage young people to have ownership of and involvement in their own education, particularly during the transition from primary to secondary education. Surely one of the key purposes of education is to provide children with the knowledge to be confident, competent and successful adults in their future lives.

Tim: How do you go about doing that? Do you have any examples?

Sir Al: UNICEF's Rights Respecting Schools programme is designed to make sure that the UNCRC theory is made real - not part of citizenship class on a Friday afternoon but embraced and made real in every minute of every day. A good example is provided by John Coughlin, Hampshire's Director of Children's Services, who is passionate about turning this into reality (**www.unicef.org.uk/tz/teacher_support/rrs_hampshire.asp**). But there are many more examples - the Department for Children, Schools and Families (DCSF) has funded 500 schools to embrace the programme. Good examples can also be found throughout the world. I have been to a school in Andover where even very young children are taught to respect and have responsibility for each other. They are included in the decision-making processes - although they don't make the final decisions necessarily. For me, this is an important, quite stunning development that respects children's voice, particularly in the activities that affect them. It's a possible vehicle for making sure children are respected and have the opportunity to express their opinions.

Tim: Lots of people think learner voice means that we're suddenly going to have young people making all the decisions, but it's actually about giving learners more of a say. Done properly, it's a process of negotiation and discussion, would you agree?

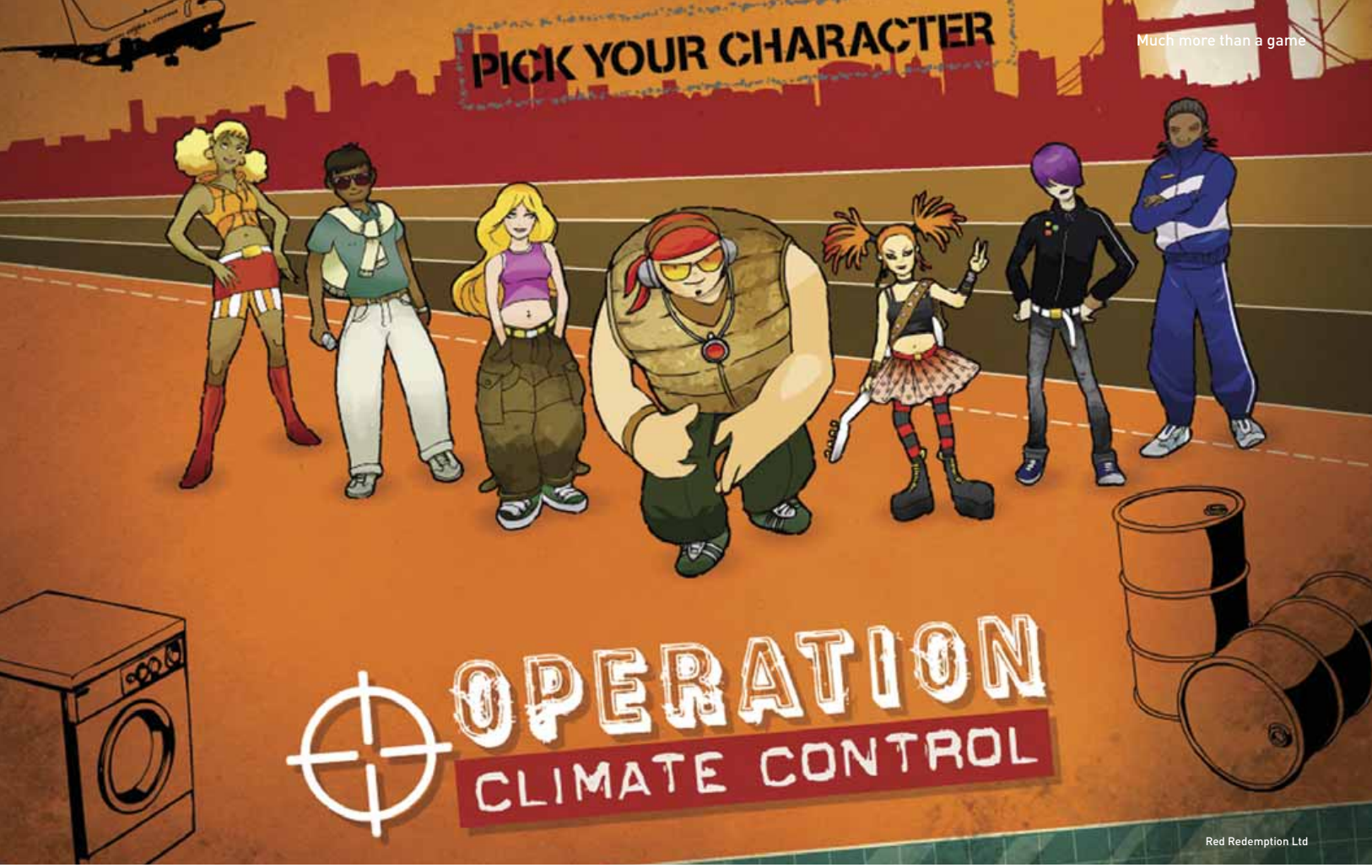
Sir Al: Yes, it's a cultural ethos that has to be embedded in all activities. It's important to demolish this perception that by improving children's rights you are taking power away from adults. Consultation and participation are buzzwords right now - there's a huge industry of consulting children, which is sadly very often tokenistic. Children have a right to say what they think should happen when adults are taking decisions that affect them. It's also important for children to have appropriate role models in society to live up to, and adults need preparation and training to understand how to participate with children. Many schools are doing a really good job. The SEAL programme* - rolled out in primary schools across the country, and now in secondary schools - encourages children to understand each other and gives them the opportunity to express their feelings. It's all part of a cultural change taking place where children are thought of as individuals who should be respected and do have rights that need to be implemented.

Tim: Yes, but we have to start from a very early age.

Sir Al: We do indeed, but this is an issue that goes beyond the boundaries of schools, out to communities and beyond. For example, NEETs is a hugely complex problem and there are no easy answers but family aspirations are certainly very important. Children who are in the care of the state - many whose outcomes are very poor in terms of teenage pregnancy, crime and university etc - often say that they lacked someone very early on in their lives who could tell them that they could do something with their lives and help them navigate the obstacles to get there. In particular, we should be making sure these especially vulnerable children are given early support to develop successful lives in adulthood.

For more information on 11 MILLION, go to **www.11million.org.uk.**

*Social and Emotional Aspects of Learning
www.teachernet.gov.uk/teachingandlearning/socialandpastoral



Red Redemption Ltd

Much more than a game

When Tanya Byron delivered her review 'Safer Children in a Digital World' in March 2008, many people breathed a sigh of relief. In contrast to the reactionary attitude towards digital technologies often seen in the media, Byron struck a level-headed balance. Calling for new strategies to reduce children's access to adult content and experiences, she also drew attention to the positive potential of new technologies, citing the "unprecedented opportunities to learn, develop and have fun" that games and online worlds offer.

Computer game-playing is now a part of the majority of children's lives. The Byron report states that sales of games for the under-12 age group represent nearly three-quarters of the total UK games market. 87% of 5-16 year-olds have a games console at home*, and the enormous success of the Nintendo Wii has shown that new technologies can reach and hold audiences who never expected to enjoy playing computer games.

Yet while games still labour under a general association in the media with the frivolous, the violent and the mindless, can they ever find a natural place in formal education? "There is certainly a growing body of evidence that some characteristics of games have a role in learning settings," says Di Levine, Head of Educational Research and Analysis at Becta, the Government's technology agency for schools. "But sometimes elements of a game are more useful than a game as a whole, and some learners' needs are better met than others." What do we know so far about the potential of games for learning – and what factors could encourage their development to offer the "unprecedented opportunities" mentioned by Tanya Byron?

An empirical understanding of using games in the classroom is slowly emerging from innovative practice around the world.

Former teacher Tim Rylands has developed literacy-boosting techniques using the stunning imagery and exploration potential of the game Myst. Elsewhere, School Tycoon is one of a number of simulation-type games that teachers have tried in their lessons. At Park View City Learning Centre in Birmingham, 10 and 11 year-old pupils played the 'sandbox' version of the game in which you can develop a school from scratch – designing classrooms, landscaping, recruiting staff and attracting pupils – and in the process develop spatial thinking skills, numeracy and social awareness, among other skills such as team working, strategic thinking and decision making.

Perhaps more surprisingly, there is published evidence that learning outcomes can result from entertainment-oriented games played for fun. Researcher Constance Steinkuehler examined World of Warcraft, a fantasy-based massively multiplayer online game (MMO) in which players work together to complete quests and defeat enemies. She discovered players were formulating theories about how the game-world worked, and then testing their hypotheses – practicing, in essence, the scientific method. It wasn't just a small proportion of the players, either: "I visited the game community forums, predicting that 5-10% of the conversations would look like high-end problem solving, and the rest would be banter," she says. "Instead, 86% of a random sample were about problem solving."

And, it seems, games and technologies developed specifically for educational purposes are improving, trying to emulate the 'engagement factor' seen in commercial computer games (although, of course, they have to succeed in much more than 'engagement' if they are to be successful tools for learning). At the London Knowledge Lab, Caroline Pelletier worked with specialist educational software publisher Immersive Education to develop MissionMaker, a tool to allow young people to make their own impressive 3D games. In use by schools across the country, the software allows teenagers to learn how to create a gripping narrative using interactive spaces, multimedia and engaging dialogue. For Caroline, it's crucial to make games in order to develop media literacy: "It gives children the resources and skills to enable them to become sophisticated participants in digital culture, as well as consuming it," she says.

The potential of games to tackle difficult and multi-faceted issues – and ultimately change behaviour – is already being explored through some ground-breaking education projects in the UK. Oxford-based company Red Redemption recently completed Climate Challenge, a game sponsored by the Government to engage young people in the issues and choices surrounding climate change. "Games are excellent at using simple mechanics to model and communicate understanding about complex issues," says Gobion Rowlands, one of the game's creators. "The player can take their own time to explore the issues and, if the game is designed well, they can come to their own conclusions rather than be force-fed an opinion."

Young people were crucial partners in developing an anti-knife-crime game, Soul Control, funded by the Department for Children, Schools and Families (DCSF). Twenty disadvantaged 16-19 year-olds lent personal experiences and learned industry-standard skills in game-design software, music and film production as they worked with multimedia education company RollingSound on the game. It aims to show realistically the longer-term repercussions of criminal behaviour, such as carrying knives or dealing drugs, by using the high-credibility medium of a gritty game.

Computer games certainly have the advantage of appealing to audiences disenchanted with traditional media and school activities. Gobion Rowlands says: "Games make use of sub-conscious learning techniques, engaging the player with the game world – it's a natural and fun way of learning."

But how the natural appeal of games manifests itself in our brains isn't yet fully understood. Research published in 1998 showed that the brain's hormonal response to winning a tank-battle game was equivalent in potency to an injection of amphetamines. Game addiction is an issue acknowledged by the Byron Review, although among young people only a low percentage play to a level of 30 hours a week or more, and it's not clear whether this is due to an addictive property of the game, or just a lack of alternative activities.

THE BRAIN'S HORMONAL RESPONSE TO WINNING A TANK-BATTLE GAME IS EQUIVALENT IN POTENCY TO AN INJECTION OF AMPHETAMINES

The way in which games combine challenge and reward, however, is one of their unique benefits, offering learners the potential to become immersed and engaged. The concept of 'flow' has been proposed to describe an optimal mental state often experienced during gaming, and desirable for learning, when the task is neither too hard (leading to anxiety) nor too easy (leading to boredom).

There is a long way to go before the true potential of games for learning is fully exploited, and a greater dialogue

Both images Red Redemption Ltd

between the games industry, educational policy makers, researchers and practicing educators is one of Byron's recommendations. Di Levine of Becta sees the need for specific conversations and initiatives: "Teacher education has a key role to play, as does the current review of the primary curriculum, which needs to ensure effective integration of digital and media literacy within its final proposals," she says. "There are also opportunities for Government and the education community to work with industry to better understand the educational potential and value of games."

But why use a game format rather than a simulation? "The point of a serious game is that it can mirror real life and allow the player to make mistakes without harming anyone," explains Strategy Director Mary Matthews. "It is the skill of the game designer to ensure a player feels the same thrill of success in achieving a learning objective as he or she would in getting to the next level or completing an entertainment game."

The power of games to persuade has been adopted by advertisers, who produce witty, quick-hit games either playable on a webpage or as a fast, free download. The genre has more recently been adopted by charities and Non-Governmental Organisations (NGOs) such as UNICEF in games such as Darfur is Dying and Ayiti to explore the value of life. With inherently lower production values than fully-fledged games, such games may be a good avenue for development in formal learning.

And the horizon for new types of games with potential for education goes on expanding. From 'augmented reality' games that use handheld technology to overlay the physical environment with a digital game, to a system that lets you care for a pet hamster while you're away from home or school: there really is no limit. However, the real issue is how can we make these games so that they are both engaging and offer real potential for learning? The answer, it seems, is to get the games industry and education stakeholders working together to share expertise and understanding. Let's hope that Tanya Byron's call for increased collaboration does result in the much-needed dialogue that will, at long last, ensure that education is no longer – in terms of games – the poor cousin of the commercial sector.

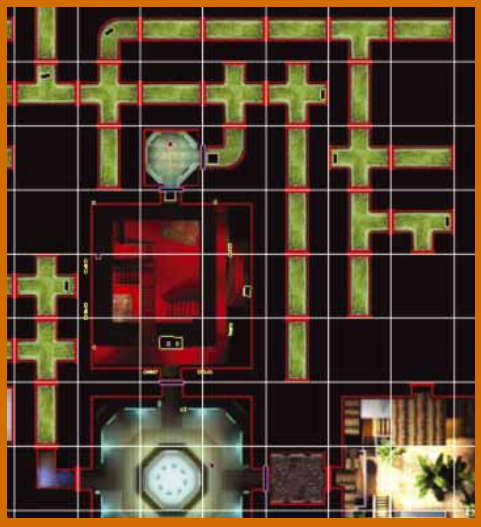
"GOVERNMENT AND THE EDUCATION COMMUNITY NEED TO WORK WITH INDUSTRY TO BETTER UNDERSTAND THE EDUCATIONAL POTENTIAL OF GAMES"

So far, very few leading commercial games companies have bitten the educational bullet, but Blitz Games is a rare exception. It has developed a highly realistic training game for health professionals called Triage Trainer through a division called TruSim. Tasks such as dealing with a victim dying of blood loss are accurately represented using a proprietary physiological model and the latest commercial-grade coding.

* Childwise Monitor report 2005/2006, quoted by the BBC at www.bbc.co.uk/commissioning/marketresearch/audiencegroup1.shtml

Further reading

Rebecca Mileham (2008). Powering Up: Are Computer Games Changing Our Lives? Wiley



Both images MissionMaker: www.immersiveeducation.com

Links

- Persuasive Games - **www.persuasivegames.com**
- Tim Rylands - **www.timrylands.com**
- MissionMaker - **www.immersiveeducation.com/missionmaker**
- Operation Climate Control - **makesyouthink.net/games/operation-climate-control**
- Soul Control - **www.soulcontrolgame.co.uk**
- Triage Trainer - **www.trusim.com**
- Darfur is Dying - **www.darfurisdying.com**
- Ayiti: the cost of life - **www.unicef.org/voy/explore/rights/explore_3142.html**

Both images World of Warcraft: Blizzard Entertainment, Inc

Child safety online: the response to Byron's calls

By way of fulfilling one of the Byron Review's key recommendations, the UK Council of Child Internet Safety (UKCCIS) was launched at the end of September 2008. With a membership that includes 100 industry, charity and public sector players including Microsoft, Google and Facebook, UKCCIS's role is to raise public awareness of online safety, promote responsible advertising to children, crack down on illegal websites and establish voluntary codes of practice for user-generated online content.

Meanwhile, wrangling continues over another of Byron's ideas: reform of age-ratings for computer games to unify them with the BBFC's system for film. Aimed at enabling parents to restrict access to unsuitable content, the recommendation has been challenged by the industry, which says its existing Pan European Game Information content rating system already does this job.

Games and learning

Futurelab is undertaking a programme of work to stimulate the development of new intelligence and discussion among the games industry, research, policy and educational practitioner communities.

The overall aim is to demonstrate what challenges and opportunities have emerged from developments in this field to date, and to identify practical actions and interventions that can be taken forward.

For more information, go to **www.futurelab.org.uk/projects/games-and-learning.**

Both images School Tycoon: Cat Daddy Games

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, new ideas would not actually be very new. With that in mind, this section celebrates some exciting and truly innovative creative projects from around the world.

Miseong Lee

Tunnelling through time

Through Time Tunnel, by South Korean artist Miseong Lee, is an interactive installation that gives users the next best thing to time travel. By video recording the person in front of the screen, slicing the footage into discrete clips and arranging them in chronological order, users can see themselves and others in the recent past. The tunnel can be navigated by buttons on the floor so that you can 'travel' back and forth in time. This installation was originally showcased at the Interactivos?@Eyebeam Exhibition in New York in July 2008 - further information can be found online.

www.eyebeam.org/learning/interactivos.php#miseong

Armella Leung and Olivier Oswald

Sweet dreams

Lay your head on the Dreaming Pillow (l'Oreiller Rêveur) at your own risk! Created by animator Armella Leung and sound designer Olivier Oswald and shown at SIGGRAPH in August 2008, it responds to touch, pressure and movement by displaying a variety of animations, sounds and physical sensations. Not for the faint-hearted, the Dreaming Pillow's animations can be both restful and, to put it mildly, bizarre. Examples include ink dripping down the pillow, animated forest scenes and eerie hands pressing against the user's head.

kiwimella.com

Joo Youn Paek

Sheet music

Fold Loud, the brainchild of New York-based artist Joo Youn Paek, transforms origami creations into musical instruments. By creating a circuit that triggers a vocal sound where each fold connects, a variety of harmonies and choruses are made possible. Visitors to New York's Museum of Modern Art, where this work is displayed as part of the online Design and the Elastic Mind exhibition, are invited to "reflect on different physical senses" by shaping paper into both geometric objects and harmonic music.

www.jooyounpaek.com

Antti Ahonen, Nuage Vert by HeHe

Going green

Nuage Vert (Green Cloud) by artists Helen Evans and Heiko Hansen was designed to make the people of Helsinki more aware of their energy consumption. For one week in February 2008, the vapour emissions of the city's Salmisaari power plant were illuminated by green light to show the levels of electricity being consumed by local residents and businesses. This visible indicator proved most interesting when energy consumption dropped by the equivalent of the power generated by one windmill running for one hour, after people were encouraged to turn off their appliances between 7pm and 8pm during that week.

www.nuagevert.org

Matsuo Takahiro

Waterfall mall

Water Crossing is an interactive shop window projection by artist Matsuo Takahiro which has been installed in the JR Nagasaki Station Plaza in Japan. As pedestrians pass by, it follows them with visual and audible ripples in a wall of projected water. It also changes colour to reflect the time of day; blue for the morning, and orange for the setting sun at dusk.

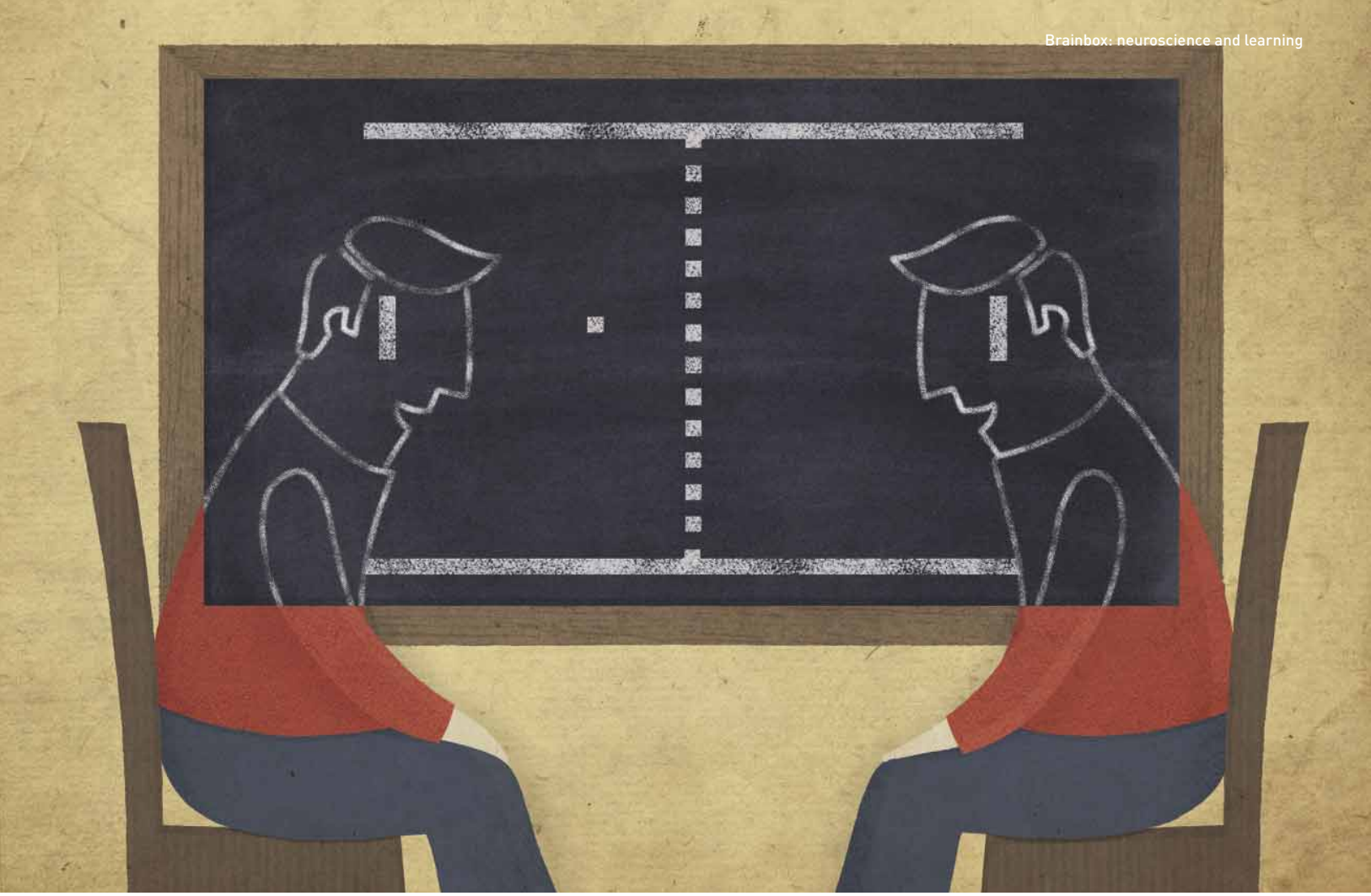
www.monoscape.jp/index_e.html

Pere Gifre

Making a splash

SPLASH is an awe-inspiring 21 metre-high solid metal sculpture created by industrial designer Pere Gifre. Situated in the Water Tower building in Zaragosa in Spain and built for the 2008 Expo on water and sustainable development, the sculpture was designed to reflect the tower and its visitors and is intended to represent the arrival of life on our planet – which, without water, would not be possible.

www.gifre.com/en/engifre.html



Brainbox: neuroscience and learning

Advances in neuroscience mean that our knowledge of the brain, how it develops and works, is rapidly improving. But what is our current level of understanding of the brain, what developments in related technology are taking place and what are the potential implications for education and learning?

Some experts now believe that neuroscience can help the way we learn. This is particularly true of cognitive neuroscience – the field concerned with awareness and thought - which looks into areas such as language, emotion, memory, cognitive control and attention.

However, these same experts join forces with a myriad of other voices from science and education to warn that we still have a long way to go before we can really understand the link. "Whenever we find out something about the brain, it's not very interesting educationally unless we understand its significance in terms of the mind. The psychology of learning has to be combined with what we discover about the brain in order to make it meaningful," says Dr Paul Howard-Jones, Senior Lecturer at the Graduate School of Education, University of Bristol. In other words, knowing that a particular part of the brain is active only really helps if it sheds light on the cognitive model that you use to understand learning. "And the cognitive model of course is often very helpful in terms of developing improved education."

Nonetheless many people do claim to have designed brain-based educational programs. Probably the most widely known is the popular commercial training program

Brain Gym, created by Paul and Gail Dennison. Its premise is that all learning begins with physical movement and that specific physical exercise can positively influence neural mechanisms, thus making it possible to overcome learning challenges. However, few such educational programmes can support those claims with hard evidence.

"The science of Brain Gym is very flawed and it would be very difficult to find a reputable scientist who would support the explanations that are given as to why it would work. The other problem with the Brain Gym is that we don't have reliable educational evidence of it working," says Dr Howard-Jones. "Yet I think the idea of regular exercise breaks to wake children up and make them more alert is very sensible. A lot of schools are using it, not least as a way of introducing more exercise into the curriculum." However, he thinks that more research is needed on the usefulness of exercise breaks to improve learning.

And research is currently continuing at a pace. For example, as cognitive neuroscience advances, we are gaining a better understanding of whether children are likely to suffer from dyslexia. The detection of such indicators can then lead to appropriate support being offered at an early stage. Moreover, neuroscience has shown that the brain continues to change throughout our life and not just in our formative years. Teenagers, for example, show a 'pubertal dip', thus they may lose the ability to match pictures of facial expressions to descriptors – a task which they could do better when younger. The recognition of this effect could be taken into account when designing educational experiences for young people of this age.

Technology is constantly improving our understanding of the brain. While functional Magnetic Resonance Imaging (fMRI) now gives us an insight into the different parts of the brain, Electroencephalography (EEG) helps scientists to identify when and what type of neural activity is happening. EEG works by recording the electric voltage of millions of brain cells as they pass messages within the brain through electrodes placed on the scalp. These are then converted to a digital display showing the electrical activity within the brain. The frequency of this activity, or 'brainwaves', is measured in Hertz (Hz) or cycles per second, and shows the conscious state of the person monitored. The most commonly known brainwaves are the slow delta, theta and alpha waves, and the faster beta and gamma waves. While delta (up to 4 Hz) is mostly present when in deep sleep, theta (4-8 Hz) is present in early sleep stages and associated with drowsiness. Alpha (8-12 Hz) is associated with being awake and relaxed, while beta (12-30 Hz) is present when a person is awake and actively processing information. Gamma (26-70 Hz) is associated with perception.

Neurofeedback uses EEG to provide a real-time visualisation of our brainwave activity, with the aim of influencing that activity. It can be used to identify instances when the desired brain activity is used and then provide positive ('reward') feedback. Rewards and reinforcement depend on the protocol of the system used – they can, for example, take the form of a simple change in the pitch of a note or determine the actions of a character in a PC game. Gaming and learning are two areas where neurofeedback has become increasingly popular. In neurofeedback-based games, developers are attempting to make a game where the computer challenges the player to control their brainwave activity or relax in order to perform set tasks. In some games, the brain could effectively become a joystick.

One such game is Mindball, in which two players sit at opposite sides of a table with a ball on it. Each player wears a headband that monitors their brainwaves, and the aim is to become relaxed and focused, thus generating more alpha and theta waves than your opponent. Doing this will move the ball towards your opponent's goal.

Another example that uses the neurofeedback principle is EmotivEPOC, a computer fantasy game in development by the American company Emotiv Systems. Wearing a headset with 14 electrodes attached to it, players can control and manipulate objects and change environments according to their emotional state. Furthermore, the creatures in the game react to players' facial expressions in real time. Another is the NASA-inspired educational system Play Attention, available in the UK from Games for Life, which is aimed at children suffering from Attention Deficit Hyperactivity Disorder

IN SOME GAMES, THE BRAIN COULD EFFECTIVELY BECOME A JOYSTICK

Mindball: courtesy of Vivifeye www.vivifeye.com

Games for Life

Mindball: courtesy of Vivifeye www.vivifeye.com

(ADHD). The idea is to help participants to increase their focus and concentration by using specifically-designed activity sessions.

In the UK, Devon-based Alpha-Active specialises in neurofeedback technology for therapeutic applications and training in sports performance. The company is developing a game system called i-Mind™ which will use its HeadCoach™ EEG brainwave measuring platform. The idea is that this can be used to play games based on sports, puzzles, life scenarios and fantasy. These games will target people of all ages and it is hoped that they will increase focus and improve learning by allowing players to practice generating the necessary alpha waves associated with this state.

While Alpha-Active's HeadCoach™ is already on the market, the games and the software interface between the game and the machine still need to be developed fully. Nonetheless, Dr Keith Barfoot, Managing Director of Alpha-Active, claims that it is based on a robust product platform. "You can wear it when you are moving around playing sports. With what we have seen of other EEG games, the players seem to be sitting in chairs. With ours, you can actually be ducking and diving and it still works."

While these sorts of games have yet to be proved to have any real effect on learning, studies have shown that neurofeedback can enhance musical performance. The Royal College of Music (RCM) in London ran a project from 1999 until 2002, funded by the Leverhulme Trust, called 'Zoning In: Motivating the Musical Mind'. Its aim was to improve performance and manage high stress levels during performances. Over 150 students were introduced to different types of training including neurofeedback. The experiments were carried out under Professor John Gruzelier, who works at the Department of Psychology at the University of London's Goldsmiths College. His research group devised several types of training. One was based on the slower brainwaves, alpha and theta, where students had to wear electrodes on their scalp and headphones, through which they would hear sounds they were supposed to 'target'. The second type of training involved faster beta brainwaves. Students would see objects like a Pac-Man on a screen and, when they produced the required beta brainwave activity, they could move these objects. The training went on for several weeks and the results were impressive, especially with those students receiving slow wave training.

"We saw that those students receiving this type of training were generally improving by about two degree classes in those performances, compared to before their training and with students that did not take part. There were generic improvements to their performance quality as a whole," explains Dr Aaron Williamon, Head of the Centre for Performance Science (CPS) at the RCM. "But we also saw some significant improvement in areas we tend to associate with better states of creativity, so we saw students' ratings on things such as interpretative imagination and musical understanding improve."

Gruzelier has since carried out more studies with musicians, dancers, artists and children with ADHD. All these studies showed a significant improvement, but Williamon is cautious about the implications for education. "Within education, there is a desire for solutions from neuroscience, but we have to be very careful. To date, there is very little that we can draw directly from neuroscience to have a direct impact on music education. What we are doing here at the Royal College of Music in the Centre for Performing Science is exploring a number of implications from many different sciences and looking into how they might impact on the practical music-making that we do here every day."

So, even with so much development and research taking place, it is still hard to say if or when brain-computer interaction will become widely available and part of everyday learning. Studies like 'Zoning In' show promising signs of its effectiveness, and the idea of using the brain as a joystick is a very attractive idea for computer game developers, as it provides them with new possibilities for sophisticated PC games. However, it's not possible to conclude if any of these developments will have any effect on education and learning. In the meantime, educators will have to be content with the prospect of a device that enables students - especially those with learning and behavioural difficulties - to get into a more relaxed and focused state, even if all it can prove to achieve is a more relaxed and less stressful teaching environment.

Links

- Emotiv Systems – **www.emotiv.com**
- Mindball - **www.vivifeye.com/mindball/index.html**
- Games for Life - **www.gamesforlife.co.uk**
- Alpha-Active Ltd - **www.staplethorne.co.uk/eeg.htm**

Further reading

- Paul Howard-Jones (2007). Neuroscience and Education: Issues and Opportunities. Teaching and Learning Research Programme Economic and Social Research Council
- Aaron Williamon (ed) (2004). Musical Excellence: Strategies and Techniques to Enhance Performance. Oxford University Press
- Sarah-Jayne Blakemore and Uta Frith (2005). The Learning Brain. Lessons for education. Blackwell Publishing

Now for the science bit...

Neuroscience studies all aspects of the nervous system - from its biochemistry, function, structure and pathology to its evolutionary history and pharmacology. From these studies we know the adult human brain contains about 100 billion brain cells which are a type of neuron or messenger cell. There are two different kinds of nerve fibres in a neuron: fibres that carry information towards the cell body, called dendrites; and fibres that carry information away from it, called axons. The electric signal from an axon is converted (by the 'presynaptic terminals') into a chemical signal, a neurotransmitter, in order to excite another neuron - as neurons do not touch directly. This, in turn, creates another electric signal and so creates complex neural networks. EEG works by detecting the electric signal in the axon, with the rate of the signals indicating the state of the person - the more relaxed, the slower the signals.

Events

BETT

14-17 January 2009

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, 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 stories from teachers and children who are innovating in the classroom.

www.bettshow.com

Learning Technologies Exhibition and Conference

28–29 January 2009

London, UK

The theme for this conference is 'Next Generation Learning at Work'. The programme will focus on learning technology, effective learning implementation and learning strategy as well as, most importantly, on how technology-supported learning is crucial to business performance and success.

www.learningtechnologies.co.uk

The Building Schools Exhibition and Conference

11-12 February 2009

Manchester, UK

For those interested or involved in the Government's school building programmes, 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

Mobile Learning

26-28 February 2009

Barcelona, Spain

The Mobile Learning 2009 International Conference provides a forum for the discussion and presentation of mobile learning research. In particular, it aims to explore the transition from consuming content to creating content and considering the learning opportunities this provides.

www.mlearning-conf.org

Society for Information Technology and Teacher Education (SITE) Conference

2-6 March 2009

Charleston, USA

SITE represents educators interested in the creation and dissemination of knowledge about the use of information technology in education. This 20th 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

CeBIT

3-8 March 2009

Hanover, 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 and how they might be used in school?

www.cebit.de

Games and Virtual Worlds for Serious Applications

23-24 March 2009

Coventry, UK

This event aims to meet the significant challenges of the cross-disciplinary communities that work on these serious applications by bringing them together to share case studies of practice, to present new methodologies and theories, and to begin the process of developing shared cross-disciplinary outputs.

www.vs-games.org.uk

The Education Show

26-28 March 2009

Birmingham, UK

The Education Show is the UK's largest showcase of educational resources of all kinds. It enables educators to see what is new and try out these resources – in the hope that they will be inspired to use them to teach and manage learning more effectively.

www.education-show.co.uk

Computer/Human Interaction (CHI) Conference

4-9 April 2009

Boston, USA

Computing is reaching into all parts of modern life. CHI 2009 brings together people working on the design, evaluation, implementation, and study of interactive computing systems for human use. CHI serves as a forum for the exchange of ideas among computer scientists, human factors scientists, psychologists, social scientists, system designers, usability professionals, and end users.

www.chi2009.org

Education Conference 2009

21 May 2009

London, UK

GovNet's 5th Annual Education Conference will examine the Building Schools for the Future programme and discuss Next Generation Learning and teaching strategies in an increasingly connected world. This conference promises to offer a unique public sector-wide perspective with interactive break-out sessions that allow delegates to engage with policy makers, practitioners and suppliers on a one-to-one level.

www.govnet.co.uk/education

Seizing Success 2009: NCSL's Annual Leadership Conference

10-12 June 2009

Birmingham, UK

NCSL's annual leadership conference offers an opportunity to connect cutting-edge perspectives on leadership with the best practice from leaders in the field today. Billed as "thought-provoking, stimulating and inspirational", the conference aims to make a tangible difference to leadership practice and thinking.

www.ncsl.org.uk/conference2009

Blended Learning Conference 2009

17-18 June 2009

Hertfordshire, UK

This conference aims to explore the varied ways in which we engage students in the curriculum. This year, the main keynote will be given by Professor Randy Garrison, Director of the Teaching and Learning Centre and a Professor in the Faculty of Education at the University of Calgary.

www.herts.ac.uk/blu

Conference on Education and Information Systems, Technologies and Applications

10-13 July 2009

Orlando, USA

The worlds of education, training and ICT are increasingly merging, with innovative tools and new methodologies. This 7th International Conference brings together researchers and practitioners from both education and technology to share ideas, theories and practices.

www.iiis2009.org/imsci/website

SIGGRAPH

3-7 August 2009

New Orleans, USA

SIGGRAPH 2009 will bring an anticipated 20,000 computer graphics and interactive technology professionals from six continents to New Orleans, Louisiana, USA for the industry's most respected technical and creative programs focusing on research, science, art, animation, music, gaming, interactivity, education, and the web.

www.siggraph.org/s2009

ALT-C 2009: 'In dreams begins responsibility': choices, evidence, and change

8-10 September 2009

Manchester, UK

ALT's annual international conference - 'In dreams begins responsibility': choices, evidence, and change will be held in Manchester, September 2009. Keynote speakers will include Michael Wesch, Assistant Professor of Cultural Anthropology at Kansas State University, USA and Terry Anderson, Professor and Canada Research Chair in Distance Education at Athabasca University, Canada.

www.alt.ac.uk/altc2009

Handheld Learning 2009

5-7 October 2009

The Brewery, London

The Handheld Learning Conference is the international signature event for learning using mobile or ubiquitous technologies. In 2008 over 1,000 delegates gathered to connect with the leading international opinion formers, policy and decision makers, thought leaders and practitioners.

www.handheldlearning2009.com

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