

# Learning Technologies and Schools of the Future



**BCSE** British Council for School Environments

I want to thank Rachel Jones from Steljes for delivering the first BCSE annual lecture on 30th November 2007.

Rachel's input and the response from Steve Moss, Partnerships for Schools was truly illuminating. This pamphlet is a record of this first BCSE lecture.

Learning technologies are changing as I write and it is individuals and organisations in our membership who are helping to make sense of a fast changing world. We can embrace change or reject it. Young people seem to

embrace technology immediately and often without a manual. The role of educators has never been more significant; helping young people make the right choices.

Old certainties and old borders are dissolving fast and it is the work of companies like Steljes, Northgate Information Systems, RM and local education authorities like Wolverhampton that show us the power (to enthuse) for learning that technology really has.

### Rachel Jones, Head of Education & Building Schools for the Future, Steljes

In her role as Head of Building Schools for the Future, Rachel Jones is responsible for Steljes' involvement in BSF projects, including developing strategies for how the company can anticipate and take the lead in designing the future classroom. She also manages the nationwide team of Educational Development Consultants.

Prior to working for Steljes Rachel was a secondary head teacher where she was responsible for leading her school out of special measures in only two terms. Rachel is passionate about transforming schools into strong learning centres in the heart of the community. She has a clear vision about how

to use technology to support information sharing across children's services and to make a real difference to young people's engagement and achievement

Her previous roles include working as an Inspector for Secondary School Effectiveness, providing management support to senior staff and focusing on school improvement. In her LA role she managed a team of consultants and advisers who provided targeted training and coaching to staff in schools. Rachel's enthusiasm for new technologies and learning also saw her contributing extensively to the development of ICT within her LA as well as for new set-up

We hope this discussion helps you in your work.

Ty Goddard  
Director, BCSE

www.bcse.uk.net



Ty Goddard  
Director

primary schools. The pinnacle of this work was in the development of the Ingenium project, which was one of the 'classroom of the future' pilots for BSF.



# Learning Technologies and Schools of the Future

## Learning is changing – isn't it?

In 2004, a US based market research corporation<sup>1</sup> dubbed a newly identified group 'Masters of the Youiverse'. The same young people are also variously referred to as Generation Y or the Net Generation. However described, these 'digital natives'<sup>2</sup> are not only our current school population, they are the parents and teachers of the future. So what are the implications for the 21st century schools that we are designing today?

So far, much of the debate surrounding the Building Schools for the Future programme has focused on whether new schools are 'fit for purpose', a judgement largely made in terms of design and build quality. The title itself proposes that this is a major 'Build' programme, which of course it is, though in fact only about half of England's secondary schools may actually be rebuilt, with some 35% anticipating significant refurbishment and 15% minor works. The consistent change element within every BSF project is however the investment in teaching and learning technologies. No matter what level of rebuild, the commitment is to invest around 10% on ICT development. This totals more ICT spend per pupil in one hit than that of the previous 25 years, acknowledging its potential for transformational impact.

## Why are we spending so much on technologies?

### Social changes

ICT is increasingly described as the fifth utility, the point being that we pretty much cannot live, work or learn efficiently or comfortably without an ICT infrastructure. National expectations of the social role of schools are also changing; hot-housed in climate of concern about youth disaffection and family breakdown. In response, the government publication Harnessing Technology<sup>3</sup> sets out a sophisticated model of how technologies can fundamentally shift the process of state education, not just in terms of learning but in terms of locality management and integration of public services. BSF offers a robust delivery framework, including support through a professional managed service, which has the capacity to deliver this ambitious level of service.

▲▲ Know-what, Know-why,  
Know-how, Know-who ▲▲

### Economic shift

The Teaching and Learning in 2020 Review Group's report emphasises the need for schools to 'personalise' pupils' learning to meet the demands of 'a knowledge-based economy where it will be possible to compete with developing and global markets'. The OECD<sup>5</sup> defines such a knowledge economy simply as 'Know-what, Know-why, Know-how, Know-who'. This extends considerably beyond the dominance of 'facts' and 'content' to which we remain deeply culturally bound in the UK. How can schools possibly engage with such a wide-ranging portfolio of knowledge? The 'empty vessel' model is no longer sustainable, and adjustments to the National Curriculum are starting to take account of this. Developing young people's capacity to 'learn to learn' and their skills in critical analysis are rapidly gaining priority status, and developing ICT capability is key to this.

### Learner Expectations

Give a school pupil a new mobile phone and she won't ask you for the manual to find out how it works. The Net Generation is habituated to a technologically rich, problem solving and lateral environment; many find the flat, linear environment of traditional 'chalk and talk' pedagogies stifling<sup>6</sup>. While this does not advocate a free for all, permitting completely self-directed learning, it does beg a serious question as to how teaching and learning will be structured in the future.

## If we (try to) keep things as they are...

Technologies on their own won't change much. Kit and cables don't have a moral purpose or desire to transform. So leadership and decision making in how we make use of this investment in ICT is where it starts to get interesting, and grappling with how we change practice is where it gets vital.

In 2001 the OECD crafted six instructive scenarios in 'What Schools for the Future?'<sup>7</sup>, two of which describe 'maintaining the status quo'. The first describes a highly bureaucratic model, emphasising control, efficiency and socialisation, in which ICT 'continues to grow without changing schools' main organisational structures'. The second paints a bleak picture of a meltdown in the teacher supply, which is then substituted by greater (undefined) use of ICT. The implication is that without any deep engagement or understanding of the relationship between technologies and pedagogy, they are little more than tools used in a futile manner to stem the tide of (social) change.



Similarly Dan Buckley's illuminating manual 'Personalisation by Pieces'<sup>8</sup> presents two models, the P(upil) Route and the T(eacher) Route. The T route presents a model of conventional educational practice, made more efficient through the use of technologies. Buckley outlines how the core pedagogical model can either remain quite unchanged (T) or can be radically transformed (P) depending on how the educator / school chooses to use technologies.

The professor had assumed... that putting philosophy on the Web would give his students more flexibility to shape their own learning experience... Instead, my online course had turned learning into exactly what I despised – a one-dimensional exercise in learning and regurgitating facts.

Here a university student in the USA<sup>9</sup> neatly captures the mismatch experienced through mere transfer of existing practice (denuded of its in-class direct social interaction) to an online environment.

The combined views of the international agency, a national educationalist and an individual learner tell us that introducing ICT without a clear rationale and agenda for change is likely to provide a poor return on investment at best and may even prove demoralising for educators and create frustration amongst learners.

## Web how many?

Web 2.0 has become a buzzword, with Web 3.0 hot on its heels. These second and third generations of internet capability are perhaps the most significant change agents impacting on the 'Masters of the Youiverse'. Our first experience of the web was for most an encyclopaedia, whereas web 2.0 has transformed it from what was essentially a 'read only' medium to one where anyone can publish and post his own material and share content. This opens up a considerable challenge to the conventional education model. Technology enables learners effectively to bypass the transmission mode of pedagogy which has often dominated practice in schools. Learners are instead able not just to find out information for themselves, but to join communities and discussions where facts, information and knowledge are challenged and tested.

Definitions of web 3.0 are still contested, but might include 'read-write-do'. In 2001 Tim Berners-Lee and others were already defining the 'Semantic Web'<sup>10</sup> in terms of metatagging content properties so that 'semantic web agents' can interpret relationships between our inputs, requests and actions. Tagged<sup>11</sup> 'smart' objects are within reach and rapidly coming on-stream. In the short term this means tailoring the functionality of a website or forum so it adapts to the community it supports. The pattern of user activity influences the interface or might generate a(n) automated shift in content. Already we can expect user recognition responses to permeate everyday activity. For example on arrival at the airport, the ticket recognition system might not simply direct you to the correct gate, but prompt you via an instant message to purchase your favourite perfume. It may even point you to a particular store whose loyalty

## Safety and Trust

At the extreme criminals and paedophiles may go to bizarre lengths to disguise identities, to mislead and corrupt. Bodies such as the Child Exploitation and Online Protection ([www.ceop.gov.uk](http://www.ceop.gov.uk)) centre provide direct support and resources for young people, parents and school staff. However within the continuum of 'false presences', interest groups or advertisers may embed messaging which is entirely legal but may be hard to spot. In an environment where all may not be as it appears, querying what we encounter becomes a life skill. While all agree that all young people must acquire a raft of functional skills, we have a duty to ensure that these go beyond literacy and numeracy. A priority must be to equip young people with critical analytical tools to gauge what

they encounter without creating undue alarm or developing a society based on mistrust and suspicion.

As content is matched and pushed towards us, sorting the wheat from the chaff of ubiquitous (mis?)information becomes a key competence. Andrew Keen maintains 'There are no gatekeepers to filter truth from fiction, genuine content from advertising, legitimate information from errors or outright deceit... When we are all authors, and some of us are writing fiction, whom can we trust?'<sup>12</sup> The Qualifications & Curriculum Authority's review of the National Curriculum and the introduction of the Technology and Media dimension is timely as it identifies that 'young people need opportunities to become discerning

and critically literate in relation to the media and the internet, learning to question the authenticity, accuracy and reliability of the information they encounter.'<sup>13</sup> Questioning veracity and interrogating authenticity may however have further possibly unintended consequences. If young people are encouraged to question and challenge perceptions, it may also hasten a deeper shift away from transmissive forms of teaching and into co-constructed learning.

scheme you are in, and trigger walking directions using your mobile's GPS. In such a context control over access to our personal data becomes highly significant. In an education context the 'intelligent' school becomes super-responsive to the individuals within it through position tracking and instant messaging as well as more familiar climate control and security management.

In a learning context these developments present the opportunity to create responsive learner profiles within a Virtual Learning Environment. As a learner completes work at a particular standard satisfactorily, new tasks are automatically pushed towards her. When a learner defines a particular study interest for a specific time period, each day new

content e.g. podcasts, weblinks or text files will pop up in her in-tray to stimulate thinking. She may be invited to join a community working on similar material or to join in an online interview with an expert in the field. The level of her activity will be logged and contribute to her grade in her e-portfolio.

### Changing Pastimes, Changing Minds

Our fear of isolated young people, alone in front of their computers is far from the reality of this online environment which provides a gateway to communities and collaborators far and wide. For the first time in a generation a recent US study<sup>14</sup> has found that teenagers now typically watch less television than their parents. The authors venture, 'teens embrace new content at a much faster pace

than their parents, so we will naturally see a widening gap in the amount of television viewing time between the two groups'.

'New' technology is by its nature subjective. Most teenagers aren't especially interested in technology per se, but have a voracious appetite for the activities that technology enables, for example the internet as an access tool, instant messaging as 'talking', multi-user games to compete and play and forums<sup>15</sup> as places where they can find 'cheats' and tricks to enhance their playing skills. They have internalised what their parents may see as 'new technologies, just as that generation had internalized the 'new' technologies of the touch-pad telephone, personal computers and CDs. The key

difference is that the internalised Youiverse is virtual, much less focused on hardware, much more focused on the kinds of activities which digital technology and the internet can support. This internalisation is not simply social but, argues Susan Greenfield, induces a physical impact on synaptic connections, 'brain-cell circuits configure in extent and power according to the particular types of input they have... this forging of new connections, which has a direct basis in the connections between neurons, is surely the essence of learning'<sup>16</sup>.

So during their formative years, young people are often engaging in a dynamic, interactive and reflective on-line environment,



with rapid feedback and multiple interfaces. Within the virtual environment, the users are engaged in social activities and are often multitasking, encouraged by extensive resources, which in turn they 'mash' i.e. repurpose and redesign in way not necessarily anticipated by the original programmers. They are attuned to an evolving infrastructure supporting collaboration, asynchronous threaded discussions, virtual environments, videoconferencing, and mobile devices with embedded GPS capabilities. Prensky<sup>17</sup> echoes Baroness Greenfield's opinion and maintains that 'as a result of this ubiquitous environment and the sheer volume of their

interaction with it, many of today's students 'think and process information fundamentally differently from their predecessors.'

They may be more visually literate, better able to express themselves through images than text. They may have very quick response times, having practised this extensively in gaming environments, but then may find extended concentration on a single task more challenging. Rapid responses in messaging and texting may also lead to the prioritisation of speed over accuracy. They may be able to shift their attention rapidly from one task to another, but their attention may wander quickly from things that interest them less. Gaming environments together with developments in internet usage during their lifetimes may also encourage an exploratory learning style, one which is predisposed to learning by doing, and embedding learning which is found out for oneself, rather than doing / learning what one is told. Extensive networking and instant messaging might promote social interaction and teamwork rather than individual activity. Peer evaluation and moderation is a very powerful part of the experience – young people may value the appreciation and validation of their peers over (external) educators.

As the list continues, the potential impacts on classroom management as well on core pedagogical practice become illuminated. In a more fragmented and less deferential society, the big question for state educators may not be whether models of teaching ought to adapt to the changing demands of modern learners. Rather it may be how long schools can continue to be manageable if learning, teaching and assessment models do not adapt to this rewiring of young people's minds.

# What does this mean for schools?

Discussions on the digital divide tend to be concerned with (home) access to broadband connectivity. However, if scientists are right and cognitive processes are influenced by regular creative engagement in the online environment, our schools need to address the quality of online provision they make. An aspect of tackling the digital divide will be to ensure that all young people gain access to and guidance on the use of more sophisticated tools.

The Office for National Statistics reports that 98% of young people in the UK used the internet in 2003/4, but this statistic disguises an uneven pattern of access and use. We need to be specifically interested in how

young people are making use of the internet and related technologies. Digital exclusion is highly correlated with social exclusion which in turn is highly correlated with educational underperformance. Access is clearly the baseline issue, but regularity and particularly the quality of use is an increasing focus, and it's not as simple as defining the 'haves / have nots'.<sup>18</sup> Socio-economic factors, age and gender influence the quality of internet use<sup>19</sup> with the predictable picture emerging that better off children and those with more attentive and educated parents are more likely to be creatively engaged.

Developing highly interactive and creative media in virtual learning environments (VLEs)

must therefore be high priority, as must avoidance of the trap of developing an attractive looking virtual teaching environment, which may be little more than a portal to an online repository for text-based linear exercises and random 'objects'. Personalisation means much more than applying a choice of 'skin' from a menu, which is really only the equivalent of covering your exercise book in your choice of wrapping paper.

Conventionally, VLEs / learning management systems / platforms have tried to mimic the classroom experience in an online space, with students able to access and submit tasks. In a web 2.0 enhanced environment the student becomes the ringmaster, is the centre of attention, selecting his own tools, managing his own performance, which is shared with a select audience, who provide feedback and, if all goes well, applause. In this scenario, we move closer to a Personalised Learning Environment, which Lubensky summarizes as 'a facility for an individual to access, aggregate, configure and manipulate digital artifacts of their ongoing learning experiences'<sup>20</sup>.

## Virtual Learning Environments and Web 2.0

BECTA: 'an intermediate target for 2008 is that all learners should have access to a personalised online learning space with the potential to support e-portfolios'

BECTA's learning platforms framework lists 10 suppliers.

October 2007, googling produces 32 million results for VLEs

Web 2.0 tools	podcasts	videos	wikis	mashups	blogs
	animations	RSS feeds	photos	tagging	social networks

Use of web 2.0 tools in education is still at an early adoption phase, not least because many tools are not entirely robust, there are legitimate concerns over e-safety and few teachers can use them confidently yet. However, future-proofing requires consideration of how web 2.0 tools might be incorporated into a V/PLE over time.

▲▲ The future is already here. It is just not evenly distributed! ▲▲  
William Gibson

## Multi-located learning

'The new reality is that the public-education system is no longer the only, or the paramount, place where we go to learn' (Daly)<sup>21</sup> Within the state education system in the UK, this is an increasingly accepted reality, particularly in the 14-19 age range where students may be registered at a school, but attend a local college or workplace (or both) for part of the week. The range of learning involved in the new specialised diplomas to be launched in September 2008 will present even greater demands for multi-located learning. Put this alongside the requirement for all secondary

pupils to have access to a VLE by 2008, and the shifting pattern of learning becomes clearer. The VLE and ultra portable devices will provide much of the adhesion in multi-located learning.

## A Pocketful of Learning

Mobile learning is attracting vast interest from early years to further education settings. A personal device and its onboard tools equips the learner with a 'digital pencil case' to record video and audio clips, take notes, create animations, read (and comment on) e-books, upload work onto his own pages on the VLE, get feedback on assessments and

access the internet, and it all fits in his pocket. Immediately this ubiquitous access diminishes barriers between home and school as the learner can 'show and tell', involving parents in his school day. Later, he can link into his online user space to continue working from home, or even refresh his memory on the bus back to school in the morning. Put together with GPS and 3G capability, the whole learning environment blossoms. Work is already progressing on 'intelligent contexts' whereby GPS tracking of the device in the real world can invoke virtual resources e.g. prompting the learner to answer questions or take a photo and annotate it during a geography field trip.

## MOBILE LEARNING When Three Is Not A Crowd

As their handheld computer screens simultaneously flash up "correct," Josh, Aaron and Jack let out a cheer. They have just worked out why Tenby in South Wales has a wall around it.

Shortly afterwards, Gavin Hawkins, assistant head at Stowheath junior school in Wolverhampton, clicks on his own personal digital assistant (PDA) and brings everyone to a halt, despite their protests. "On my PDA I'm getting all the answers," he says. "Every group is getting question five wrong at least once."

As the class lift their heads to focus on the board - remarkably, there has been no reaction to the boys' cheers as they are all too engrossed in their own learning - the screen from Jordan's machine comes up for all to see. At the top is the question, "Tenby is famous for being a medieval walled town. Why do you think it was important to build a wall around the town?" and then the five possible answers.

The Eduinnova software (which originated at the Catholic University of Chile, Santiago) they are using has been designed to promote discussion, so the answers are in a different order on each device in their working groups of three. Pupils can't simply say "The top one" or "B" but have to quote the whole text.

As their PDAs are released, they settle back to work. Although the classroom looks like any other, with the exception of the banks of chargers around the room, something quite new is happening. It is not just that every child from the end of year 5 onwards has their own device, but the way in which they enable them to learn.

The software assigns children to groups of three, a significant number. "There is a reason for three in a group," says Miguel Nussbaum, professor of computer science at the Catholic University, and the brains behind this approach. "When there are two there is a conversation. With three you have a new dynamic. When there are four too many viewpoints appear. It is more difficult to converge."

Nussbaum sees this as the core of Eduinnova. "What we need in the 21st century is the development of social and communication abilities. What I try to foster is to bring technology to change the classroom to develop these abilities."

Adapted from The Guardian 17th June 2007

# What next, Immersive Learning?

Not yet readily available, this could be one of the next steps. Think of multi-user games environments. Think of the augmented reality that can already be experienced through prompts on the mobile device, combined with some of the psycho-sensory stimulation experienced in an IMAX cinematic environment. Think Second Life. The potential of virtual simulations to augment and stimulate learning and response is significant. At one level it could enable learners to influence the design of content, pedagogy, and assessment based on their individual preferences and needs. At another

level it could lead to the development of 'Cave Automated Virtual Environments. A CAVE is a 3D visual computing environment that recreates space and allows the educator or researcher to interact and visualize complex shapes in an interactive 3D environment. It is a multi-person, room-sized, high-resolution 3D video and audio environment'<sup>22</sup>. Currently used in research on genomics, the potential of this type of combined physical / virtual space to provide multi-sensory immersed learning experiences opens the door to types of learning and content which stretch our current imagination.



## Learning is changing, isn't it?



The million dollar question is of course the impact all of this might have on learning and standards. Will the nation see a good return on its investment? Has an overemphasis on hardware and content at times obscured the need to develop a deeper understanding of the pedagogical shifts implied by technologies? BECTA comments that a 'key concern is the extent to which teachers fail to appreciate that learning and teaching through technology requires a new approach to pedagogy, to planning and preparation, and to how the curriculum is perceived'<sup>23</sup> The challenge within this, is that there is no 'quick fix' for our schools or teachers. The table opposite indicates the extent of change that teachers and learners may find themselves grappling with.

20th Century Pedagogy	→	21st Century ICT-enhanced Pedagogy
Schemes of work are supplied by the Head of Department. Hard copy lesson plans are prepared by individual teachers	→	Schemes and lesson plans are maintained online; iterative practice permits these to be collectively improved. Teachers work collaboratively to share resources, locally and at a distance
The teacher chooses and provides sources and resources	→	The teacher recommends good quality resources for students to investigate and encourages critical analysis of additional resources provided by students
Examples are taken from text-books, fixed at date of publication	→	Live real-world examples are watched, listened to or read
The teacher defines and controls the learning environment	→	The teacher enables students to access various learning environments, physical and online, both in and out of school. Learners personalise their user spaces
Teacher-created and supervised work dominates	→	Teacher guided and pupil initiated work is balanced. Autonomous group work features strongly and is self regulating, though guided by the teacher
Individual work at a single desk dominates	→	Collaborative work dominates. Students use handheld devices to work in small groups, with thumbnail images on the Smartboard providing an overview. The teacher can pause the lesson and devices to discuss learners' work
Linear, textual and verbal approaches dominate learning	→	Hyperlinked, interactive, visual and aural approaches dominate learning
The classroom and the teacher are the prime focus of learning	→	The real world, peers, teachers and other adults are the prime focus of learning. Collaboration takes place locally, nationally and globally
A 'chalk and talk' delivery model is often used	→	Teaching is predominantly interactive, involving the learners actively and creatively, with both learners and teachers using a range of presentation tools. Presentations (and commentary) on the Smartboard are recorded and uploaded to the VLE for revision purposes or for access by absent learners
Classroom time is mainly used for individual quiet work rather than discussion and dialogue	→	Classroom time is usually used for discussion and dialogue. Individual quiet work is done in a quiet zone, which may be outside the main classroom

Teachers are expected to know answers to pupils' questions	→	Pupils do not necessarily expect teachers to know the answers to their questions. They expect help to frame the right questions, help to develop skills to find answers and help to judge the reliability of content themselves
Learners record their work in exercise books. These are usually private. Work may occasionally be shared with a neighbour	→	Learners select the medium which most effectively conveys the content and analysis they are working on. They create text, presentation, audio and video files with embedded objects and hyperlinks. They present their work on the Smartboard and critique each
Exercise books are dispersed between the learner's bag, home and school, even the teacher's home!	→	Learners maintain a personal work space in the virtual learning environment (VLE) which can be accessed by the learner, teachers and parents. Attendance, assessment and performance data is accessible via the VLE
Learners are issued text books at the start of the year. In some subjects there is a class set which can only be used in school	→	Learners access content via handheld or desktop computers. They use e-books which they can annotate. They access international archives. New tasks and information are pushed into their VLE workspace via RSS feeds according to their progress and areas of study
Homework tasks are individual. They are mainly written and recorded in exercise books	→	Learners can collaborate over homework tasks. They use skype, webcams or shared online user space to discuss and adapt their work. They use visualisers to show handwritten or practical tasks online. The VLE is accessible from home, school, the youth centre and the local library
Work is marked and commented on some time after it is done	→	Feedback and formative assessment are available immediately as part of the work process. Handheld assessment devices enable the teacher to adapt the lesson according to pupils' feedback while the class progresses
The teacher marks pupils' work	→	Much work can be marked electronically. Teacher-marking is focused on moderating self-assessment and peer assessment. The teacher spends more time providing personal feedback and guidance to the learner.

Adapted from a model developed by the European Education Partnership<sup>24</sup>

## What do teachers need?

'Teachers who are digital immigrants assume that learners are the same as they always have been and that the same methods which worked for the teachers when they were students will work for their students now', claims Prensky. While he is right to stress that teachers should not make such assumptions, there is a risk that we underestimate the interest and competences of our staff. The Laptops for Teachers and Hands on Support initiatives showed that where staff have personal access to devices, and where they have in-context training and support focused on their existing classes and teaching schemes, they tend to make greater changes more quickly.

The sea change started with pioneering schools' adoption of interactive whiteboard technologies, followed by a major rollout by government as their impact was observed. Teachers have been hugely incentivised by having continual access to a complete creativity centre which enables them to incorporate text, web links, movies and images, all of which can be moved around by the touch of a finger tip. At the same time, the pressure of (technologically capable) learners' expectations has accelerated a change in practice.

### Weblinks and Blogs

Teacher Resource Exchange

<http://tre.ng/fl.gov.uk/>

NextGen Teachers

<http://www.nextgenteachers.com/>

The Educational Technology Site

<http://www.terryfreedman.org.uk/>

EffectiveICT

<http://www.effectiveict.co.uk/>

Shambles (SE Asia but used worldwide)

<http://www.shambles.net/>

C4LPT – tips on tools

<http://www.c4lpt.co.uk/index.html>

Ewan McIntosh's blog

<http://edu.blogs.com/>

Doug Belshaw's blog

<http://teaching.mrbelshaw.co.uk/>

Now educators of all ages are exploring the potential of blogs, wikis, media-sharing services, and other social software, which, although not designed specifically for e-learning, is being re-purposed to empower students and create new learning opportunities. Teachers are using these same tools to share and discuss innovations and share resources, tips and practice. The pace of change is such, though, that as soon as educators repurpose such media with educational content or objectives, new applications appear and the process continues. Some of the most interesting e-learning developments are to be found in individual teachers' and schools' online communities, wikis and blogs. Effective course content and resources are continually adapted and enhanced by the collective effort, embedding change and developing sustainability.

Contributors to the blogs and website shown are the pioneers, the early adopters, and perhaps not typical. However as the Masters of the YOUiverse develop into adulthood and may be employed as teachers, in addition to the informal co-teaching they are already engaged in, this practice will only gather pace and become the new norm.

## Continuing Professional Development

The move from BSF visioning to a Strategy for Change can be expected to assist in the effective use of technologies. However modes of training and CPD will have to shift alongside these new demands. Too often in the past schools have spent significant sums on hardware without supporting this with serious teacher development. Inevitably the technology has been blamed as contributing little at high cost. Yet we don't buy cars and neglect to take driving lessons.



Teachers increasingly expect 'hands-on' practice and may well be as resistant to be lectured as many students. Practice or work based learning models supported by visiting consultants, in-school champions, peer mentors, online communities and forums offer an updated and embedded approach to teacher professional development. Such models offer staff continuing support while also providing a ready resource in a 'next steps' approach to changing practice. To make the most of our technologies we need to have fantastic teachers who really understand their capabilities and have the creativity and imagination to inspire young minds. If we are looking for transformation we need to invest in those who will be leading it.

## Changing learning, Changing Schools

So within the Youiverse learners are busy learning independently and collaboratively. They are developing user-led structures and communities to support this learning, which provide the 'master' to whom they apprentice themselves<sup>25</sup>. The divergence of experience between social learning contexts and traditional 'schooling' is stark and is reawakening debates from the 1970s<sup>26</sup> about the role of school in society and the value of learning outside formal school 'institutions'. At the same time a national commitment to lifelong learning and expectations of community provision are raising expectations of the role of schools within the community. This pressure exerts itself in many ways, not only in how we see the role of the school building in supporting learning, but also in how schools redefine their pedagogies to take account of these 21st century challenges.

To date much of the research on ICT impact in schools has focused on hardware and software utilization, and attempts to gauge

how much effect this may have on pupil progress. What has been examined far less is the extent to which making use of these technologies impacts on the whole pedagogical process. BECTA found, 'there was much less systematic enquiry into the impact on the day-to-day teaching practice of teachers, the impact on the teacher-pupil relationship, or on the teacher-teacher relationship. The evidence is that these relationships cannot and will not remain as they have been.' If learners have as much trust in external sources as the opinions of their teacher, that relationship starts to change. If learning means increasingly interacting with a range of media, and selecting one's own tools and forms of expression, conventions of 'instruction' are challenged.

The convergence of thinking about the process and relationships of learning alongside technological advances and personal use prompts the concept of C-learning<sup>27</sup> which starts to summarise some of the opportunities that building 21st Century, ICT-enabled schools presents. A national commitment to lifelong learning

places schools as a critical resource to the community, and new designs will need to accommodate this. So does this mean schools will need to be (even) bigger? With 'anywhere' learning a reality, does it not rather place the school as the hub of learning within a community? Given multi-located learning, and many-aged learners using school sites, will the notion of an intelligent school 'knowing' who is in it, rapidly become reality? Will learning become a continuum between locations, as the personalized learning environment travels alongside learners, linking their communities at home, at school and internationally?

The choice that we are starting to face is our level of commitment to making transformational changes through our adoption of these technologies. Once we grasp what we are technologically capable of providing educationally, we start to grapple with attitudes to the role of school. As we roll out BSF over the next decade we will undoubtedly explore big questions about how transforming education fits with broader social values.

## C-Learning?

<b>Community</b>	The school is extended and shared with the community; learning is on and off-site, online and potentially global
<b>Content</b>	Learners select and repurpose resources to support and extend their learning
<b>Creativity</b>	Learners and educators select media and tools appropriate to the task. They select visual and audio images to amplify points.
<b>Context</b>	Metadata and pattern recognition facilitates personalised learning and content assembly
<b>Collaboration</b>	Learners access, share, develop, display and demonstrate their work within the school and into the community
<b>Critique</b>	Critical analysis of one's own and others' work is a key learning strategy. Critical analysis of online content is a core skill.
<b>Connectivity</b>	Mobile technologies are used in school and at home 3G / WiMax / GPS enable resources and media to be accessed within and beyond the school
<b>Construction</b>	The building is designed to provide flexible spaces for learner, group, class and community use, The intelligent building responds to the learner; ICT infrastructure is a core design component



<sup>1</sup> [www.trendwatching.com/trends/MASTERSoftheYOUNIVERSE.htm](http://www.trendwatching.com/trends/MASTERSoftheYOUNIVERSE.htm)

<sup>2</sup> Prensky M, Digital Natives, Digital Immigrants, from On The Horizon, NCB University Press V9, No 5, October 2001

<sup>3</sup> Harnessing Technology, Transforming Learning and Children's Services, DfES 2005

<sup>4</sup> 2020 Vision, Report of the Teaching and Learning 2020 Review Group, Ofsted, 2006

<sup>5</sup> 'What Schools for the Future?' OECD 2001

<sup>6</sup> See <http://www.demos.co.uk/publications/theirspace> Green H & Hannon C, Theirspace, Education for a Digital Nation, January 2007

<sup>7</sup> OECD *ibid*

<sup>8</sup> Buckley D, Personalisation by Pieces Framework (PbP), Cambridge Education, 2006 (T&P route developed in association with Microsoft)

<sup>9</sup> Windham C, The Student's Perspective [www.educause.edu](http://www.educause.edu)

<sup>10</sup> Berners Lee T, Hendler J and Lassila O, The Semantic Web, in Scientific American, 2001

<sup>11</sup> <http://en.wikipedia.org/wiki/Rfid>

<sup>12</sup> Keen A, The Cult of the Amateur, Pub. Nicholas Brealey, 2007

<sup>13</sup> <http://curriculum.qca.org.uk/cross-curriculum-dimensions/technologymedia/index.aspx?return=http%3A//curriculum.qca.org.uk/cross-curriculum-dimensions/index.aspx>

<sup>14</sup> Parents set to watch more media than their kids in 2007, Integrated Media Measurement Inc, from [www.marketwire.com](http://www.marketwire.com) July 17 2007

<sup>15</sup> e.g. <http://radarnation.gamesradar.com/forum>

<sup>16</sup> Greenfield S, Tomorrow's People, How 21st Century technology is changing the way we think and feel, Penguin 2004  
See also [www.futuremind.ox.ac.uk](http://www.futuremind.ox.ac.uk)

<sup>17</sup> Prensky M, *op cit*

<sup>18</sup> Bober M, Helsper E, Livingstone S, Inequalities and the Digital Divide in Children and Young People's Internet Use, Findings from the UK Children Go Online project, LSE, April 2005

<sup>19</sup> Digital Inclusion, a discussion of the Evidence Base, pub. FreshMinds for [www.ukonlinecentres.com](http://www.ukonlinecentres.com) July 2007

<sup>20</sup> Lubensky, Ron. (2006), eLearning & Deliberative Moments, <http://members.optusnet.com.au/rlubensky/2006/12/present-and-future-of-personal-learning.html>

<sup>21</sup> Daly J, <http://www.edutopia.org/editors-note-july-august-2007>

<sup>22</sup> <http://elgg.net/mechelledc/weblog/154106.html> Michelle de Craene Blog

<sup>23</sup> Condie R and Munro B, The impact of ICT in schools, a landscape view, BECTA Research, January 2007

<sup>24</sup> Adapted from the European Education Partnership [http://www.eep-edu.org/InnService/Start/ICT%20Rich\\_Start2.htm](http://www.eep-edu.org/InnService/Start/ICT%20Rich_Start2.htm)

<sup>25</sup> Vygotsky

<sup>26</sup> Illich I, Deschooling Society' 1973 Harmondsworth: Penguin.(First published by Harper and Row 1971)

<sup>27</sup> adapted from Wayne Hodgins CEEdMA Europe Workshop C-ing the Future the coming convergence of: Content, Competencies and Context, January 2007

## About the BCSE

The British Council for School Environments (BCSE) is a membership organisation made up of local authorities, schools, construction companies, architects and others involved in, and concerned about, the design and build process in the education sector.

It acts as a forum for exchange, dialogue and advocacy for anyone interested in learning environments; from educators to policy makers; users to designers; managers to constructors.

## To join the BCSE

Visit our website - [www.bcse.uk.net](http://www.bcse.uk.net) or contact Beth Gladstone on [beth@bcse.uk.net](mailto:beth@bcse.uk.net), 020 7785 6286

Address: 2nd Floor, Downstream Building, 1 London Bridge, London SE1 9BG

British Council for School Environments Founding Members:

Aedas Architects Ltd AMEC Project Investments Ltd, Association of Teachers and Lecturers, Bedales School, Building Design Partnership, Buro 4, Buschow Henley, CABA, Capita Symonds, Carillion, Carlton Hill Primary School, Catalyst Education, Catholic Education Service, CITB Construction Skills, CM ParkerBrowne, Davis Langdon, Devon County Council, Dorset County Council, Ecophon, EC Harris, English Secondary Students Association, Feilden Clegg Bradley, Fenstanton Primary School, Galliford Try, Hawksmoor Engineering, Hampshire County Council, Hertfordshire County Council, HOK International, Investors in the Community, Isis Concepts, Islington Council, Jo Richardson Community School, Knowsley Metropolitan Borough Council, London Academy, Manchester City Council, Max Fordham, Milton Keynes Council, mpb education, Nightingale Associates, Northgate Information Solutions, NPS Property Consultants, Penoyre & Prasad, RIBA, Ryder HKS, Skanska, Stoke City Council, Taylor Woodrow, The Learning Trust, The Southwark Diocesan Board of Education, Waring & Netts, Wates.

The British Council for Schools Environments is a company limited by guarantee, registered in England & Wales no. 5881310. Registered office as above. Registered Charity no. 1119307. VAT Registered no. 855 624091



**BCSE** British Council for School Environments



Printed on NAPM approved recycled paper

© BCSE 2007