

## Technology in Education From virtual classrooms to enhancing communities

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Remote access, interactive multimedia and the Internet. As new technologies become available, the locations and methods of working of the past are replaced by new ones that are 'virtualised'. For those at work this offers the flexibility of mobile, remote or home working, removing the need to travel physically to a place of work. So for those in full time education does this spell the end of the traditional educational location – what now for the school, college or university?

There is no doubt that the technology available for use in all levels of education has moved far beyond the traditional classroom format of blackboard and teacher at the front, and pupils lined up in rows behind desks with pen and paper at the ready. Now, laptops perhaps more than desktop PCs, mobile phones or other handheld devices and interactive whiteboards have become increasingly established as regular tools for home and business life as well as learning. The pervasive wireless and wire line networks which link them offer an unparalleled opportunity to connect almost anyone, anywhere at any time to anything. However at different stages in the education process – primary, secondary and beyond – the methods, learning process (and therefore tools used) will vary, and no single, simple approach will suffice. The technology provides only a universal medium, not a universal method.

There are a number of key strands to draw from the

potential of the many technologies now becoming more commonly available to support the learning process. These can be explored further to see whether technology will have a positive effect on education overall:

- ✓ Connection – the availability of access to computers and networks
- ✓ Collaboration – enhance the experience through the availability of new resources
- ✓ Content – re-purposed, by access method or by educational process
- ✓ Cohesion – how this supports the learning process and wider social interaction
- ✓ Control – ensuring this is a secure and manageable experience

In each of these aspects there are differences in emphasis placed on learning, from the flexibility of education establishments in later life to time spent in more structured places of learning such as primary or secondary schools. All face many similar challenges, but these are more acutely felt at the earlier stages of schooling, where family, social and financial pressures are more intense. The number of people involved, diversity of topics to be covered and strictures of central



government initiatives around curriculum, only add to the complexity.

There are, however, a number of government sponsored initiatives aimed at tackling aspects of challenges faced by schools, as well as a greater individual awareness and comfort with using technology overall – especially among the generation who have grown up with it as consumers. Consumer technology often leads with new ideas for businesses to use in the workplace, and the same can be seen in the education place. However, just as those in the business world need to balance between reluctance to use and over reliance in order to get the best out of technology use, so too do those involved in its application in education.

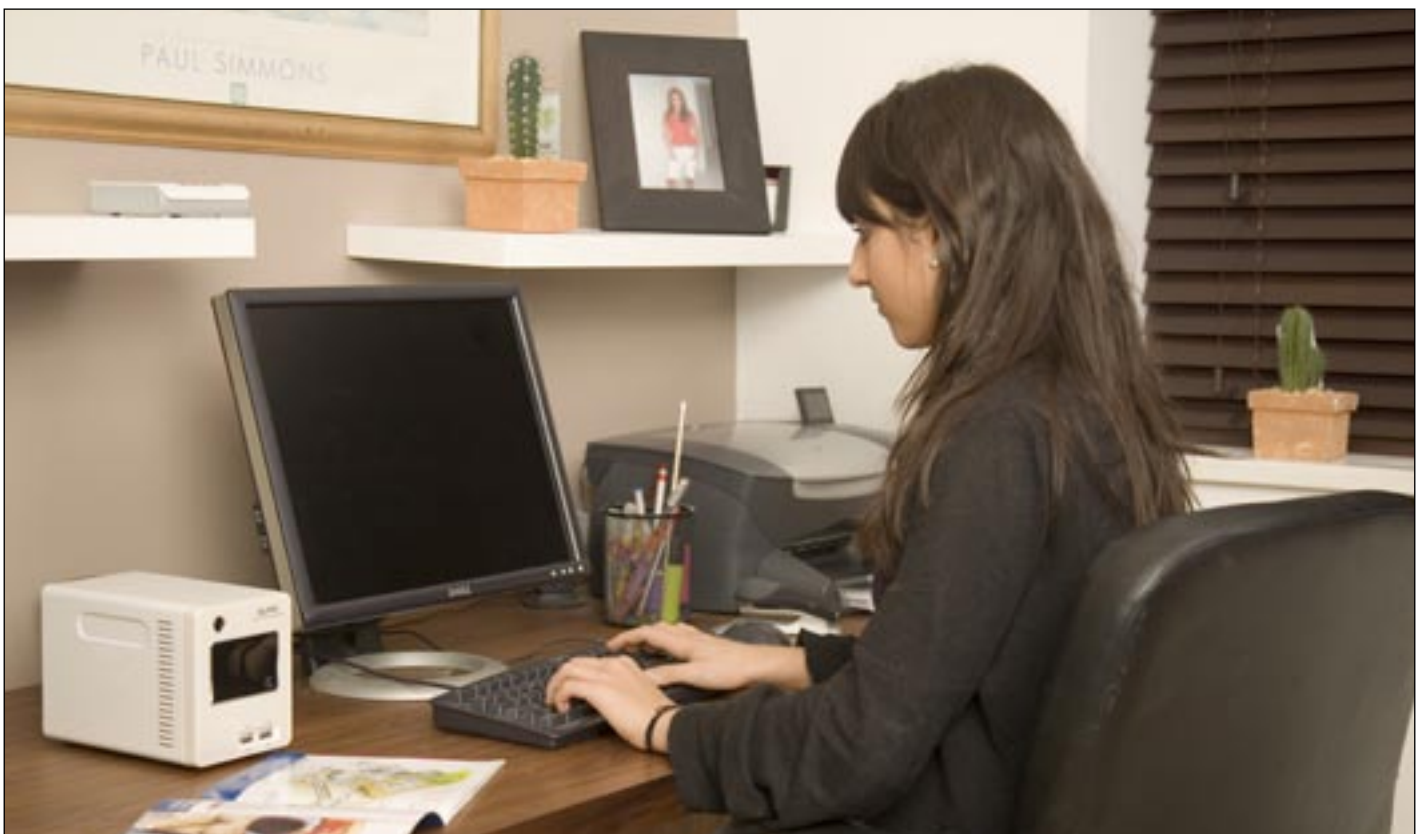
## Connection

While the number of households with access to the necessary tools has soared, easy access is by no means universal as there are significant costs involved both for individual families and the schools or colleges themselves. At home and in school, use of computers is often shared with others, and while public systems in libraries and Internet cafes also offer connectivity, they belong to someone else. Low cost, limited capacity floppy discs and CDs have been replaced by high capacity, simple to carry memory sticks, and relatively affordable portable hard drives. As the capacity has grown so too has demand. Students are now able to access, store and transport media rich homework

and other material including videos, audio and high resolution images even when using public PCs.

However this is only a baseline and there needs to be fast and reliable access to broader networks, as the availability of material and services on the Internet has made it a valuable, if sometimes double-edged, source of informative material. Although the school should still remain the centre of learning activity, resources here are often limited. The flexibility of remote and mobile access enjoyed by the workforce suggests the value of similar flexibility to extend the educational reach of a school or college further into the homes of its catchment area. According to Ofcom's 2007 review of the communications market, over 64% of households have broadband access to the Internet, but this still leaves a significant gap.

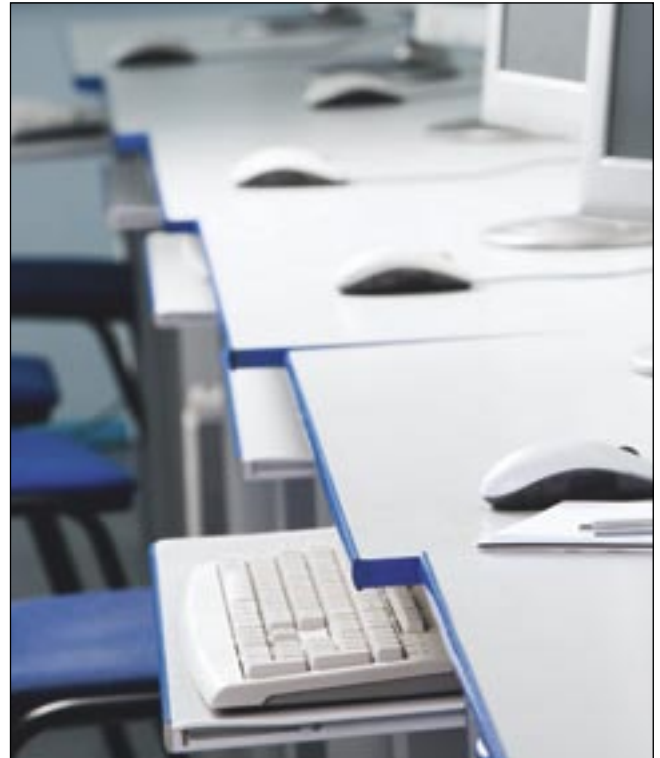
The UK government has put in place the Home Access Taskforce, as it recognises that over a million children in the UK do not have access to a computer at home, and sees this as a fundamental part of their education. It will make a start by earmarking £30m to be made available over three years to support the funding of both computers and Internet access to try to extend the connections from schools and colleges into poorer homes. An initial pilot involving 50 schools across Birmingham, Worcestershire, Stockton and Brent and working with industry partners to reduce the cost of devices and broadband connection will stress the educational benefits of home access to parents and teachers.



## Collaboration

This represents an increasing emphasis on the opportunity to use technology to make connections, rather than simply using it in isolation, and recognises the basic premise of Metcalf's Law, that the value of a network increases dramatically with the size of the community it connects. Where the focus was on supplying a number of PCs for those studying IT, or a wireless/Wi-Fi network for those fortunate few with suitable laptops, the emphasis now is on growing the network of use and connecting it to a wider educational fabric.

Whether this involves interaction between different classes, the occasional involvement of an external subject matter expert or a conversation with someone in a remote part of the world, the technology brings previously separated parties closer together. This means that schools and colleges become the hubs of an extended educational network that not only brings together those students and pupils involved in the learning, but also teachers, parents and the broader community both locally and globally.



## Content

The building and delivery of educational material is vastly improved by networked access not only to other individuals and groups, but also to a huge array of sources of knowledge. The Internet delivers a huge amount of potential content, which brings its own information management challenges – is it accurate, safe to access and legal? – as well as other issues for teaching - is it interesting, informative and does it provide educational value?

Once assessed, it is important to capture the value for re-use, and this is where technology again extends the value of the educational facility no longer as simply a repository of course content, but as cross-referenced directory of where and what to find. With this model in mind, similar material should not longer have to be re-created for other topics, but can be re-purposed and re-used in different subject areas, at different stages or levels in the process and across different means of electronic access. This might mean use from a wirelessly connected laptop, a PC over home broadband, or while projected on a smartboard in a classroom. In all cases, no matter where in the world the content has been sourced, the education process now depends on its integrity and availability, so safe, reliable and secure delivery must be assured.

## Cohesion

Most schools and colleges now have networked, broadband access to allow pupils and teachers to access information and resources while within the school. The

challenge is to now extend the reach beyond the physical boundary of the educational establishment through a common or standardised platform. This should offer access to learning resources, shared and personalised storage and tools for education, communication and management. Done well, this can be extended not only to the traditional students, but to further the education of others – adult education, community projects and clubs – extending the value of the educational location across the community.

While this extension into the greater community depends on the skills and commitment of those directly involved – governors, Local Education Authorities, teachers and parents – it also needs a common set of principles to encourage technology suppliers to be assured there is a sufficiently significant market for them to sell to and support. While academic markets pose many challenges, many suppliers recognise the longer term benefits of product and service visibility among the future workforce. With consistent needs, a common set of solutions can be developed more cost effectively to address a wide market.

The government's assistance in this process is vital, and the publically stated e-strategy encourages all schools to have a similar set of technology support systems to provide a learning platform. This does not mean identical sets of products, but a collection of tools and services, based on functional requirements as defined by Becta, the Government's agency for co-ordinating, developing and delivering the strategy for technology in education. This collection includes:

- ✓ Content management for educational material to be managed and shared to efficiently support self paced, online learning and complement traditional classroom teaching.
- ✓ Curriculum navigation and planning for personalising and tracking by student needs.
- ✓ Management tools for administration, enrolment and pupil records.
- ✓ Communication and collaboration tools, such as email, messaging, blogs and portals.

This consistent approach provides a level of predictability for the market, but also for the broader social needs of the wider community. It again extends access, information and some control to parents or guardians to further remove any perceived barriers between educational establishment and the community at large. Increasing and extending the direct linkage to parents is crucial for engaging the whole community in the educational process, allowing technology to play a useful part in making more information transparently available in a timely manner through safe, secure and managed connections. A forward looking study, Beyond Current Horizons, aims to look even deeper at the effect of potential technology use in education between now and 2025, investigating social and cultural as well as economic impact.

## Control

The benefits and positive aspects of the widespread use of technology in the educational environment have to be set against the problems and challenges it also brings. These can span from the inappropriate use or misuse of resources, through the accidental increase of susceptibility to viruses and malware from wider network access, to the social issues around cyber bullying or peer pressure. Well defined and robustly enforced policies can go some way to addressing these issues, but only if supported by comprehensive understanding and effective use of technology to aid control and management processes.

At one time schools relied on simple tools based on infrequent face to face contact – registers and parent teacher evenings – but the right use of technology can deliver regular and relevant information directly so that parents can take more timely action. To this end a real time reporting system is proposed to be in place for all secondary schools by 2010. This will be updated with information on pupils' attendance, behaviour and progress, for parents to access securely wherever and whenever is most convenient. Taking this

a stage further and adding alerts through emails or text messages would not be difficult, and would increase the awareness and involvement of parents in their children's education, strengthening the link between educational establishment and home.

There is also an opportunity to bring pupils into the management and use of the technology, in an attempt to exploit their interest and acceptance, and at the same time provide some empowerment as a way to encourage positive behaviour. Not only how to take responsibility in how they interact with others, but how to keep themselves safe in a modern day equivalent of the 'milk monitor' and 'Tufty road safety club' – translated perhaps into individual or collective blog monitors and group advice on online defence against cyber bullies and avoiding inappropriate external contacts.

## Summary

Overall, the benefits of technology use to extend education are significant. Some may have feared that the value of educational locations might diminish with the availability of information over the Internet and opportunity for distance learning. In reality the technology and processes are being put in place to make schools and colleges the interactive and collaborative hubs of learning with deeper links into the social fabric of the community. This is not only good for the education of the pupils, it keeps their parents more involved, allows the schools to extend their appeal to a wider catchment both during the school day and with out of hours activities, and provides greater value for educational investment to the taxpayer at large. Technology is at its best is when it not only empowers the individual, but extends the network of information and contact at their fingertips – this is crucial for the education of citizens of all ages in any modern day knowledge based economy.

