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TechNews is a technology, news and analysis service aimed at those in the education sector keen to stay informed about technology developments, trends and issues.

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Analysis: Mobile phone trends

The mobile phone has evolved immeasurably since first achieving mass-market awareness in the early 1990s. Each year manufacturers have tempted consumers into upgrading their devices with new features, reflecting the move from simple communications device to portable, multi-function, multimedia computer.

One of the most important dates in the mobile world is the annual Mobile World Congress, held recently in Barcelona, Spain. There are a number of new announcements and themes that can be drawn from this industry event that will change the devices in our pockets in the next couple of years.

Perhaps the single most important issue being considered by mobile companies in the longer term is the choice of technology for 4G. There are competing technologies being developed around the world, but it seems certain that the fundamental technology will be based on the similar developments already being used in newer wireless computer networks. These included MIMO - the use of multiple antennae; IPv6; and Orthogonal Frequency-Division Multiple Access (OFDMA) – for efficient simultaneous connections to multiple users. This should allow greater compatibility and flexibility for applications. Already in the UK BT has announced plans to upgrade its voice network to a more efficient IP-based infrastructure by 2010. As similar initiatives happen around the world it seems inevitable that all voice communications will happen over IP networks – irrespective of whether they originate from fixed lines, mobiles or ‘soft’ phones such as Skype or commercial VoIP (Voice over IP) solutions.

4G technology will also support higher speed data transfers alongside the efficiency gains from the use of similar technology across all devices. Data continues to drive an important segment of the market for stand-alone mobile devices (smartphones) and laptop-based data solutions. Increasingly mobile phones have integrated Wi-Fi chips which means they can use public and private networks for data, such as email and mobile web browsing; and in the case of some networks for VoIP software. The actual technology that will become the basis of 4G has not yet been agreed but may be based on WiMAX or LTE (3GPP Long Term Evolution). Indeed, more than one technology may be mandated for 4G. Current higher speed standards include High-Speed Downlink Packet Access (HSDPA) and High-Speed Uplink Packet Access (HSUPA). These currently offer up to 7.2Mbps (download) and 1.4Mbps (upload) but despite networks being rapidly upgraded to deliver these speeds, few phones currently support them. Laptop users are currently the key target and integrated chipsets are likely to proliferate as the majority of users will be much more comfortable with a once-only task of inserting a SIM card or equivalent rather than constantly managing external peripherals or wireless links to mobile devices.

The challenge to the smartphone versus laptop debate comes in the form of UMPC (ultra-mobile PC) devices and what Intel classes as Mobile Internet Devices (MIDs).

MIDs are expected to be launched by a range of manufacturers this year, using energy efficient processors and offering the ‘full internet’ experience.

These demands for increased data usage have lead all of the major UK operators to offer some kind of flat-rate ‘unlimited’ mobile data tariff. However, as with domestic broadband provision, this normally means a generous but not unrestricted monthly allowance. Some providers also differentiate pricing between mobile data on a smartphone and on a laptop.

The link between the traditionally separate cellular and traditional telephone networks has been further strengthened by the emergence of the femtocell as a viable product. These are discrete, low power, short range mobile phone cells that link to IP broadband networks. The concept is that they can be used to provide better coverage in areas where traditional infrastructure does not reach and use IP backhaul to link with the cellular provider’s network. In the UK several operators are beginning to trial these technologies and commercial services may be launched next year.

The Mobile World Congress was used by Google to show off prototypes of their Android mobile phone operating system. Google hopes that by offering developers a simple platform that can be used by multiple devices they will attract software developers and handset manufacturers. Currently there are a large number of different systems being used (estimated between 30-40) which is seen by commentators such as Arun Sarin, CEO of Vodafone, as too many. The key players are likely to include Symbian (used by Nokia and others), Microsoft’s Windows Mobile, LiMo and Google’s Android once a volume of handsets becomes available. Commentators are divided on the likely impact of Android and Google’s entry to the market. LiMo is a modular Linux based mobile platform supported by Motorola, NEC and Vodafone amongst others.

Smartphones will also see improved multimedia support. Already devices such as Nokia’s N95 will playback audio and video without the need for a separate device; and support for different formats is likely to grow alongside screen size and all-important battery life. Despite low use of cameras for video calling, the ability to capture short videos and still images continues to be an important area for consumers. The number of megapixels and the quality of images from phones will keep improving, although the small sensor sizes is likely to mean lower picture quality than from stand-alone digital cameras.

The Apple iPhone, with its innovative touch sensitive interface, has seeded a number of imitations and further developments. Touch screens, orientation sensors, media integration and emphasis on communication using email and the web has been followed by other manufacturers, though the iPhone retains a certain cachet and profile derived from the Apple name. The handset itself has been most strongly criticised for the lack of support for third party applications (though a development kit and support for push email services similar to RIM’s Blackberry have been announced), and the lack of higher speed data connectivity. The iPhone has underlined the importance of the user interface on small devices and different

vendors are developing a variety of approaches (eg software widgets) to help improve usability.

Nokia, one of the most significant players in the smartphone market, has announced a significant push for the integration of GPS (Global Positioning System) chips in its phones to drive the adoption of location based services. These services were covered in some detail in TechNews March 2007. Nokia has announced a drive to accelerate the adoption of digital over paper maps with a range of applications including their own Maps software and handset versions of Google Maps. The hugely popular Google Maps application has been updated for mobile devices to allow location information to be estimated from the cell tower being used without the requirement for GPS. The future for these services includes more accurate, contextual location based searching and adopting elements of augmented reality where the handset will offer a range of different information based on location. The phone is becoming the interface to embedded networks and objects in the world around us. In combination with satellite navigation there are technologies that will use a phone's camera to analyse 2D barcodes or signs to display relevant information. Nokia has included its Maps application as part of the Ovi online services portal. As reported in January TechNews, mobiles are also being trialled in London for making payments/ticketing or accessing information from smart posters using near field communications(NFC).

One of the most exciting new mobile ideas being developed is Nokia's Point & Find. This links information with pictures so, for example, a picture of a shop sign taken on a mobile phone camera can be automatically analysed and linked with the shop's website and stock list. This has some similarities with other machine recognition systems such as the Shazam music recognition software which analyses a song and returns track and artist information via a mobile phone.
http://www.nokia.com/NOKIA_COM_1/Press/twwln/press_kit/Point_&_Find_Press_Backgrounder_October_2007.pdf
http://www.shazam.com/

For the further future Nokia have shown off a concept for mobile handsets called Morph. This is not a production model but highlights some of the nanotechnology advances that are expected to become possible in the next few years, such as self-cleaning units and personal portable power generation.
http://www.nokia.com/A4852062

Finally it is useful to consider the consolidation in the UK broadband, TV and telecoms market. The majority of the major players in these industries offer some kind of combined package that discounts a combination of these elements – ranging from BT and Virgin Media who offer all in one packages covering TV, broadband, fixed and mobile telephony to mobile providers such as Orange who offer free home broadband with a mobile contract. The market is consolidating on services that offer an amount of service for a fixed monthly fee, rather than concentrating on pay-as-you-use – which is a most significant change for the domestic fixed line market. However, mobile operators, phone manufacturers, internet companies and software companies are all competing for control of the mobile internet as the next billion

internet users are likely to be mobile. This change in the way people access the internet will also influence how the internet develops.
In conclusion, the recent developments have been evolutionary more than revolutionary and there is some sense that the market is looking to create demand for new smartphones to drive the constant refresh cycle rather than particularly respond to user need. As multimedia devices become more popular functionality will increase and prices drop.

More powerful personal devices have a huge potential impact on learning, able to offer personal, mobile learning solutions with true anytime, anywhere access. Learners are likely to increasingly have powerful, connected devices in their pockets –making effective, safe use of these devices will be a challenge for education. Already pilots in this area, such as Learning2go in Wolverhampton, have shown the potential for personal devices, so when ubiquitous connectivity is added to the mix much more is possible.
http://partners.becta.org.uk/index.php?section=rh&catcode=_re_rp_02&rid=14204
http://www.learning2go.org/

Networking and wireless news

Technology exemplar networks

Jointly led by Becta and the Learning and Skills Council, the Technology Exemplar Network is a new approach to support learning providers in further developing their e-maturity, via peer support and sharing of effective practice with other providers across the country. Ten exemplar supporting providers are leading the way in the effective use of technology for learning and will work with other providers to help share and develop the use of technology across the sector. The ten exemplars already announced will receive funding to help develop their use of technology and share their successes with others. Further members will be announced in April.
The Technology Exemplar Network is all about sharing of experience and discussion of issues – a true peer support approach. All participating learning providers will be expected to proactively communicate across the network and share their aspirations, issues, learning points and areas for development in an open and honest manner, and to positively contribute to the objectives of the network. The initial ten exemplar organisations are listed here:
http://news.becta.org.uk/display.cfm?resID=35526&page=1658&catID=1633

Next generation broadband moves closer in the UK

As demand grows in the UK for increasingly faster broadband technologies, both the UK and European governments have acted to promote improvements in speed to home, business and potentially education users. The current generation of technologies deployed in the UK are based on copper cable – either laid as part of the standard telephone infrastructure or for cable TV services. It is widely recognized that despite advances in technology that will deliver 50Mbps by cable or 24Mbps using ADSL 2+ over the telephone network, the next-generation of multimedia services will require even higher speeds. It is likely this speed shift will require significant and expensive re-engineering of the underlying physical networks perhaps with the replacement of copper networks with higher capacity fibre-optic

cable able to operate at significantly higher speeds. Currently this technology is used in the backbone of communications networks but not the last mile of connections to individual customer premises.

BT estimates that such a deployment is not yet commercially viable as it would cost some £15bn, thus putting responsibility on the government if it wishes to incentivise such a deployment. Speaking in autumn 2007, minister Stephen Timms said ultra-fast broadband was essential for the long-term future of the UK but stopped short of promising a subsidy. His replacement, Baroness Shriti Vadera announced that an independent review will take place to be led by Francesco Caio. The review will consider what action needs to be taken to ensure the UK stays competitive.
http://news.bbc.co.uk/1/hi/technology/7114728.stm
http://www.gnn.gov.uk/Content/Detail.asp?ReleaseID=354760&NewsAreaID=2

One supplier is investigating running fibre networks through sewers to offer 100Mbps in some towns. BT has pledged to connect all new building estates by fibre and to roll out a fibre to the home trial in Ebbsfleet but this will take until 2020 to connect 10,000 homes.
http://www.h2o-networks.uk.net/
http://insight.bt.com/news/Faster-broadband-coming-to-Ebbsfleet-Valley/

European Commissioners have given Ofcom permission to remove regulation from parts of the UK where there is deemed to be sufficient competition for broadband supply, so that the market does not need to be artificially maintained. The rules were originally introduced to prevent BT, as the incumbent telco, taking unfair advantage of its existing infrastructure, but now it is widely accepted that there is a thriving market with other suppliers in some areas. This could open up new products and services from all providers and create a new wave of competition for customers.
http://news.bbc.co.uk/1/hi/technology/7244869.stm

HSDPA/LTE/WiMAX update

Mobile hardware manufacturer picoChip has released a reference design for a scaleable mobile basestation that will support both LTE (Long Term Evolution) and WiMAX mobile technologies. Both LTE and WiMAX are candidates for 4G mobile technologies and by backing both picoChip reflect the lack of clear direction so far from within the industry. The reference design they have produced can also scale to support standard mobile cell broadcast distances down to small, room or office based femtocells that give an extra boost to coverage within a discrete area.
http://www.picochip.com/press/press_releases/press107

Fujitsu have announced the creation of a family of products aimed at short and long range WiMAX services. The initial devices offer a range from between several kilometres to several metres and are aimed at service providers looking to make an early entry into this market.
http://www.fujitsu.com/us/services/telecom/broadone.html

WiMAX is based on the IEEE 802.16 family of standards for delivering wireless broadband. 3GPP LTE (Long Term Evolution) is a project that is part of the evolution of the UMTS standard. The project will result in the UMTS version 8. Both

technologies are expected to offer in the region of 100Mbps for mobile applications and 1Gbps for fixed wireless applications.

Vodafone has announced that it is increasing the speed of its HSDPA Mobile Broadband services in the UK. This will improve the download performance to 7.2Mbps using High-Speed Downlink Packet Access (HSDPA) and upload to 1.4Mbps with High-Speed Uplink Packet Access (HSUPA). This will be available to the majority of the UK population and shows how data demands are increasing from mobile users. Similar developments are being introduced by other mobile providers around the world, but all will require compatible equipment.
http://online.vodafone.co.uk/dispatch/Portal/appmanager/vodafone/wrp?_nfpb=true&_pageLabel=template08&pageID=MB_0002

Emerging connectivity technologies

Whilst urban areas enjoy higher speed connectivity and access to new services, rural areas continue to be harder to connect and more expensive. This is true for the rural areas of the UK but is even worse for the large, sparsely inhabited areas of the world. The Japanese space agency has launched an experimental satellite that will offer 1.2Gbps across rural areas of Japan and South East Asia. A number of similar solutions have been proposed in the past including long-duration, long term aircraft as well as satellites. The issue has been one of economic viability and the cost of the equipment – often poor rural areas who would most benefit from connectivity cannot afford the outlay of expensive ground equipment.
http://news.bbc.co.uk/1/hi/world/asia-pacific/7260673.stm
http://ieeexplore.ieee.org/Xplore/login.jsp?url=/iel4/5850/15595/00722542.pdf
Researchers at Alcatel-Lucent have demonstrated optical data transmission at 16.4Tbps over 2550km. Whilst this will not translate directly into commercial, let alone domestic products, it may eventually feed into faster backbone speeds. 16.4Tbps would allow an HD movie to be downloaded in 3 seconds so would be more than enough to satisfy educational, business and personal requirements.
http://www.informationweek.com/story/showArticle.jhtml?articleID=206900603&cid=RSSfeed_IWK_All

Wi-Fi Alliance interoperability developments

The Wi-Fi Alliance industry group has launched a series of certification schemes designed to promote interoperability and standards between different vendors equipment. Industry bodies such as this exist to promote a number of manufacturers working together to deliver services to customers. A new scheme – Voice Personal and Voice Enterprise – is focussed on delivering quality of service when using wireless networks to transmit voice calls and enable easy roaming for handsets between base stations linked to the same network.
http://www.wi-fi.org/knowledge_center_overview.php?docid=4541
The Alliance's more established Protected Setup brand now has over two hundred products that use the same approach to securely and simply set up wireless connections. http://www.wi-fi.org/wifi-protected-setup

The wireless community is still waiting for a fully-ratified 802.11n standard. There are many products on the market that claim they will meet this standard, either

automatically or through a software update when it is confirmed late 2008/early 2009. The majority of products still use the 2.4GHz spectrum whilst full 802.11n will work in either the 2.4GHz or 5GHz bands. The 5GHz band is expected to offer better performance through increased bandwidth and reduced congestion. It is possible to run both frequency bands on the same equipment and route traffic separately for even better performance. The first mainstream access points with dual antennas offering coverage of both frequencies are now coming to market. However, the best advice at present is to wait for full ratification of the standard.
http://www.techworld.com/mobility/news/index.cfm?newsid=11622&email

UK femto cell trials

Mobile operator O2 is pushing ahead with trials in 2008 and commercial deployment in 2009 of cellular femto cells. These are small, relatively short range cellular cells that are used to improve coverage in a limited area – such as a home or office. These small cells might be linked to the core networks using consumer-grade technologies like DSL broadband. This could provide a range of services, including using existing handsets as IP telephones when in range and replacing Wi-Fi hotspots in some markets. Femto cells will use less power than Wi-Fi.
Companies such as Netgear are looking to include this technology with wireless access points, but growth in the UK market is most likely to be driven by existing mobile operators who can allow the use of their handsets with these units. Vodafone and T-Mobile are also trialling femto cells in the lab but have not announced plans for real-world deployment.
http://www.guardian.co.uk/business/2008/feb/11/mobileworldcongressbusiness.technology

BBC iPlayer hits ISPs

The BBC has publically launched its iPlayer technology. This allows users to watch programmes from the last seven days online using peer-to-peer technology and streaming to share content. This has been a great success for users and the BBC, but has led to increased demands on ISP resource without granting them any income. A report by Telco 2.0 suggests that ISPs are facing significantly increased demands on their networks from users. ISP PlusNet have noted their streaming costs have increased from £17,233 to £51,700. per month
This tests the validity of the 'unlimited' deals offered to many consumers that are actually capped at what is considered a reasonable limit. As true broadband applications like the iPlayer emerge demand will continue to increase. For education users these figures highlight the benefit of the National Education Network which is a free of many of the commercial and market pressures faced by ISPs.
http://community.plus.net/blog/2008/02/08/iplayer-usage-effect-a-bandwidth-explosion/
http://www.bbc.co.uk/iplayer/

EU drafts guidelines for RFID technologies

The European Commission is continuing a wide-ranging public debate on the opportunities and challenges posed by Radio Frequency Identification (RFID) technology. As part of this work it has published draft guidelines on how tags should behave, what information they carry and when they will deactivate. The

recommendations also include symbols for packaging to alert consumers. 600 million RFID tags were sold in Europe in 2006, according to Commission research. That is predicted to rise to around 300 billion by 2016.
Radio Frequency Identification (RFID) chips are small tags that contain information that respond wirelessly when scanned. The information they store is increasingly used for wireless reading of passports, parcel tracking and stock control. They can store a lot of information compared to normal barcodes, such as unique identifiers . The concerns of the European investigation are focussed on persistence and privacy for consumers whilst reflecting the potential efficiency gains in supply and distribution.
http://ec.europa.eu/information_society/policy/rfid/index_en.htm

New European cloud computing research

IBM has announced a new research project funded by the European Union into cloud computing. Cloud computing is the approach where massive infrastructure is used as a utility and pools of systems are brought together as required for large-scale projects then redistributed as required. The challenges for this kind of solution are around deployment, management and reconfiguration. The EU and IBM hope that this project will leave Europe at the cutting edge of this approach to solving incredibly complex computational problems such as modelling.
http://www-03.ibm.com/press/us/en/pressrelease/23448.wss

IPv6 update

In early February 2008 the Internet Assigned Number Agency (IANA), the organisation that governs addressing on the internet, has added support for IPv6 addresses on six of the thirteen root name servers. Prior to this change IPv6 hosts could only reach each other by translating requests through IPv4, but now they can communicate directly. This change will make it easier for organisations to implement IPv6 and encourage its adoption.
Internet Protocol (IP) is the fundamental communication protocol used in data transfer across the internet and local area networks. IP works at Layer 3 of the OSI Model for networks (http://searchnetworking.techtarget.com/sDefinition/0,,sid7_gci523729,00.html). The role of IP is to dictate the format and structure of the data packets that travel across the network. The current most widely used variation of IP is IPv4. This is based on a standard first published in 1981, but has a number of limitations that are becoming more and more obvious to network engineers and in some cases users. The internet is based on a backbone of IP routers and ISPs that maintain addressing and routing links between each other to deliver data traffic. IPv6 offers a massive capacity increase – giving the equivalent of 5x1028 addresses per head of population as compared to the 4x109 of IPv4 (79 228 162 514 264 337 593 543 950 336 compared to 4 294 967 296 unique addresses). It also offers security and mobility advantages.
http://www.iana.org/reports/2008/root-aaaa-announcement.html

Multimedia

Analysis: E-books

e-Books or electronic, digitised books, and text have been around in one form or another for some time. However the functionality of these e-books together with copy protection and new devices that can read them have increased their use considerably. No longer limited to a PC or laptop e-books can now be flexibly deployed in a number of different ways. This article seeks to explain some of the key developments and issues in e-Books and e-Book readers.

e-book document formats

There are many potential formats for e-book documents - some are proprietary and work with a particular reader and some are open document specifications designed for use with many readers. There is more than one open specification, however, and no single format is the clear leader for e-books just yet. Some of the formats, such as HTML and Adobe's portable document format (PDF) will be familiar to users of the world wide web. Others such as Encapsulated Postscript (EPS) and plain text (TXT) are not specifically document formats, but are standards for desktop publishing pages and text transmission respectively.

The leading open standards are PDF, HTML and Open e-Book (OEB) with both PDF and HTML being long established ways of describing documents. E-book formats tend to also include security and digital rights management (DRM), to allow for copyrighted materials such as commercial novels, journals and other literature to be sold. Because of this HTML is only ever used to describe free content.

Plain text is significant in that DRM free services, such as project Guttenburg, offer wide support for this format, as well as more recent formats such as HTML and plucker. Project Guttenburg offers free e-books and texts for documents that are no longer in copyright, so many classics of English literature and historical texts are available. Googlebooks offers a similar e-book service with previews of e-books in copyright and full versions of books out of copyright available in PDF.

PDFs offer the same if not better hyperlinking and image handling as HTML and include DRM. With the transfer of ownership from Adobe to the international standards organisation (ISO) it has become an open standard. This means that other companies and projects can create software to support the PDF format without needing to license software from Adobe. This is a big step towards an open e-book format. There are limitations however, as PDF is intended primarily to represent the printed page, and can have difficulties in scaling and overflowing the text to fit different screen resolutions. Some work has been done towards this, but currently this relies on the person creating the PDF to make sure it can be used at different resolutions.

The other major open standard is Open e-book (OEB), developed by international digital publishing forum (IDPF). The OEB is an extensible mark-up language (XML) specification for the description of e-book contents. The specification contains three

elements, Open Packaging Format (OPF), Open Publication Structure (OPS) and Open Container Formation (OCF).

The OPF describes the contents and structure of the e-book for distribution. Those familiar with the IMS content package used in e-learning materials will find this concept familiar. The OPF contains three sections: metadata describing the package as a whole; the manifest describing the image files, text files and other components of the document; and the spine or structure, which describes how the various elements are structured into a document.

The OCF element contains information on security and rights management, whilst the OPF element contains information on how to format and structure documents for sharing. The OEB draws on early standards works such as the ISO Daisy standard otherwise known as Z39.86. DAISY is an XML specification for talking books that describes complex document structures, including citations, bookmarks and footnotes. The Mobipocket document format, which uses the PRC file extension is based on elements of the OEB. Most e-book readers and PDAs are capable of supporting the Mobipocket format to some extent, which indicates that the OEB format is likely to be increasingly popular.

The limitations of PDF and HTML and the relatively untested nature of the OEB has lead most commercial e-book readers to adopt either their own document format such as Amazon's AZW or Sony's BBeB formats. All of these formats are designed specifically for e-books and have elements of digital rights management. Both Sony and Amazon offer services which will convert existing documents into either AZW or BBeB. Amazon's AZW format is a version of the Mobipocket file designed specifically to support the Amazon Kindle device.
http://www.mobipocket.com/en/Corporate/AboutMobipocket.asp?Language=EN

Readers

e-books in PDF or Mobipocket formats can be read on a number of devices including PCs, PDAs and mobile phones. The e-book reader though is a device specifically designed for reading and using e-books. Older, unsuccessful versions used LCD screens and were bulky and power hungry. Since 2004 devices using electronic paper have transformed the market. Sony launched its first e-book reader the Librie in 2004, which, like all subsequent readers, used the proprietary e-ink screen developed at MIT. E-ink screens are electrophoretic and operate by applying a electrical charge to a thin layer of liquid containing black and white microcapsules. To create an area of white, a positive or negative field is applied to a particular pixel area which draws the black capsules to the bottom of the liquid and pushes the white capsules to the top. Where black is required the opposite charge is applied.

The key benefit of e-Ink is the way in which the image is created and light reaches the eye. Liquid crystal displays require a backlight. Strong external light sources can obscure the image on the screen as they reflect off the surface and overpower the light being projected. E-Ink works in a similar manner to viewing traditional paper in that rather than projecting light it reflects it. This means that e-ink can operate more effectively in bright conditions. E-ink displays also have resolutions and contrast

ratios much closer to the printed page. As e-ink relies on the physical movement of the microcapsules to create the image, the screens are slower to refresh than Liquid Crystal or Cathode Ray displays. However, each page, once created, is not rescanned or refreshed until a new image is required, so e-Ink screens are easier to read and require less power to operate than traditional displays. So, e-Ink screens can offer high quality display of static, monochrome content, but the refresh rate is too slow to display animation, and dynamic content. Future developments in electronic paper displays are likely to include higher refresh rates and the addition of colour.

A further advance in display technology offered by electronic paper is the ability to create flexible screens. This allows screens to be rolled up when not in use, in products such as Polymer Vision Readius, and will lead to small devices having extendible screens, which can be rolled out when needed. This again is likely to extend e-book readers to hand-held devices such as mobile phones and PDAs.

The Sony Librie and updated Reader products have been in the market since 2004 and support a number of book formats including BBeB and Mobipocket. Using either secure digital (SD) and Multi Media Cards (MMC) to store data; and USB and Wi-Fi to transfer the data to the e-Book. The BBeB and Mobipocket formats are used to support DRM whilst TXT, PDF and HTML can also be displayed.

Amazon's commitment to e-books has been demonstrated by its purchase of Mobipocket in 2005 and the release of the Kindle Reader in 2007. The Kindle includes support for HTML, TXT, and AZW as well as Mobipocket, but not PDF. The AZW, which is a modified Mobipocket format, is used for DRM support and Amazon have provided a server-based tool to convert documents to this format, which does include conversion from PDF. Significantly the Kindle also includes mobile networking for downloading content, by piggy-backing on the mobile phone networks within North America.

There are other devices such as the Iliad e-Reader and the HanLin, both of which use e-Ink screens and Mobipocket.

Business Models

If e-Book readers can be considered the MP3 player of books, then the same kind of arguments and business models occur. Publishers of content want to guarantee their income, but at the same time digital publication makes it very easy to share this content quickly to a wide audience. There are some free sources such as Guttenburg and Googlebooks, which contain largely copyright-free content. The Amazon e-book service, Sony e-books and ebooks.com all sell e-books, in AZW for Amazon, BeBB for Sony and in PDF and Mobipocket for e-books.com.

Amazon have also launched the Digital text platform, a portal by which publishers can upload e-books for conversion to AZW format, create catalogues and include retail prices. Publishers receive a percentage cut of the retail price they enter, with Amazon and its service partners sharing the remainder.

The rights management restrictions limit the number of devices that the document can be shared with, and will require management through specific software. The AZW format for instance cannot be shared between devices, whereas the DRM-protected PDF allows for a limited number of transfers from the original download.

Uses In education

The combination of HTML interfaces and e-books allows the e-Book reader to interact more effectively with digital archives and e-learning platforms such as a school's virtual learning environment. Projects such as Wolverhampton's Learning2Go, have investigated the use of portable computing, and have used the e-book format with PDAs. They found that the ability for students to make personalised annotations, and the interactive features of e-books such as searching within thesaurus and dictionaries improved the learners' motivation. The ability to embed notes, including questions and discussion prompts allowed the reader to be prompted in the development of their understanding of the text. They also looked at software that allowed students to create their own e-books which could be produced to the same quality as the commercial texts.

The ability for teachers and students to annotate a book, and to share those annotations is one of the real benefits of e-books, and one that was not possible with traditional texts without permanently marking the hardcopy.

The e-book format also allows the transfer of a hardcopy archive to a digital archive which would allow far more texts and far more copies of texts to be stored by a single school than previously possible. For copyright-free material e-books should be a serious consideration as the cost of obtaining and storing the text would be far less than a hardcopy. For copyright materials the licensing model needs to be considered as the cost of displaying the e-book on multiple devices may be higher than a hardcopy. So for example PDF will not necessarily allow copying and Mobipocket format can be used on up to 3 devices. The DRM model for e-Books needs to considered closely when deciding on which books to support.

How the e-books are accessed should be considered separately from the e-book document format. The e-book readers themselves should be considered alongside other devices such as PDAs and PCs. The e-Book reader screen does offer a significantly better experience than a PDA, but with much reduced functionality. They are lighter than standard laptops and the wireless connectivity offers opportunities for more flexible learning opportunities, although they will have to compete with more functional devices such as the Ultra Mobile PC, particularly as the prices are likely to be comparable if not cheaper in the UK. The readers currently available in the UK retail from £239 to £433. In the US the retail price for the Sony reader is $299 and the Kindle $399 whereas the current retail price of an Asus Eee for example is £169. E-book Readers are likely to win out where readability and battery life are more important that the capability and flexibility of the device.

As flexible e-Ink screens and faster refresh becomes available, more portable devices will use them to reduce weight and extend battery life. It is likely that we will see a convergence between e-book readers and UltraMobile PCs (UMPC) as e-

Book readers become more functional and UMPCs adopt low power large format e-Ink and other e-paper displays screens.

Multimedia news

Blu-Ray beats HD-DVD for High Definition disc format

Toshiba has formally announced that they will no longer be supporting the High Definition DVD (HD-DVD) format. This follows announcements by major studios such as Warner Brothers that they would be concentrating on Blu-Ray content. The success of Blu-Ray has lead many laptop manufacturers to add Blu-Ray drives to their latest products, however the power consumption of the Blu-Ray drives has meant that these latest laptops struggle to support a full movie from battery power alone. Efforts are being made to move some of the video processing to the graphics chips within laptops to reduce the drain on the battery.
http://www.wired.com/gadgets/pcs/news/2008/02/bluray_power
U.S. company V media has launched a small alternative to Blu-Ray for use with mobile devices. The disk and drive known as V Media or VM Disks are approximately 4 centimetres in diameter and use blue lasers to read the data. Using the same H.264 video compression codec as Blu-Ray and MPEG 4 the disks can hold up to 1GB in data and are capable of displaying 720 x 576 progressive video, equivalent to standard DVD quality.
http://www.vmedia.net/

Brain control systems to go on sale

The emotiv Epoc neuro-headset featured in pervious TechNews articles is set to go on sale later this year. The head set measures activity within the brain and is capable of recognising over 30 different ‘thoughts’ including emotions and actions. The new device will plug into a computer using a regular USB port and will retail for around $299, making it a viable consumer device. The device developed by emotiv, is being aimed at adding realism to virtual worlds as well as offering new gaming experiences, with video game characters being able to reflect the emotional state of the player.
http://www.emotiv.com/corporate/2_0/2_4.htm

Mobile TV

Orange and T-Mobile have launched a mobile TV pilot in London using the TDtv standard. Whereas other manufacturers are focusing on the DVB-H standard such as the Nokia N96, TDtv allows mobile phone operators to utilise their exiting infrastructure. TDtv uses the existing unpaired UMTS networks, used to provide 3G data, to stream video over IP networks to existing 3G handsets. The DVB-H mobile TV standard is unlikely to be available in the UK until the analogue TV switch off in 2012.
http://pressoffice.orange.co.uk/Content/Detail.asp?ReleaseID=755&NewsAreaID=2

Texas to sell pico projectors

Texas Instruments has announced that their pico projector chip is going into production. The chip will control integrated laser based display projectors covered in previous issues of Technews. These pico-projectors are small enough to be incorporated into a mobile phone and are capable of resolutions up to 800 x 600. This is the first step in handheld projectors coming to the market. It is likely that add-on projectors will precede integrated devices. Microvision demonstrated similar technology earlier in the year (see TechNews Jan08) and 3M also have plans to launch devices.
http://www.dlp.com/tech/press_releases_details.aspx?id=1342&year=2008

Active Matrix OLED screens used in mobile phones

Samsung has managed to implement their active matrix OLED technology in their their latest mobile phone display. The new 820SC phone will feature a QVGA resolution. The phones will be available initially in Japan and will feature integrated television reception. Active Matrix Organic LED screens (AMOLED) are only just appearing on the market and offer extremely thin, bright low power displays. OLED screens emit light so do not require backlights. They have been used in a number of small devices and more recently Sony has begun to sell 11" OLED TVs. Eventually, OLED displays may be 'printed' onto flexible substrates allowing rollable displays to be attached to mobile devices or moulded to various surfaces.
http://mb.softbank.jp/mb/en/product/3g/820sc/

Olympus demonstrate latest Eye-Trek prototype

The Olympus eye trek display headsets have offered a portable display system for mobile devices for some years. One of the key problems with the existing systems has been that the headsets obscure the view of the user's real surroundings and can therefore only be used when stationary. The latest model 'mobile Eye-Trek Keigan', projects the display onto clear glass, allowing the user to overlay the computer display with their normal vision. Another key difference is the wireless connectivity that will allow the display headset to receive data from specially written network applications. This kind of display would be useful in augmented reality systems that overlay your view of the real world with relevant digital information. However, to date heads up displays have been expensive or too unwieldy for widespread adoption. Augmented reality in education has been covered in previous editions.
http://www.ubergizmo.com/15/archives/2008/02/olympus_mobile_eyetrek.html

Kodak releases the world's smallest high resolution camera chip

Camera manufacturer Kodak released a new 5 megapixel image sensor chip designed for mobile phones cameras and other small devices. The 1.4micron CMOS chip is designed to offer better performance in low light conditions. This has been achieved by using the absence rather than the presence of electrons to measure the depth of signal. This has allowed Kodak to bring the quality of the image captured closer to that of charge couple device sensors used in larger cameras. This technology could allow better quality imaging to be incorporated into a wider variety of devices.

http://www.kodak.com/eknec/PageQuerier.jhtml?pq-path=2709&pq-locale=en_GB&gpcid=0900688a80884f89&ignoreLocale=true

High definition video sharing

Three new high definition video sharing products were demonstrated at the Demo08 exhibition in February. The first, Squid cast uses peer to peer file sharing technology to create a distributed cluster of computers through which files can be transmitted. The files are broken down into small chucks of data and spread across multiple computers, and then when a user downloads the file it is reassembled from the distributed computers directly(swarmcasting) This allows Squidcast to provide a service with very low overheads for the operators, and shares the bandwidth across all users.
http://www.squidcast.com/
Askanya have developed a slightly different system, to manage the burden placed on networks of transferring large HD quality video. The system effectively balances the load of a large data transfer across multiple routes. The system called hypermesh, breaks a large file into smaller components, which are then transmitted separately using more than one route. The components are reassembled in order by the receiving computer. This allows video download sites to distribute the bandwidth across multiple networks and potentially reduce the cost.
http://www.asankya.com/
For an exploration of High Definition see the January edition of TechNews.

The European Union commissions research into peer to peer video sharing

The European Union has launched a 19 million Euro project dubbed P2P Next. With additional sponsorship from a range of partners including the BBC and the University of Lancaster the project will investigate the use of Peer to Peer (P2P) file sharing as a means of distributing content including video, audio and digital media. The belief is that a peer to peer model would prove more resilient and offer better capacity for distributing content. However, recently concerns have been raised about the impact of extra traffic on ISPs.
http://www.tribler.org/P2P-Next/19Million-for-P2P

3D broadcast trial

The BBC recently ran a trial broadcasting a live sporting event in 3D. The Six Nations rugby match between Scotland and England was broadcast to a selected industry audience at a cinema in London. Although only three 3D capable cameras were covering the match, the audience reported an extremely life-like and immersive experience. Some industry watchers believe 3D cinema could become popular, but for broadcast TV, stereoscopic TV sets would be required.
http://news.bbc.co.uk/1/hi/technology/7286852.stm

Hardware

Analysis: Power management and green computing

Few aspects of modern society are immune from a growing interest in environmental issues. Computing is a key consumer of power for many organisations and reducing the environmental impact of IT use has become a major issue. Improved power efficiency is now been addressed by many manufacturers and schemes such as Energy Star are having an impact. However, there are a range of technical and practical solutions that can be adopted by institutions to help reduce the impact of computers and other devices on the environment through more considered power management.

Personal computers are most commonly differentiated by their central processing unit (CPU). As CPU speed has increased so has the amount of power required. For comparison Pentium 75MHz processors would typically draw 3-8W while some Pentium 4s were rated at 150W. This scale of power/performance increase was the typical model until the latest generation of chips that use active power management technologies and multiple, rather than faster, cores to offer higher performance output for a lower average power consumption. However, although processors have become more efficient, overall energy consumption is likely to continue to rise and computing demands increase.

http://www.xbitlabs.com/news/cpu/display/20060421031743.html

Lower power chips are being used in mobile computing devices where battery life is important and in inexpensive internet workstations. Specially designed processors for these applications will draw under 5W of power but will not run the same applications as full, general-purpose computers. Such devices commonly use solid-state storage which is much less power intensive than hard disks with their moving parts. The ‘One laptop per child’ OLPC XO-1 is quoted as consuming 2W of power during normal operation. Intel’s flagship processor brand in this market is the new Atom that ranges from 0.6W to 2.5W during normal use and 0.1W when idle.

Efficiency is also improved by integrated systems. For example a single chip solution that combines central processor and graphics is more efficient than a comparable two chip solution. Advances in components such as power supplies are also increasing efficiency. The latest PSUs are 80% efficient in transferring electricity to components. http://www.80plus.org/

Server based computing such as Thin Client and Blade Centre solutions can certainly offer energy saving on the client device. Thin Client systems typically use a fraction of the power required by a desktop PC based system. These solutions use large, cooled servers but connecting to low-power, solid state devices on users’ desks. Blade centres work in a similar way by making more efficient use of central resources meaning there is less ‘idling’ by high power-consumption PCs. Virtualisation is also an emerging technology in this field, as it allows multiple virtual logical servers to efficiently share the same resources and power connections. The power requirements of the data centre, especially for cooling are being addressed by new designs.
http://www.thegreengrid.org/home

Display technology is also a significant factor. CRT units, now replaced in many environments by flat screen technology, are expensive to manufacture, costly in terms of materials and have very high power consumption. LCD displays power requirements are around 35% of CRTs. Across a large school or college this can make a significant difference to costs and environmental impact. However, the trend is towards larger displays that draw more power. There are a range of emerging flat screen technologies that could further increase efficiency For example organic light-emitting diodes (OLEDs) do not require the backlight of normal LCD displays and thus saves power. Currently LED backlights are also being used in some displays, which also reduces power consumption.
http://www.edn.com/index.asp?layout=article&articleid=CA6391430

Overall it is estimated that a typical desktop PC and CRT monitor is responsible for 9lbs of CO2 emissions in a 24 hour period and energy use roughly equivalent to a barrel of oil every 90 days. The US government created a scheme called Energy Star (http://www.energystar.gov/) to promote energy efficient products and the EU is looking to adopt similar standards. The latest Energy Star specifications are quite stringent, so the standard is a good guide to which products are more efficient.

Turning off equipment when not in use and making best use of power management features of devices are vital to reducing power consumption. User education is obviously important in achieving energy reductions, but some processes can also be automated. Modern operating systems include some kind of power management that will turn off monitors and hard drives after periods of inactivity and perhaps take simple measures such as dimming a laptop screen when it has not been recently used. There are also third party applications, such as Uniblue's Local Cooling, that will calculate power saved and give a more accessible interface to operating system services. In addition to operating system features it is possible to use scripts to manage when machines switch off. For example for a school computer lab, automatically shutting all the machines down at 4pm (or later as part of an extended school environment) might be appropriate. A Staffordshire IT worker managed to save £40000 per year by writing a simple script to automatically shutdown 8000 PCs.
http://www.itpro.co.uk/news/121406/it-worker-saves-council-40000-in-energy-costs.html

This is the kind of feature that enterprise management systems are designed to support. The reverse is also possible – using start-up scheduled in the BIOS and remote starts across a network. However it is important to note that PCs that can be started via the LAN are not truly powered off – just maintained in a very low power state. Indeed, even when shut down PCs will draw some power while still plugged in to the mains.

http://www.localcooling.com/

A significant downside to timed operation of this kind is conflict with the need to run management tasks overnight (such as installing updates). Care must be taken that any administration has time to take place. Some newer management technologies such as Intel vPro technology allow easy remote management of PCs through special hardware features. This allows a system administrator to control when and how updates are applied.

Most computers have two main power-saving modes. The first is hibernation where the contents of the memory are written to a hard disk drive and the computer powered off. In this case when power is restored the state of the computer is read from disk in around 30 seconds and the user can carry on as if without interruption. The second is a sleep mode where a standby or low-power consumption mode is used to maintain the contents of the computer memory for immediate reactivation. The sleep or standby mode is roughly equivalent to similar modes on domestic electronics such as TVs and DVD players but can be higher power consumption. These levels are coded as part of the Advanced Configuration and Power Interface (ACPI) specification. The ACPI specification includes a range of G codes for the global system state; S codes for different sleep states and others relating to the CPU and specific devices. Setting computers to S3 mode (in the bios) is much more energy efficient than the usual S1. These are fully described on the ACPI website and are differentiated by which elements of the computer system have power, the user actions required to turn the machine on (e.g. mouse button; power button; reset button) and any persistence from the previous state of the machine (e.g. whether the contents of the RAM have been preserved. http://www.acpi.info/

Monitors and other peripherals can also have a standby mode with constant power draw. Recently Fujitsu Siemens announced a monitor that automatically switches off (zero power draw) when video signals are halted. The system uses capacitors to maintain enough power to reactivate when necessary rather than draw on mains power. Monitors should be set to power down and not to use screen savers.www.pcw.co.uk/personal-computer-world/news/2202970/computer-monitor-zero

In the server and datacentre markets power consumption has become an important consideration. Companies such as IBM and Sun are marketing products specifically based on their low power consumption and datacentre operators such as Google are actively choosing locations for facilities based on infrastructure (including power) requirements.

Schools and all computer users need to start taking more responsibility for the impact of computing on the environment. This needs to be part of an institution wide strategy (electricity bills are seldom considered as part of the IT budget so there is often no direct incentive to reduce demands in this area).Tightening regulations on carbon emissions are leading to cleaner, greener manufacturing, but while high-tech devices are required in volume, they will continue to be significantly responsible for pollution.

In practical terms there are a number of actions that could be adopted in every institution such as: switching off devices every evening (except essential servers etc); enabling power management wherever possible; switching off monitors, projectors and other peripherals when not in use – perhaps by having them on a separate power connection; tightly managing printing; considering extending the life of PCs; replacing CRTs with LCD displays; and having an appropriate equipment disposal policy in place. There are technical solutions such as software and scripting but user education has the potential to be the most important element.

Classroom design, especially for new build, should minimize the need for artificial ventilation and lighting. Institutions also need to consider energy consumption of

products during procurement as well as the whole life cycle of a product. WEEE regulations govern the disposal of IT equipment and the responsibilities of suppliers and users. The use of reputable recycling/donation schemes may be one option for obsolete equipment. The life cycle of computers may also be extended by reconfiguring older machines as Thin Clients. Displays may be able to be used for 2 computer life cycles.

The Carbon Trust offers guidance and advice packs for schools on reducing their carbon footprint. They also provide free site surveys on request.
http://www.carbontrust.co.uk/

There is also advice on the Becta website.
http://partners.becta.org.uk/index.php?section=pv&catcode=_pv_ip_02&rid=14635

It is clear that these issues are important for whole school consideration, not just the ICT department. However ICT will remain a high profile user of energy and power and hence potential champion for better practices. The DCSF has emphasised the importance of the environment in managing schools and under the Children's Plan, there is a target for all new school buildings to be carbon neutral by 2016.Technological solutions such as lower-power laptops and more efficient models of delivering computing will help – but ultimately there has to be a human element around changing practice to switch off equipment when it is not in use ICT can also offer some environmental benefits in terms of reduced use of paper, and reducing the need to travel.

Hardware news

Low cost portables

The market for low cost UMPC (Ultra Mobile PC) style devices continues to grow rapidly thanks to an increasing range of products and demand outstripping supply for certain models. Education is a key market for these devices. Asus led the way with its Eee PC and now a number of other manufacturers are hoping to emulate their success with highly portable low cost devices.

UK manufacturer Elonex has announced a £99 Linux based laptop due for launch in June 2008 aimed at the education market. The device will include a 1GB solid state drive and built in wireless networking.
http://www.elonexone.co.uk/

More expensive and aimed at a portable business market is the Belinea s.book 1 from Maxdata. This is a similar sized device that includes a detachable Bluetooth handset to allow easy VoIP calls to be made. This is based on a reference design from Taiwanese manufacturer VIA. A similar format device has been announced by Everex.
http://www.via.com.tw/en/resources/pressroom/pressrelease.jsp?press_release_no=1787
http://www.everex.com/

Asus have announced that the next version of the Eee PC may be shipped with a cheaper hard drive instead of the current solid state device. The Eee 900 series will also be a version with a larger display – 8.9" rather than 7" and an option to run Microsoft Windows XP.
http://www.reghardware.co.uk/2008/03/10/asus_ceo_on_eee_future/

Mary Lou Jepsen, the chief technology office for the One Laptop Per Child (OLPC) organisation has left to start up her own company aimed at delivering a $75 laptop using some of the technologies developed for OLPC. She hopes that with the falling component prices this will be achievable. License fees from her commercial operation will be paid to the OLPC organisation.
http://www.itworld.com/Comp/1290/mary-lou-jepsen-pixel-qi-080218/index.html

Computing giant Hewlett Packard has announced a mobile thin client computer using many of the technologies seen in these UMPC devices. The company hopes that the lack of local storage will prove to be popular with customers worried about the potential local data loss if standalone devices are lost or stolen.
http://www.hp.com/hpinfo/newsroom/press/2008/080124b.html

Later this year, the first mobile internet devices (MID) based on Intel's Atom processor (see below) are expected to launch. These will be inexpensive Linux based devices, typically with 5" displays and offering a 'full internet' experience.

Ultra mobile devices have the potential to offer personal access to the networks, data and applications to education users. Projects have already shown how personal ownership improves the opportunities available to pupils and teachers; and promotes adoption of ICT to improve standards.

Processor updates

Chip giant Intel has announced a range of new technologies. In the ultra mobile sector it has announced the Atom brand. These chips, based on Intel's 45 nanometre architecture are designed to use less power, and be physically smaller than previous processors, and are therefore well suited to mobile devices. These were previously codenamed Silverthorne and Diamondville. The Menlow platform showcased in various mobile internet device (MID) prototypes will now be known as Centrino Atom.
http://www.intel.com/pressroom/archive/releases/20080302comp.htm?iid=pr1_releasepri_20080302m

At the higher end of the market it has announced a new version of its flagship Itanium processor with 2 billion transistors. The chip, codenamed Tukwila, features 30MB of cache built in. Users can expect six-core Xeon processors, codenamed Dunnington later in the year and a replacement for the Core architecture over the next 12 months. This new architecture, codenamed Nehalem will, like the Core brand, cover a range of processors for different devices.
http://download.intel.com/pressroom/kits/isscc/ISSCC_News_Fact_Sheet.pdf
http://www.techworld.com/opsys/news/index.cfm?newsID=11632&pagtype=all
http://www.intel.com/technology/architecture-silicon/next-gen/index.htm

Intel has also announced that its Montevina platform will be released as Centrino 2 – a follow-up to the highly successful mobile platform solution first launched in 2003. Centrino 2 will include Core 2 Duo processors and Wi-Fi and WiMAX wireless communications. Centrino 2 is due expected to be formally released in June 2008.
http://www.news.com/8301-10784_3-9893748-7.html?%5E$

AMD have also released their 65 nanometre quad-core Barcelona processors, the latest in the Opteron family of server chips. The chips have been shipped to development partners such as HP and Dell to allow system development and are expected to go on general release in the second quarter of 2008.
http://www.news.com/8301-10784_3-9882250-7.html?part=rss&subj=news&tag=2547-1_3-0-20
AMD also demonstrated their new 45 nanometre quad-core processor termed 'Shanghai'. The Shanghai chip, due for release later this year, is AMD's first 45 nanometre chip and will support server and desktop implementations. AMD is also planning on offering triple core Phenom chips, offering performance improvements over dual core, but at a lower price point than quad core chips.

Finally AMD announced the successfully testing of their Extreme ultraviolet immersion lithography fabrication unit in Germany. This unit, featured in previous TechNews, uses extreme ultraviolet lasers and a layer of liquid to create more accurate circuits, allows architectures below 45 nanometres to be created.
http://www.amd.com/gb-uk/Corporate/VirtualPressRoom/0,,51_104_543~124069,00.html
http://www.amd.com/gb-uk/Corporate/VirtualPressRoom/0,,51_104_543~123954,00.htmlht

Green computing update

Reducing the power consumption of computers will have benefits both to users with longer battery life and the environment. With these aims in mind researchers at the Massachusetts Institute of Technology (MIT) have designed a new low power processor, which is believed will dramatically reduce the power consumption for mobile devices. The new processor cuts the power usage from 1 volt, which is normal for mobile devices, to 0.3 volts, this in turn will extend battery life considerably.
http://web.mit.edu/mitei/research/spotlights/microchip.html

Despite not competing in the premium chip market with Intel and AMD, manufacturer VIA has a successful business developing lower-power chips for mobile devices. The new Isaiah range of chips are designed to be power efficient and claim to offer the best power-performance ratio on the market.
http://www.via.com.tw/en/products/processors/isaiah-arch/

An experimental mouse, named Dormino, was demonstrated at the greener gadgets design competition, which used the waste heat from a laptop for power. The system uses a mouse mat with embedded electrodes that convert heat into power, which is then used to power the wireless mouse. Other notable designs this year include a

parasol that generates solar power and a kinetic powered mobile phone design.
http://www.core77.com/competitions/GreenerGadgets/projects/4614/

Hard drive latest

There are two main developments in the world of hard disk storage. The first is the perpetual quest for higher capacity in the traditional 3.5" and 2.5" formats and the second is the replacement of moving hard drive with faster and lower-power solid state drives. Fujitsu have upgraded their line of laptop drives including new 400 and 500 Gigabyte models. The new three platter design models are more power efficient and quieter, designed primarily for Laptops Fujitsu have also identified Media Centres and set top boxes as a crucial market.

Traditionally enterprise products have been based on 3.5" devices. However, Infortrend has developed a 2.5inch disk drive enterprise storage array, aimed at reducing the amount of space required to host drives within a data centre. The system uses two Serial attached SCSI or two Fibre Channel (FC) host ports which can connect up to twelve 2.5 inch disk drives. In addition, versions with four FC and dual Raid controllers, allowing an automatic failover is one of the controller sets fails.

Solid State Drives have so far been aimed at portable users however HP has announced a desktop PC using this technology. The cost for higher capacity drives remains high so these are likely to be for a comparatively small range of applications such as receptions and internet cafes rather than high performance power users.
http://www.hp.com/hpinfo/newsroom/press/2008/080123b.html

Korean company Mtron has launched a new PATA Solid State Disk (SSD). The disk combines a PATA interface with the 1.8 inch drive format, leading to a smaller faster disk. The drive has a capacity of 120GB and a read write speed of 120Mbytes per second. Based on single level cell flash technology, the solid state drive will only be available to systems builders and is likely to appear in laptops and other mobile devices towards the end of Spring 2008.
http://www.mtron.net/english/
http://blog.wired.com/gadgets/2008/03/intel-to-ship-1.html
http://www.samsung.com/us/business/semiconductor/newsView.do?news_id=900

Pen computing

Digital pens have been around for some time but have failed to achieve mass market penetration. This is most likely due to requirements for batteries or special paper that means the process of casually making a note for subsequent capture on a computer can be complex or time consuming. Development company Livescribe demonstrated the new pulse smart pen recently. The pen is a rich input device allowing handwriting and audio input to be captured at the same time and synchronised. The pen can then replay speech when the user taps the pen on a particular place in their notes. The pen uses special dot paper to map the movements on the page, and allow synchronisation of the text and speech. The pen can also be synchronised with a PC using standard USB connections. Livescribe are planning a number of add-ons including translation software and interactive books. This new input methods offers real opportunities for different forms of interaction between the user and text

http://www.livescribe.com/

Bill Gates on the future for computer interface

Bill Gates, who is retiring as Microsoft's Chief Software Architect in July, has used his speech at the Consumer Electronics Show in Las Vegas, to talk up future alternative methods of human computer interaction. Microsoft has previously demonstrated touch technologies like their Surface interactive table, but Bill Gates talked about increasingly complex interactions being possible in the next five years – including mature speech recognition technologies.

Hollywood has often been cited as an inspiration and showcase for these approaches. The film 'The Island' showed a technology similar to Surface and 'Minority Report' uses vertical, gesture based interactions. One word of caution – in the latter film the star was reported to need regular breaks from the physical activity of interacting with a vertical free-space display.

It's also not clear how speech recognition will work in shared environments – such as offices, classrooms and public transport.
http://biz.yahoo.com/ap/080222/gates_goodbye_keyboards.html?.v=2
http://www.microsoft.com/surface/

Sony unveil hand powered concept gadgets

Sony has demonstrated a number of concept devices aimed at children. The devices including digital cameras, radios, photo viewers and video cameras are powered by kinetic energy developed through play. Developed as part of Sony's 'odo' project aimed at stimulating creativity within children, the devices are intended to be fun and simple to use. The camera for instance, is shaped like a flower, used like a magnifying glass and powered by running it along a table top. Images are downloaded to a computer using a USB cradle in the shape of a flowerpot. Although not intended for production, the concept of kinetic powered devices is likely to be increasing used with small gadgets.
http://www.sony.net/Fun/design/activity/sustainable/odo.html

Exascale Computing

Whilst home computer users contend themselves with browsing online and gamers make more demands of their consoles to create massive numbers of polygons; the cutting edge of computing power is in the hands of scientists who make real mathematical demands of their hardware to crunch numbers. Mathematical modelling demands faster and faster computers to deal with complex systems such as predicting climate change and decaying nuclear waste.
Scientists in the US are looking forward to exascale computing – one million trillion calculations per second (one petaflop) through multiple processors built with high-speed links. The US has announced a new initiative called the Institute for Advanced Architecture with an initial $7.4bn to lay the foundations for this type of computer. The fastest computer in the world currently is an IBM system housed at the Lawrence Livermore National Laboratory in California. This system runs at 480 teraflops, or less than half a petaflop.

Other scientists have been using distributed computing. Bringing together unused processor time on games consoles and home computers large problems can be solved without quite the same scale of cost.
http://www.wired.com/science/discoveries/news/2008/02/exascale_computing
http://blog.wired.com/games/2008/02/foldinghome-rea.html

Possible nanotech futures

Nokia have shown off ideas for the future of mobile handsets with a device called Morph which demonstrates some of the expected benefits of nanotechnology and materials. Researchers at Nokia and the University of Cambridge expect the handsets of the future to use new materials to offer flexibility and transparency; be self-cleaning; transparent; be one large solar cell for power and battery charging; and contain environmental sensors to affect its behaviour.
At the moment this makes for interesting pictures and video, but it is possible that within a few years the first materials with these characteristics will be found in all kinds of devices as the new materials are developed and then mass produced. For example, most laptop users would be pleased to have their computer made of a material that recharged the battery in the sunlight.
http://www.nokia.com/A4852062

IBM nanotech advance

Nanotechnology has great potential for the creation of new materials and technologies such as in processor design. Researchers at IBM have announced that they have measured for the first time the force required to move individual atoms on a surface. For example the force required to move a cobalt atom over a smooth platinum surface is 210 piconewtons, while moving a cobalt atom over a copper surface takes only 17 piconewtons. Researchers have been able to manipulate individual atoms since 1989 but understanding the minimum forces involved has not been achieved before now.
Being able to understand and manipulate atoms individually will give scientists the chance to explore this new world with another tool and take us closer to new materials. These materials could offer lightweight, flexible yet strong materials or room-temperature superconductors that reduce wastage in power transfer.
http://www-03.ibm.com/press/us/en/pressrelease/23544.wss

Software and internet

Analysis: Telepresence

Telepresence refers to a number of technologies that increasingly allow a person to have a presence and/or control elements in a separate location. That presence can be through images and sound, or by manipulating objects such as with robotics.

One type of Telepresence is the next generation of video conferencing, which can simulate a real meeting room. Using high definition video and large format screens, projects such as Hewlett Packard's Halo and Cisco's Telepresence systems create life-size video links between two meeting rooms. Other leading players within the

video conferencing market, such as Polycom and Tandberg also offer High Definition facilities. Polycom also offer a vision for the future of telepresence and video conferencing termed VC2. This provides an interesting take on video conferencing, with a mobile video conferencing facility that allows users to video conference with multiple venues via a mobile phone allowing video conferencing to become more pervasive.

The new telepresence video conferencing systems are designed to improve collaborative working and education. This can include corporate video conference classrooms, and joint workshops, with two or more small lecture theatres being joined together via life size video conference. The Halo system which has been jointly developed with Tandberg, uses a mix of high definition video conferencing and a joint presentation screen. The presentation screen also includes a zoom camera allowing participants in one location to explain and show in detail an object or document to the other groups.

Cisco have taken a standards based approach and their telepresence system is capable of communication with systems sold by a number of other companies, whereas Halo has a separate infrastructure and needs a gateway device to allow interoperability. The standards they have developed to are:
H.264 high definition video codec (which is also used by Blu-Ray and HD-DVD);
H.323 telecommunication standard for audiovisual communication;
the common intermediate format which forms part of the H.263 standard

The Cisco system also uses existing IP networks and can be integrated with IP telephony. Initial set up costs will be expensive however the use of standard IP telephony will bring this down. The use of standards such as H.323 also makes this service and other compliant systems such as LifeSize capable of working with the JANET Video Conferencing System (JVCS) which provides a directory of video conferencing systems and is available through the national education network.

All these systems are designed to overcome the limitations of traditional video conferencing and offer a more life-like, ‘being there’ experience.

Telepresence in Education
Within education telepresenece could be quite powerful, combining collaborative software tools such as shared desktops with more effective video conferencing facilities. Projects such as thereNow run by the US department for education have attempted to bring telepresence into continuing professional development and the classroom to provide coaching support for teachers and students.
Projects such as the Learning Science Research Institute’s video conferencing work, have looked at using video conferencing to share expert lectures across institutions and campuses including providing language lessons to remote locations from Nottingham to China and from the Lebanon to the UK. The TDA have also looked at the use of video conferencing to support initial teacher training and newly qualified teachers.
http://www.ict-tutors.co.uk/index.php?sec=3&tp=6&ts=3&skip=1
http://www.edmoweb.com/therenow/dissertation

IBM has now started to deliver a proportion of their internal and external training through a telepresence system called Live interactive Telepresence Education (LITE), this system is designed to remove some of the issues experienced in distance learning. Again combining aspects of collaborative working and shared desktops, the tutor and the student can interact within a 'virtual' classroom as they would within a normal classroom.

Projects such as the NASA JASON project and OceanLive allow students to participate in projects through telepresence. This allows students access to experiments and areas of this planet and others that would otherwise be impossible for them to view. Developed from the JASON system that discovered the RMS Titanic, students participate by visiting classrooms in the NASA Johnson Space Centre or the National Marine Sanctuary. These classrooms have live links to remotely-operated vehicles (ROV) . Students receive video from the vehicles and can operate them using a live link. This has been used to take students to the Florida Wetlands and a various marine sanctuaries. Video footage is also made available through the telepresence portal allowing many other students to be involved. A number of other marine sanctuaries are being fitted with the equipment with a total of five sites planned
http://oceanslive.org/

Telerobotics
Telerobotics offers a different form of telepresence, the ability to control objects at a distance through the internet. There are a number of telerobotic and internet-controlled devices that allow students to control the movement and focus of the remote vehicle or device. Other projects such as Teleworkbench provide a framework for conducting experiments with multiple internet-controlled robots in a single environment and seeing how they interact together. The telelab run by the University of Western Australia allows more in depth activity, with students remotely controlling scientific equipment, and conducting experiments. Other projects allow learners to access real-time data from sensors in the environment and conduct remote experiments over the internet

The telegarden is a community garden managed through telerobotic control. Users control a robotic arm and camera that can plant seeds, water plants and view the garden. The project was designed to monitor how communities could be created and supported through the use of telerobotics.
http://goldberg.berkley.edu/garden/Ars
http://www.cs.hmc.edu/roboteducation/paper2007/c43_tanoto.pdf
http://telerobot.mech.uwa.edu.au/information.html

Within education the remote sensing robotics project used Lego robotics modules to create internet controlled robots. The robots explored a simulation of a lunar environment and measured light and distance. The project used a flash interface to create control programs for the robot, and create a log of sensor readings which were transmitted back to the student. Other environments are planned covering undersea locations and other space themed simulations.

http://www.ni.com/pdf/academic/us/journals/Remote_sensing_and_tele.pdf

Telepresence combining teleconferencing and collaborative software offers better opportunities for distributed learning. Competing to a certain extent with virtual worlds such as second life. Each has its own strengths and weaknesses, however, Teleconferences are transient and time based, when the conference is over the meeting place will be used for other activities, and the presentation and resources discussed will be not be available through the same mechanism. With virtual worlds a resources can be deposited in a simulated classroom and can be interacted with at any time. However virtual worlds do not offer the level of detail offered by video conferencing, which is far more capable of representing and discussing real world objects. It is also true to say that within telepresence including telerobotics there are only so many students that can interact with a specific location at any one time. With virtual worlds however multiple simulations of a particular environment can be created, although they will offer less realistic interaction.

The possibility of high definition mobile video conferencing, such as that proposed by Polycom in their VC2 vision, offers increased opportunities for location based learning. Students and teachers in geographically dispersed outdoor locations can interact and collaborate. Combined with PDAs and other tools this would greatly extend the types of activity that can be undertaken and could provide live linkages between classroom based learning and field trips.

Software and internet news

Becta produce revised internet safety guidance

Becta has created a new guidance toolkit for Local Safeguarding Children Boards (LSCB). Following the successful internet safety guidance for schools, and community learning centres, this work has been produced in collaboration with 38 local authorities and 5 regional broadband Consortia, as well as contributions from the other UK administrations and the European Union. The guide covers key areas such as establishing a safety group within the LCSB, e-safety training, monitoring and reporting incidents and measuring the effectiveness of local strategies.
http://publications.becta.org.uk/display.cfm?resID=35446

Byron review on computer games and online content published

A review commissioned by the Government into the potentially harmful effects on children from inappropriate content in video games and on the internet has been published. The independent review, led by Dr Tanya Byron, ‘Safer Children in a Digital World’ concludes that that while new technologies bring incredible opportunities to children and young people, parent’s general lack of confidence and awareness is leaving children vulnerable to risks within their digital worlds. She makes a number of recommendations including the setting up of a Council for child internet safety, better classification of games, greater industry responsibility, better education and raising awareness of the risks. The full report can be found here:
http://www.dfes.gov.uk/byronreview/

ICT Excellence Awards 2008 launched

Becta has launched the ICT Excellence Awards 2008 to seek out the best and brightest schools that are using technology to help learners achieve. As young people become more and more digitally minded, schools have to raise their game to keep children engaged in the classroom. The ICT Excellence Awards aims to identify and reward schools throughout the UK approaching ICT in outstanding or innovative ways, benefiting their whole community both inside and outside the school building. By recognising whole-school best practice, these awards are closely aligned with Becta's self-review framework and the ICT Mark. While rewarding the school as a whole, there will be a focus within the awards on those individuals leading change within the school and making an impact across it. This year there will be eight national awards, across five categories, with winners receiving a cash prize to spend on ICT equipment, provision or training.
The deadline for entries is 30 April 2008. Schools and organisations that are shortlisted for an ICT Excellence Award 2008 will be visited by judges during June, July and September 2008. Winners will be announced at an awards ceremony in November 2008. Details on the categories and how to apply can be found here:
http://news.becta.org.uk/display.cfm?cfid=2890801&cftoken=cac8d3fd20dd0a83-F519E0FF-D9AF-2094-60C8A397E9D7427B&resID=35604&page=1658&catID=1633

Launch of the Information Standards Board

The Chief Information Officers for the Department for Children Schools and Families and the Department for Innovation Universities and Skills Launched the Information Standards Board in February. This board will have a remit to develop a sector wide systems architecture and to recommend interoperability standards within education. The board will operate a number of special interest groups looking to particular areas of data transmission and the education data workflow.
http://www.civilservicenetwork.com/profiles/article.html?tx_ttnews%5Btt_news%5D=31285&tx_ttnews%5BbackPid%5D=268&cHash=f9229e372c

Microsoft announces updates and improved interoperability

Microsoft has announced a series of tools designed to improve interoperability between their software and third party systems. The software company made a commitment to create open connections to its high volume business products as well as promoting data portability and a commitment to open standards. As an indication of its commitment Microsoft has made considerable documentation regarding the Microsoft Communication Protocol and Working Group Server Protocol available through its MSDN web site.
http://www.microsoft.com/presspass/press/2008/feb08/02-21ExpandInteroperabilityPR.mspx

The International Standards Organization (ISO) has been considering a revised proposal for Microsoft’s Office Open XML (OOXML) as the XML standard for describing document data. The Document format was initially rejected by the ISO back in September but a number of comments were made and another submission incorporating those changes is being decided in March. The Open Document Format (ODF) used by Open Office, and Lotus Symphony is already an ISO standard.

Members of the ISO have until the 29th of March to review the document and withdraw their negative votes should they wish to do so.
http://www.iso.org/iso/pressrelease.htm?refid=Ref1117

Microsoft also launched the latest version of the windows server family Windows 2008 in February. This group of software products will include the latest versions of SQL Server and developer suite Visual Studio.
http://itw.itworld.com/GoNow/a14724a177035a296047229a11

Vista Service Pack 1 is now also available. It includes security, compatibility and performance improvements. Becta advice on adopting Vista in schools can be found at:
http://news.becta.org.uk/display.cfm?resID=35287&page=1658&catID=1633
The full report is available here:
http://publications.becta.org.uk/display.cfm?resID=35275

Web based applications

Microsoft has announced their intention to add web based editing and view capability to the next planned version of Microsoft office. The new version currently called Office-14 will look at incorporating some of the features available in Microsoft Outlook Web Access into other office applications.
http://www.techworld.com/applications/news/index.cfm?newsID=11394&pagtype=all
Google have released a new version of their Google Apps online software suite named Google Apps Team Edition. The new release allows people to collaborate directly in the creation of a documents, and presentations, share calendars, instant messages and create team and employee websites. The system requires users to register with their work e-mail address, and provide a list of co-workers that have also signed up.
http://www.google.com/apps/business/index.html

Tablet PC animation software launched

The University of Washington human computer interaction and design centre have launched a new, simple to use animation application for Tablet PCs. Making use of the touch sensitive screens used in Tablet PCs, K-Sketch allows users to draw simple pictures and then create motion paths to create animations. The freeware application is intended to aid presentation and education by allowing presenters to quickly create simple rough animated explanations of concepts in response to questions.
http://www.cs.washington.edu/

Online education expands in India

A new report by business week look into the rapid expansion of distance and e-learning in India. Used to support part time learning and learning in employment the distance learning market in India is now worth over $200 million and is expected to continue increasing . The courses focused mainly at professional qualifications are now being offered by overseas universities and commercial learning providers in similar pattern to China. Many of the leading universities have tied up with overseas organisations such as the Massachusetts Institute of Technology and Carnegie

Mellon, providing a mix of pre-recorded lectures, web casts and live video streams to deliver the learning. All the leading providers have struck a deal with Google video to allow students to download videos for free.
http://www.businessweek.com/globalbiz/content/feb2008/gb20080222_979860.htm?campaign_id=rss_daily

UK internet use

A recent report from eMarketer has looked at internet usage in the UK. Around 37 million users went online each month in 2007. The company characterises the UK as one of the most mature internet populations in Europe. For example, the UK accounts for approximately 40% of all European online sales. The full research report published this February is available (for a fee) below:
http://www.emarketer.com/Reports/All/Emarketer_2000401.aspx?src=report_head_info_sitesearch

Legal moves to criminalise unlicensed downloading

The European Parliament has moved to push ahead with a proposed directive to make copyrighted infringement a criminal act, regardless of the scale. The EU parliament wants each member state to adopt the laws, however it is not clear how much wider support there is for such a move. There has also been a general tightening of the controls around internet usage within Europe which has seen the Danish governments blocking of the Pirate Bay download site in a response to breach of copyright and the Finnish governments blocking of some pornography sites which have association to child pornography. This filtering has come under criticism for the ease with which it can be bypassed and the fact it blocks legal as well as illegal content.

In the UK the governments green paper 'The Creative Hub' calls for Internet Service Providers to be forced to co-operate with Intellectual Property rights owners. The Internet Service Providers Association (ISPA) has responded with calls for better self regulation rather than legislation.
http://itw.itworld.com/GoNow/a14724a176847a296047229a6
http://go.theregister.com/feed/www.theregister.co.uk/2008/02/22/eu_wants_ip_action/
http://www.culture.gov.uk/NR/rdonlyres/096CB847-5E32-4435-9C52-C4D293CDECFD/0/CEPFeb2008.pdf

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Becta
Millburn Hill Road, Science Park, Coventry, CV4 7JJ.
Tel: 024 7641 6994
Fax: 024 7641 1418
Email: becta@becta.org.uk