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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. Please navigate the newsletter by clicking on items within the table of contents.

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Networking and wireless

Analysis: Ultra-Wideband

Ultra Wideband (UWB) is an emerging wireless technology that is expected to become widespread over the next few years. It has the potential to be a transformational technology, providing high speed wireless connections for a variety of devices, such as PCs and peripherals, handheld devices, mobile phones and wireless home multimedia systems (TVs, set top boxes, hi-fis, media servers).

UWB technology has been around for a long time and has been used by the military for communications and radar applications. Ultra-Wideband is based on pulsing a signal in very short bursts across a very wide bandwidth. Data is sent by altering the amplitude, phase or position of the pulses. OFDM and frequency hopping techniques have also been developed, which spread the bandwidth across different frequencies. The bandwidth can range from 500 MHz to several GHz. Unlike other radio technologies UWB does not need a carrier frequency. The spectrally wide signals have a very accurate spatial resolution and so can provide precise location information. UWB is largely a software defined technology using simple radio transmitters and could also be used to send signals over wires.

The current development of Ultra Wideband as a technology to connect devices and exchange digital media stems from the US FCC regulator's decision to make UWB spectrum commercially available. The specifications set out by the FCC have guided the commercial development of UWB. The FCC has allowed UWB to operate in the frequency ranges of 3.1GHz to 10.6GHz. Because it operates across a wide frequency range, the FCC has specified that it needs to transmit with extremely low power (-41dBm/MHz) to avoid interference with other wireless communications. These restrictions largely limit the uses of UWB to short range applications of around 10m. Therefore it is primarily seen as a cable replacement technology for Personal area Networks (PANs).

The EU has recently approved UWB for use in Europe, but has reduced the amount of spectrum available for the technology compared to the US. In Europe UWB will operate in the 3.4GHz to 5GHz and 6GHz to 8.5GHz range. European governments need to regulate for the use of UWB by August 2007.

The IEEE 802.15a group that was working on a UWB standard was disbanded last year due to the failure of two main industry groups supporting incompatible UWB technologies to reach agreement. The WiMedia Alliance group has the most market support and its technology is likely to become the de facto standard. The International Standards Organisation (ISO) and Ecma, a European standards body, have both now ratified the WiMedia solution.

Devices using UWB are expected to have data rates of up to 480Mbps at 3 metres dropping to 110Mbps at 10 metres. The WiMedia UWB solution defines the PHY and Mac layers which will then be adopted by other protocols. For example Certified

Wireless USB (backed by the USB Implementers Forum) is likely to be one of the first products to market. The Bluetooth SIG also has plans to adopt UWB technology.

A competitor to UWB-based systems in the home audio/visual application space is WirelessHD. WirelessHD has been demonstrated as reaching speeds of between 2Gbps and 5Gbps and the core technology has the potential to achieve up to 20Gbps. UWB has been demonstrated up to 1Gbps but it is not clear what further speed increases will be possible. WirelessHD has, unlike UWB, been carefully targeted at a particular market segment – home cinema – and has the backing of some major players in this segment including Samsung, Sony and Toshiba. WirelessHD will work in the 60GHz frequency and the specification is expected to be published this spring.
<http://www.wirelesshd.org/>

There is little doubt that faster and faster wireless links will have growing applications in the computing and home entertainment markets. As with many technologies the computing market is likely to be a key early adopter, enabling a market base to be built and technology be defined, whilst it is stable implementations in home electronic systems that help define the success or failure of a standard. It is also notable that the two markets are rapidly converging in the home at least, with broadband delivering television content and PCs being seen as devices to be attached to HD Televisions as well as computer displays.

UWB technology is likely to be increasingly built into PCs, mobile phones and other consumer electronics. Add-on Wireless USB adapters/hubs may also be able to convert legacy kit. UWB has the potential to give real ease of use benefits providing a simple, robust high speed wireless link that could help reduce the proliferation of interfaces. However, wired USB does have one key advantage in its ability to carry power to connected devices.

<http://www.wimedia.org>

<http://www.usb.org/developers/wusb/>

http://bluetooth.com/Bluetooth/Press/SIG/BLUETOOTH_SIG_SELECTS_WIMEDIA_ALLIANCE_ULTRAWIDEBAND_TECHNOLOGY_FOR_HIGH_SPEED_BLUETOOTH_APPLICATION.htm

[http://eur-](http://eur-lex.europa.eu/LexUriServ/site/en/oj/2007/l_055/l_05520070223en00330036.pdf)

[lex.europa.eu/LexUriServ/site/en/oj/2007/l_055/l_05520070223en00330036.pdf](http://eur-lex.europa.eu/LexUriServ/site/en/oj/2007/l_055/l_05520070223en00330036.pdf).

Networking and wireless news

UWB ISO standard

Ultra-wideband (UWB) technology is an emerging high-speed wireless technology for connecting devices over short distances (10m). As with all developing standards UWB has involved a number of competing approaches hoping for standardisation and subsequent market adoption. After a process with the IEEE broke down without agreement, the WiMedia Alliance industry group has succeeded in getting its technology approved by ISO (International Organization for Standardization) and Ecma (European Computer Manufacturers Association). The agreed standard

covers the Physical and Data Link layers and it is expected that USB and Bluetooth will be early protocols to run over UWB. The European Commission recently approved the use of UWB and has given EU governments until August 2007 to regulate for its use.

For more information on UWB see the analysis in this issue of TechNews.

<http://www.techworld.com/mobility/news/index.cfm?newsID=8315&pagtype=all>

WiMAX update

WiMAX, a wireless broadband technology, continues its slow move towards adoption. WiMAX comes in two main varieties – fixed and mobile. Fixed WiMAX was agreed as IEEE 802.16-2004 and Mobile WiMAX as IEEE 802.16e-2005. It is expected that the real-world speeds of WiMAX will be around 10Mbps at a range of 10km.

Warwick District council have announced it will be trialling WiMAX over the southern part of its district from late May. The council hope that the high speed, medium range service will offer significant efficiency improvements for its mobile and home workers in the area. The council hopes to significantly reduce demands on desk-space and other infrastructure by giving workers the tools to work from home and from their most convenient office, rather than travel extensively.

<http://networks.silicon.com/mobile/0,39024665,39166656,00.htm>

Ofcom has finished a consultation on award of licenses for spectrum that would be appropriate for 802.16e mobile WiMAX. The regulator hopes that the spectrum will be awarded by the end of 2007. The regulator has also said that companies holding licences for fixed WiMAX spectrum will need to apply for new licences if they want to offer mobile WiMAX services.

http://www.ofcom.org.uk/media/news/2006/12/nr_20061211

Intel has announced that their 2008 mobile computing platform, currently codenamed Montevina, will support WiMAX. This follows the 2007 update, code named Santa Rosa that supports 802.11n Wi-Fi.

http://www.reghardware.co.uk/2007/04/16/intel_spills_montevina_beans/

802.11n draft 2 approved

March 2007 saw the latest moves towards final agreement and ratification for the IEEE 802.11n wireless LAN standard. 802.11n is the latest iteration for wireless LANs and intends to deliver up to 540Mbps (200Mbps in practice) over a longer range than current 802.11b and g systems. The Draft 2.0 version agreed is not expected to undergo significant changes before a final draft 3.0 version is published later this year. Final ratification is not expected until late 2008.

There is already a range of 'pre-n' equipment available for homes and businesses. Manufacturers selling these products are promising that a simple firmware upgrade will be all that is necessary to meet any changes in the final specification. Toshiba has become the latest manufacturer to announce it was including draft 802.11n network support in laptops during manufacture. Intel intends to include support in its upcoming Santa Rosa chipset and Apple's AirPort Extreme also uses this technology.

<http://arstechnica.com/news.ars/post/20070313-802-11n-draft-2-0-gets-thumbs-up-from-working-group.html>

The Tokyo Ubiquitous Technology Project

Radio Frequency Identification (RFID) chips are being used in a bold new technology project in Ginza, Japan. RFID chips are used in wireless tags that give a unique identity to objects – working like wireless barcodes. The Japanese project, dubbed the Tokyo Ubiquitous Technology Project, uses thousands of RFID tags at different locations in the Ginza district of Tokyo, to deliver contextual location based information. It is hoped visitors will carry small terminals that will give them information about their location based on the tags that are detected. In addition to radio tags, printed symbols that can be read using mobile phone cameras will also be used. These black and white patterns are placed on information plates and work in a similar way to RFID tags but must be actively scanned rather than passively discovered.

However location is discovered, the unit or mobile phone then delivers information on tourist attractions, store offers, route navigation and neighbourhood services. Several US cities have apparently also shown interest in the results of this pilot. This kind of contextual information delivered from real world objects and locations is a growing area of development. Mobile location-based technologies in education were explored in more detail in the March issue of TechNews. Also see Becta's Emerging technologies for learning (volume 2) publication.

http://www.tokyo-ubinavi.jp/index_en.html

http://partners.becta.org.uk/page_documents/research/technews/mar07.pdf

<http://www.becta.org.uk/research/reports/emergingtechnologies>

European Commission sets out RFID plans

The European Commission has announced its plan of action in response to its earlier consultation on the use of RFID chips. RFID tags, 'short range wireless barcodes', are widely recognised as having great potential to deliver more efficient services, but there are concerns that they also challenge individual privacy. The EC consultation concluded that there was a lack of awareness amongst individuals, but the organisation has decided against formal discrete regulation. Instead the EC has proposed the creation of a RFID Stakeholder Group to advise on data security and privacy issues under a wider Data Protection policy umbrella. Analysts have commented that such an organisation is likely to be industry dominated as there has been little effort towards raising the level of understanding in ordinary citizens to the level at which they can participate meaningfully. It is estimated that the RFID market will be worth €7bn by 2016.

<http://www.rfidconsultation.eu/>

http://www.theregister.co.uk/2007/03/15/ec_passes_rfid_buck/

Global Information Technology Report

The UK has moved up one place in the latest report from the World Economic Forum. The WEF produces an annual Global Information Technology Report that looks at how nations are using IT to lever economic benefit. This year Denmark tops the Networked Readiness Index and the UK is at 9, behind Denmark, Sweden, Singapore, Finland, Switzerland, the Netherlands, the United States and Iceland.

This Index looks at three dimensions: the general business, regulatory and infrastructure environment for ICT; the readiness of individuals, businesses and governments to use and benefit from ICT; and their actual usage of the latest information and communication technology available. For more, and to read/download the report, visit:

<http://www.weforum.org/en/initiatives/gcp/Global%20Information%20Technology%20Report/index.htm>

Ofcom rules for Voice over IP

After two consultations Ofcom, the UK communications regulator, has published its latest thinking on Voice over IP (VoIP) services. VoIP, unlike the traditional telephone system, does not normally work during a power-cut as it tends to rely on mains-powered devices and networks. The lack of ability to call the emergency services without external power has been a clear barrier to widespread acceptance of VoIP over these traditional services.

Ofcom has concluded that VoIP providers should operate to a code of practice that includes the use of labelling and ensure, through obtaining a signature that users understand the limitations of the equipment in case of power cuts. It will amend its general conditions of operation to achieve this and is planning a further consultation in the summer of 2007. The VoIP industry has had a mixed response to this. Some feel that the global nature of the internet and services means that any restrictions will be a disadvantage to UK firms attempting to compete with effectively unregulated foreign competition.

<http://itw.itworld.com/GoNow/a14724a163480a296047229a9>

<http://www.ofcom.org.uk/consult/condocs/voipregulation/voipstatement/>

http://home.businesswire.com/portal/site/google/index.jsp?ndmViewId=news_view&newsId=20070415005033&newsLang=en

Broadband over Power Lines update

The idea of delivering broadband over power lines has been around for some years as it is seen to be able to offer good performance and almost universal coverage – certainly wider than the good quality telephone lines required for DSL circuits. It has suffered for some time with competing, propriety standards that discourage wide adoption, keep costs high and markets small. Now the IEEE P1901 Working Group has announced the technical requirements for a standard and has set a June deadline for responses. This is an early step in what is likely to be a very long development process before a final standard is agreed. However moves towards wider industry agreement are likely to be positive. An agreed standard could help address the issue of the few areas still unable to get DSL broadband and introduce new competition into the market. As with adapters that allow mains wiring in homes to be used to create networks, there are some concerns that these technologies may cause interference.

<http://www.informationweek.com/software/showArticle.jhtml;jsessionId=RO5203CSHXPWYQSNLRSKHSCJUNN2JVN?articleID=198000988>

Ofcom digital progress report

UK Telecommunications regulator Ofcom has released its latest Digital Progress Report. This report includes a number of headline figures about how households and

businesses are using broadband. The full report makes interesting reading and is available online at: http://www.ofcom.org.uk/media/news/2007/04/nr_20070402. The report is based on data up until the end of 2006 and a survey carried out in February 2006. Highlights include: Around 10% of adults are making voice calls across the internet; Half of the 1 in 3 adults with internet enabled mobile phones use it to go online; Between September 2006 and September 2007 there was a 32% increase in the number of public wireless hotspots; Around 10% of broadband lines are based on Local Loop Unbundling (LLU) which is up from 2% in the previous year. Finally, around 40% of adults with broadband connections took another communications service from the same provider. This highlights the importance of the triple-play (broadband, TV, phone) and quad-play (broadband, TV, phone, mobile) offerings that has driven such market convergence over the last few years.

http://www.ofcom.org.uk/research/cm/broadband_rpt/

The Broadband Stakeholders Group (BSG) has released a report warning that while broadband links in the UK are improving, the rate of development is still too slow and the UK needs to plan for next generation broadband at much higher speeds. The BSG is an industry/government forum which aims to promote the adoption of broadband services in the UK within a context of economic and social benefit.

<http://www.broadbanduk.org/content/view/236/7/>

Internet non-adopters

A study by Parks Associates in the USA has identified some startling figures for non-adoption. The study estimates that 31 million households do not currently have internet access and half of these (around 29% of the population) have no plans to jump on the information superhighway.

This figure of 29% represents a 5% drop based on the previous year and analysts are positive about further erosion of this minority in the future. There are likely to still be technological barriers in delivering high speed connectivity to some of these households. 44% of households who do not take an internet service claimed there was nothing online that interested them.

http://www.parksassociates.com/press/press_releases/2007/nat_scan1.html

Multimedia

Analysis: on demand video

The new broadcasting landscape

The advent of IPTV (Internet Protocol Television) and video streaming sites such as YouTube has led many to question the future of television and its regulation. Until recently television has been seen as a broadcast medium, where programs are available on a strict time limited schedule. With the advent of digital TV, IPTV and video streaming sites, this has changed. Viewers have a lot more flexibility about, where, how and when they access the video they want to watch and are now much less restricted by the content choices and timetables of schedulers.

This change in the possible styles of video delivery has an impact on the way people can interact with video broadcasts. Digital video recorders/PCs not only enable digital recording of video, but innovative new functions such as the ability to pause

live TV. Broadband connections also enable TV place shifting, with services such as Orb and Sling box which allow the user to watch and control their TV from any computer device with a browser and internet connection.

Moreover, video creation and distribution is no longer only in the hands of professional broadcasters, but open to all. This is part of a shift from a massive passive audience to an active participatory culture. The means of production and distribution have been democratised with inexpensive digital video cameras and software, and sites such as YouTube which allow people to share their own films with a mass audience. This user generated content (UGC) is expected to become an increasingly important aspect of modern media culture. Recent research from InStat reports that by 2010, the volume of downloads on UGC sites will be more than 65 billion, and revenues (from linked advertising) are expected to be over \$850 million. <http://www.instat.com/catalog/Ccatalogue.asp?id=212#IN0602976CM>

Educationally this presents a number of opportunities, both for the delivery of digital video content and for the creative, technical and media literacy learning opportunities offered by students making and distributing video.

Sites such as YouTube and VideoJug have already been used for education purposes, providing clips from historical sources, films of experiments and films of direct instruction. Sites, such as the Warwick University i-cast program: <http://www2.warwick.ac.uk/newsandevents/icast/>, also provide tailored educational and research content. Other projects use video making as a means of exploring social and oral history, social participation and local citizenship.

Internet Protocol Television (IPTV)

IPTV is a transmission medium that uses the internet to deliver television to a receiving device. IPTV uses either the MPEG-2 or MPEG-4 video compression standards to either stream or to download video content. This requires the video content to be decoded by the receiver and this is done either through a networked PC or set top box for display on a television. IPTV potentially falls into both linear and non-linear categories. The bandwidth requirements of transmitting video files means that this is exclusively a broadband service.

IPTV uses a number of protocols to deliver services depending on need. The IETF Real Time Streaming Protocol (RTSP) supports video on demand and video streaming servers. The IP Group Management Protocol (IGMP) is used to support multicast delivery of MPEG-2 and MPEG 4 files. The Digital Video Broadcasting Consortium also back IPTV and has released the DVB-IPI specification for delivery of MPEG-2 via Internet Protocol (IP) Networks.

<http://www.dvb.org>

Video on demand (VoD)

Most traditional broadcasters are starting to offer video on demand services including the BBC, BT, Sky, Tiscali TV (formerly Homechoice), Channel 4 and Virgin Media. The BBC has been trialling video on demand services, but is waiting for approval from the BBC Trust before launching them more widely. Many internet

start-ups are using peer to peer technology to deliver video over the internet eg Babelgum, Joost and Vuze. Many established broadcasters are now also licensing their content to internet video sites.

YouTube and clip TV

Video streaming has long been available through the internet by a variety of technologies both proprietary (Realtime, Quicktime and Windows Media Player) and open source (Icecast, Ogg, MediaFrame). The recent surge in output has largely been down to the widespread adoption of Flash video streaming technology. This allows videos to be encoded as Macromedia Flash "FLV", files which require no additional codecs and use extremely common web browser plug-ins, but are limited in sound and picture quality. The Flash FLV files use the Sorenson h263 codec from the International Telecommunication Union (ITU) to encode video files as progressive download streams.

Services such as AtomFilms, YouTube, MySpace and Video Jug all depend on this form of video streaming. Although the FLV format is proprietary it is supported by a large open source community with many projects developing FLV conversion and hosting tools. A new development in this area is Microsoft's Silverlight software. It is designed to fulfil a similar role to Flash but uses the SMPTE VC-1 video codec delivered through a stand-alone binary plug in for web-browsers. The VC-1 is an open standard codec that is conceptually similar to MPEG but not interchangeable.

<http://www.adobe.com/licensing/developer/>

<http://www.ietf.org/rfc/rfc2326.txt>

<http://www.itu.int/rec/T-REC-H.263-200501-l/en>

http://www.microsoft.com/silverlight/default_01.aspx

Video streaming rates

Format	Resolution	Transfer Rate (bits per second)	Example Application
MPEG2 LL	352x288	4 Mbps	PDA
MPEG2 ML	720x576	15 Mbps	Digital TV
MPEG2 H-14	1440x1080	60 Mbps	HD TV
MPEG2 HL	1920x1152	80 Mbps	HD TV
MPEG4 Low	Small	64 Kbps	
MPEG4 Mid	Medium	364 Kbps	
MPEG4 High	Large	4 Mbps	
Sorenson h 263	Small	64 Kbps	
Sorenson h 263	Medium	256Kbps	Flash Video
Sorenson h 263	Large	512Kbps	

Legal issues

The European Union's legislative proposal for the co-ordinated regulation of audiovisual media services (Audio visual media services without frontiers directive) attempts to address some of the ambiguity caused by these new technologies. This legislation encompasses IPTV, video on demand, internet video and mobile phone video. Critics argue that it is too early to regulate some of these rapidly emerging video technologies and say it could stifle innovation.

The proposed legislation divides audio visual services into two broad headings based on style of delivery rather than broadcast mechanism; these are linear and non-linear services.

http://ec.europa.eu/avpolicy/docs/reg/modernisation/proposal_2005/com_2007_170_en.pdf

Linear services form the traditional broadcast media style of programmes delivered at set times for set durations; these will be regulated according to the current framework for broadcast media. Non-linear services are those that are delivered on request to no set schedule such, as video on demand or internet video; these will be subject to regulation on advertising content and duration, but the regulation is intended to have a lighter touch.

Another potential issue is as the use of video grows will the infrastructure of the internet and local networks be able to cope? The proliferation of free services may not give providers the incentive to invest in infrastructure needed and may increase calls for the end of 'net neutrality' (all internet traffic treated equally).

Multimedia news

Digital TV Switchover

Digital UK, the consortium tasked with leading the switchover to digital TV, has announced the first location in the UK that will have its analogue television signal turned off. Whitehaven in Cumbria and the surrounding district of Copeland will no longer be able to receive the BBC2 signal from October the 17th with the three remaining channels (the area does not have Channel 5 at present) being switched off on November the 17th. A campaign has been mounted to urge the 25,000 remaining residents who have not got digital receivers, to buy an appropriate device prior to losing the signal. Digital UK says that this is the model that is likely to be followed when the analogue service is turned off at other transmitters across the country between 2008 and 2012.

<http://www.digitaluk.co.uk/en/news-media/pressReleases/0114/file/03-14%20whitehaven%20date.pdf>

Becta advice on digital switchover:

http://schools.becta.org.uk/index.php?section=re&catcode=ss_res_dig_02&rid=12199

Campaign for terrestrial HDTV

A campaign has been launched by major terrestrial broadcasters, electronics retailers and manufacturers to challenge Ofcom's decision to auction of the soon to be redundant analogue television frequencies. HDForAll backed by BBC, ITV,

Channel 4 and Five argue that the radio frequency spectrum that will be released by the analogue TV switch off should be reserved for High Definition Television Signals for Freeview digital televisions users. Ofcom has a neutral approach to spectrum allocation and currently intends to offer the frequencies in an open auction for any use. This could mean they are not available to carry televisions signals, leaving satellite and cable customers as the only people that could receive multiple High Definition television channels.

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

Virtual worlds grow

Analysts Screen Digest has published research showing the global turnover of Massive Multitplayer Online Games (MMOG). Their research shows that in 2006 the MMOG market in the 'Western World' topped one billion dollars. North America accounted for 54% and Europe for 29% of the market for online game subscriptions. In terms of market share for games, World of Warcraft came out on top by a considerable margin with Runescape coming in second. It is into this competitive and growing market that Sony has launched two online games LittleBigPlanet from mediamolecule.com aimed at younger audiences, and Home from Sony themselves, both of which will be available on the PS3 platform. There is increasing interest in the use of virtual worlds and MMOGs in education (see Analysis: virtual worlds)

<http://www.screendigest.com/reports/07westworldmmog/readmore/view.html>

<http://uk.playstation.com/games-media/news/articles/detail/item55853/Go-Home-with-PS3/>

<http://uk.playstation.com/games-media/news/articles/detail/item59952/It's-a-small-world/>

Emotional interface for gaming

Emotive Systems has made a new brain computer interface kit available to games developers. Brain computer Interfaces use sensors to monitor the electrical activity in the brain caused by certain types of thought and translate this into an instruction to the computer. The kit comprises three key elements, two of which rely on brain computer interfaces and one that uses real time interpretation of body language and facial expressions. Emotive claims that their system can allow users to move and twist 'objects' using thoughts alone. The system can read a user's emotional signals and respond to them. Some research projects have looked at the potential of emotionally aware applications that can judge the emotional state and attentiveness of the learner and respond accordingly.

http://www.emotiv.com/3_0/pr/pr022607b.htm

Location tagging photographs

Both Phillips NXP and Sony have announced advances in geographically tagging (or geo-tagging) photographs. Sony's offering is an attachment to their popular professional and semi-professional cyber shot range. The Sony GPS-CS1 logs the geographic co-ordinates where pictures were taken, storing them for later retrieval. NXP has released swsGPS, a software toolkit for recording location and combining this with information about the photograph. NXP (a Philips spin-off) has worked this technology into a theoretical design which is about the size of a credit card and can be integrated in devices or used in add-on units.

Alternative methods of geotagging include recording the location with a dedicated GPS device, using PDAs or cameraphones with in-built GPS or manually looking up the location on an internet map. This geotagged information can be fed into photo sharing sites such as Mappr to build up geographical maps of photographs. Photographs and other location based information can also be linked into Google earth via network links. This offers various opportunities for location based projects and learning.

http://www.sony.co.uk/view/ShowProduct.action?product=GPS-CS1&site=odw_en_GB&pageType=Overview&category=DCC+Other+Accessories
[http://www.software.nxp.com/assets/Downloadablefile//swGPS_SnapSpot_HR\(1\)-13469.pdf](http://www.software.nxp.com/assets/Downloadablefile//swGPS_SnapSpot_HR(1)-13469.pdf)

Samsung Show off USB connected Monitor

Samsung unveiled their new Syncmaster 940UX USB connected monitor. This move allows multiple monitors to be run from one computer using a USB 2.0 hub, a potential benefit for small presentations. Up to 6 monitors can be daisy chained together. Samsung envisage that the primary market for the device will be laptop users requiring an additional monitor. It remains to be seen whether other major manufacturers will follow suit. Adapters to convert VGA interfaces to USB are also available.

<http://www.displaylink.com/news/news140307.htm>

EU revises advertising regulations for television

The EU has provided further information on the likely revisions to the proposed update to the 'Television without frontiers' legislation. The legislation will create harmonised regulations for traditional broadcasters and new video on demand services. A key feature will be a limit to the amount of advertising allowed in any 30 minutes of programming for video on demand and internet video services, although broadcasters will be free to decide when the advertising appears in the program. Critics say it is too early to regulate emerging internet video services and this may stifle innovation.

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/311&format=HTML&aged=0&language=EN&guiLanguage=en>

Computer games teach aggression and ethics

A new study published in the journal of applied psychology by Ludwig-Maximilian's University in Munich has drawn a clear link between people that played computer racing games and bad drivers. In one of the three studies the University found a statistical link between the frequency of playing racing games and car accidents. In another they witnessed that people who played a racing game immediately before a simulated critical road traffic situation, were more likely to take higher risks than those that played a none-driving related game.

<http://content.apa.org/journals/xap/13/1/22>. Help may be at hand however, as a government official in Thailand has launched a new game to reinforce positive ethics. Pakorn Tancharoe of the Thai governments Moral and Ethical Development office developed the game as a response to commercial offerings. The game focuses on teaching the core precepts of Buddhism through game play.
http://www.nationmultimedia.com/2007/03/12/national/national_30029034.php

ViaCom sues Google over YouTube

ViaCom has sued the video sharing site YouTube for copyright infringement. ViaCom claimed over 160,000 unauthorised clips of their copyrighted material were being hosted in what it termed 'massive intentional copyright infringement'. Viacom are seeking \$1 billion in damages, but it is also seeking an injunction to prevent further infringement which may prove difficult for YouTube to adhere to. Youtube has previously removed files that are known to infringe copyright, but has struggled to prevent such files being uploaded. The Electronic Freedom Foundation has counter-sued Viacom for abuse of the Digital Millennium Copyright Act in relation to YouTube. They claim that Viacom requested YouTube remove a clip parodying a ViaCom show. It is argued that the clip contained no ViaCom material and is protected under fair use, YouTube have declined to republish the clip pending the court hearings.

This action highlights the trend for publishing clips of commercially broadcast and copyrighted material on social networking sites. It is important that the issues of copyright and are understood by students uploading and downloading video and music.

http://www.viacom.com/view_release.html?inID=1000040&inReleaseID=227614

Adobe launch CS3 applications

Adobe has launched the Creative Suite 3 (CS3) range of applications which includes updates to major, industry standard applications such as Photoshop, Dreamweaver, Illustrator and Premiere Pro. A new module also helps designers create content for mobile devices. The applications can be purchased individually or in various bundles.

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

Hardware

Analysis: projector technologies

The advent of affordable digital projectors has had a significant impact on the spread of educational use of ICT. The ability to share ICT activity within a whole class or small group has improved the accessibility of digital content. Projectors might look reasonably similar and perform similar tasks, but they have varying characteristics. This article will provide a brief overview of the different characteristics of projectors and compare the major projection image technologies.

Projectors can be divided into a number of discrete product segments. The labels used by manufacturers vary, but broadly they can be divided into fixed, portable and ultra-portable units. Fixed units perform well in large dedicated rooms for large audiences. Portable units are designed to be carried between rooms, but to still offer the performance required for a medium to large sized group. Ultra-portable units are designed to be light and compact. They are aimed at meeting the needs of small groups and informal locations.

Key performance characteristics of projectors are brightness, contrast, output resolution, effective operational distance (throw) and weight. Internal to the projector

is a mechanism for displaying images and this affects many of the characteristics of a unit. Early projector technologies were based on the same CRTs (Cathode Ray Tubes) used in televisions and computer monitors. These tubes, one per colour, are reliable and project large images suitable for big rooms, but come in bulky units that might require significant effort to install.

The two most popular technologies in the mass market today are Liquid Crystal Display (LCD) and Digital Light Processing (DLP). LCD holds the dominant market share, and works by splitting the light from a powerful bulb through a prism into different colours. Each colour hits an LCD grid which then either allows or blocks the passage of light for each pixel. Combining the different colours gives a bright and colourful image for final display. In a DLP system the light from the bulb projects onto one or more DLP chips. Each of these chips has a large number of tiny mirrors that can be selectively tilted to reflect light. DLP systems might have three chips (one per colour), or a single chip which is preceded by a rotating colour wheel. These one-chip systems are cheaper, but do not offer as good an image.

Upcoming technologies include Liquid Crystal on Silicon (LCOS) and Light Emitting Diode (LED) projectors. LCOS shares characteristics with both DLP and LCD systems. The technology is based on a large number of tiny reflective crystals (so similar in principle to DLP), but rather than use small mirrors that change position, the reflective properties are altered by the application of voltage (as in LCD). LCOS systems offer higher resolution potentially at a lower cost than traditional LCD. LED projectors use Light Emitting Diodes instead of traditional bulbs. The colour displays are then created either using LCD or DLP technology. The benefit of using LEDs as the light source for such displays is significantly reduced physical size and weight, though there is a cost in brightness. Some models of projector using this technology come with special screens designed to minimise the reflection of ambient light in an attempt to compensate.

Projector brightness is measured in ANSI lumens. ANSI stands for the American National Standards Institute which is a standards body. Brighter projectors are more suitable for larger rooms and can cope better with ambient light. Classroom projectors shouldn't be brighter than 1500 ANSI lumens. Projectors more powerful than this may be able to have their brightness reduced through the firmware settings.

Typically around £400 will buy a 1500 ANSI lumens LCD portable/fixed (around 3kg) projector suitable for most classrooms. A more portable DLP projector, still 1500 ANSI lumens, but weighing 1.2kg, retails for more – around £700. Portability is therefore, a clear price differentiator. The most portable projectors, designed for portable media devices are expected to work at a lower output level – perhaps around 650 ANSI lumens. This lower output would require a suitably light-controlled room and perhaps a special screen designed to minimise glare.

Projector contrast is the ratio between the brightness of a 'fully on' and 'fully off' pixel. Higher contrast will give a better quality image that is clearer and shows more detail. One of the main problems with projector technologies is that 'fully off' pixels do give out light. The lack of a true black colour is an issue with all these

technologies, but some systems work better than others. DLP systems tend to offer blacker blacks and better contrast than LCD/LCOS units. Contrast typically ranges from around 800:1 on lower cost projectors, to over 2500:1 for premium units. Currently, DLP systems can run up to 5000:1 and LCD to 7000:1.

Output resolution is the key characteristic for users who are interested in taking advantage of High Definition (HD) video. Typically projectors offer similar resolutions to computer monitors. 1024x768 (XGA) pixels is common but, widescreen resolutions are growing in popularity. However, projectors with full HDTV resolution (1920x1080p) are still rare and expensive. At the lower end of the market projectors only offer SVGA (800x600) images. Classroom projectors should be a minimum of XGA resolutions (with support for VGA). Widescreen projectors should be a minimum of 1280x720p.

The long-term market trends in projector technology are miniaturisation, support for high definition and more efficient performance. LCD and DLP remain roughly equitable technologies each with their own strengths and weaknesses. The former is backed most strongly by Sony and Epson, while DLP is a technology owned and licensed by Texas Instruments. LCOS, backed by Hitachi and JVC, is likely to make become more popular when volume manufacturing lowers production costs.

Analysts suggest that there are some differences between the different types of projector. Historically LCD is brighter than DLP when using equivalent power lamps. LCD also tends to be sharper than DLP, but at lower resolution has a grid or 'screen door' effect caused by the gap between the pixels – though this is less obvious at higher resolution. The colour resolution of LCDs tends to be better than DLP. DLP can give more compact and portable units, but a single, rotating colour wheel can sometimes give a blurring or 'rainbow' effect in a one-chip system. Current LCOS systems have excellent resolution and image quality, but tend to have shorter bulb life and offer the poorest contrast performance. Bulbs are often fragile, expensive to replace and power hungry so a move to smaller, more energy efficient LEDs will have benefits to both the user and the environment. LCD and DLP units typically offer 2000 hours or more of life. Energy efficiency savings can be difficult to implement, as turning bulbs off without letting them slowly power down will reduce their lifespan significantly. This means many users simply leave the units powered on (if not switched on) all the time, though this can be noisy and generate significant amounts of heat.

http://www.projectorcentral.com/banding_rainbows.htm
<http://www.projectorreviews.com/advice/dlpvslcd/index.asp>
http://www.projectorcentral.com/lcd_dlp_test.htm
<http://www.projectorpoint.co.uk/ProjectorLCDvsDLP.htm>

There is no doubt that schools will remain major consumers of projectors, however the majority of upcoming innovations might not be that relevant. Business interest in projectors is biased towards more portable models to support mobile sales staff, while schools generally want high quality, secure fixed units. Indeed many schools have security problems that drive a need to ensure that projectors are not mobile

Becta has published a number of resources on securing projectors and has suggested that using a particular colour projector body for schools will reduce resale potential and hence prevent theft. The introduction of orange projectors in schools in the London Borough of Havering reduced thefts significantly.

<http://news.becta.org.uk/display.cfm?cfid=662527&cftoken=63d05f972705-4b7df789-c05d-eae1-98481165ea7bbc6b&resID=29426&page=1657&catID=1632>
<http://schools.becta.org.uk/index.php?section=tl&&catcode=&rid=10902&rr=0>

The future for ultraportable technologies is the focus of a number of company's developments. Samsung have demonstrated an LED projector that measures only 128 x 85 x 53mm. It claims 10,000 hour life for the LEDs and has its own battery pack for the ultimate in portability. This is based on DLP technology.

<http://www.samsung.com/uk/products/projectors/mobileprojector/spp300memxedc.asp>

Another company working on miniature devices is Light Blue Optics. This company has demonstrated a projector the size of a stack of coins that uses LCOS technology and lasers rather than glass, prisms and moving parts. Not only can this reduce the size of the device but can also reduce noise and heat production.

<http://www.engadget.com/2006/02/13/new-pvpro-mini-projector-has-no-moving-parts/>
<http://www.electronicweekly.com/Articles/2006/09/13/39683/Light+Blue+Optics+shows+hologram+laser+projector.htm>

Microvision demonstrated a tiny projection unit at the CES show early in 2007 in Las Vegas. Their demonstration device is about the size of the generation two iPod shuffle. This level of miniaturisation will eventually be matched by some improvements in colour, resolution and brightness. However the focus of the product will remain small size,

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

Australian company Digislide is also targeting the integrated device market. Its Digismart hopes to provide good quality 11"x17" projections from units integrated with other devices. It is targeting more than just mobile phones and suggests that cheap, affordable mini-projectors will also have applications in wearable technology - such as displays built in to glasses to deliver location-based information; and vehicles - such as cheap heads up displays for cars.

<http://www.digislide.com.au/consumer/digismart.htm>

These ultraportable mini projectors are not designed to replace normal projectors for small group or class sized presentations. Instead they are aimed at giving individuals more flexibility. For example instead of being forced to watch mobile video on a small screen, a commuter might project a 6-8" high image on the seatback in front or onto a piece of plain paper as a makeshift screen. This is not currently a significant market, but a number of the companies mentioned above are hoping that increased availability of media for phones and portable devices will create one.

A section of the market is also moving away from the typical direct cable connection. Some projectors can be networked (wireless or cable) to provide management and diagnostic information. Wire-free connection to computers is also possible – either very short range using Bluetooth or a normal wireless LAN. For example, a wireless projector and Tablet PC can give similar functionality to an interactive whiteboard, with some added flexibility. A small number of projectors can also be used to store and present documents without the need for a controlling computer.

The projector market is still quite healthy and may eventually see new products designed for portable media players or even built into mobile phones and video players. However there is a big question about how big a market this will be and indeed if there is any kind of demand in this area. The single biggest driver in home entertainment is HDTV as promoted by next-generation DVD formats, games consoles and a growing number of HD television broadcasts. Again though, there is a question of how relevant these premium features are to schools where normal resolutions are likely to meet the majority of needs. Schools are a volume market for projectors. They do not typically need particularly portable or high resolution devices for the current generation of applications.

Hardware news

Emerging technologies for learning

Becta has published a second volume of its 'Emerging technologies for learning' document to complement last year's version. It considers how emerging technologies, developments and trends could transform our ways of working, learning and interacting over the next three to five years. The six articles in the publication are: Emerging trends in social software for education; Learning networks in practice; The challenge of new digital literacies and the 'hidden curriculum'; How to teach with technology: keeping both teachers and students comfortable in an era of exponential change; Games in education and Ubiquitous computing. The publication can be downloaded from:

<http://www.becta.org.uk/research/reports/emergingtechnologies>

New details on Intel's plans

Intel has made further announcements in their continuing strategy to either improve chip speed or reduce size every year. The new Penryn architecture will shrink chip architecture from 65 nanometres to 45 nanometres. This will allow faster more energy efficient chips. The chip will also feature better power management and more on chip memory improving the caching capability of the CPU. The 45 nanometre chips will start production mid 2007. Intel is following a 'tick-tock' policy of shrinking the manufacturing process one year, followed by a new micro-architecture the next year. This means a new micro-architecture called 'Nehalem' is due in 2008. This will process two threads per core and also integrate the memory controller into the processor, something AMD has been doing for some years.

In May Intel is releasing a new Centrino platform for laptops codenamed 'Santa Rosa'. The new platform will be more efficient and should also include support for pre 802.11n Wi-Fi.

Intel has also described further plans for mobile devices at its recent developer forum. Its McCaslin architecture with a low power 'Steeley' chip will be used in new ultra mobile PCs, including ruggedized versions aimed at education.

AMD are also working on their next generation chips. The new generation of Opteron chips will make use of the 'Barcelona' quad core architecture. These chips initially intended for the workstation and server market are expected to be released mid 2007.

<http://www.intel.com/pressroom/archive/releases/20070328fact.htm>

http://www.amd.com/gb-uk/0,,3715_13530_1260_1276^544~115794,00.html

Further guidance on waste electronics

Further guidance regarding the implementation of the EU Directive on Waste Electrical and Electronic Equipment (WEEE) has been issued by the Department for Trade and Industry (DTI). In a new guidance note issued in February 2007 the DTI clearly sets out who is affected and what their responsibilities are in regards to the act. The main obligation of distributors is to provide a take back service allowing customers to return WEEE free of charge. Institutions need to be aware of their responsibilities under the directive and have an appropriate policy for the disposal of electronic equipment. For more information:

<http://www.dti.gov.uk/files/file37923.pdf>

Standard measure for inkjet performance

Manufacturers of inkjet printers have started to embrace the new ISO standard for measuring inkjet efficiency. ISO/IEC24711:2006 uses a set of standardised tests to ensure that ink consumption can be measured on a like for like basis. The standardised test specifies how many cartridges must be tested, the format of the test document, and the type of machine used. This gives a page yield figure that can be compared across manufacturers. The ISO has previously release standards for Laser toner usage.

<http://www.iso.org/iso/en/CatalogueDetailPage.CatalogueDetail?CSNUMBER=40034&ICS1=37&ICS2=100&ICS3=10&scopelist=>

Energy efficient computing

US manufacturers and retailers have announced a new initiative to promote energy efficient computing. US retailer Wal-mart has announced a scheme to prioritise energy efficient electronics in its store using a score card system. The score cards assess products for energy efficiency, durability, upgradeability, and packaging. In a move that echoes the WEEE regulations in Europe Walmart has also organised take back days when customers can bring in old equipment. Some PC manufacturers such as HP and Dell offer similar services.

Hewlett Packard has responded to the US Environmental Protection Agency Star 4 regulation by announcing a new range of energy efficient PCs. The Star 4 rating (in force from July 2007) requires PCs to use 80% of the incoming power directly in

computing. The business focused PCs will be available with AMD and Intel Chips. The efficiency of computer power supply units (PSU) currently varies considerably.
<http://www.walmartfacts.com/articles/4861.aspx>
http://www.hp.com/hpinfo/newsroom/feature_stories/2007/07energy.html

Alternative energy for mobile devices

Texas Instruments has launched a new low voltage step up converter that could enable micro fuel cells or solar panels to be used in more portable devices. The TPS61200 contains a 1.5-A switch and can handle a range of input power from 0.3-V to 5.5-V. This is 0.6-V lower than currently available. This is significant as the limitations of previous components may have hampered the use of alternative energy sources in mobile devices.
<http://focus.ti.com/docs/pr/pressrelease.jhtml?preId=sc07062>

Virtualisation may disrupt server deployment patterns

A recent report by analysts IDC predicts that virtualisation and multicore server deployments will reduce the number of servers sold globally, with predicted growth in server sales down by 22%. Virtualisation allows multiple servers to be consolidated into a single physical machine. The number of virtual servers is set to rise by 40%. IDC believes that server consolidation is helped by the move to multicore processors.
<http://www.idc.com/getdoc.jsp?containerId=prUS20609907>

Sunderland Digital Challenge

Sunderland City Council has won £3 million of government funding to tackle social exclusion through digital media. Sunderland City Council now aims to establish Community e-Champions to promote internet and computer use, provide e-mentors for children and young people and extra help for Key Stage 3 students seen as under achieving.
<http://www.communities.gov.uk/index.asp?id=1002882&PressNoticeID=2372>

Stack chips to improve speed

IBM has announced that from late 2007 they will start making chips that can be stacked one on top of another rather than side by side. This technology also being worked on by American company Tru-Sci removes the need for chips to be wired together in a circuit board and allows them to be directly connected using through silicon vias, effectively tungsten plugs running through the chips vertically. This reduces the distance information needs to travel within the CPU by up to 1000 times, which will have considerably speed benefits.
<http://www-03.ibm.com/press/us/en/pressrelease/21350.wss>

Laptops outsell desktops

Market trends research Company IDC published their analysis for the European PC market for the last quarter of 2006. The shift toward laptops has continued driven by low prices with laptop sales growing by 20% to 8.5 million whilst desktop sales dropped by 6% to 8 million for the same period.
<http://www.idc.com/getdoc.jsp?containerId=JP01P>

Software and internet

Analysis: virtual worlds

Virtual worlds are online environments where multiple users can interact together or with characters in a game world. Virtual worlds today are generally taken to mean immersive 3D environments where users have a great deal of freedom in terms of where they go and who they can interact with. Users participate in the world through the control of an avatar or online persona. This is significant because it allows the user to choose how much of their real self they wish to portray in the virtual world, potentially allowing them to act as completely different people. The concept of the virtual world is an old one though, and stretches back to the online text based games of the 1970s and 1980s. The modern games are generally referred to as Massive Multiplayer Online Games (MMOG) and the 3D worlds often used in education for collaboration, and communication are known as Massive Multiplayer Online Social Game (MMOSG). A significant aspect of MMOG and MMOSGs is their persistence, these worlds exist and can change and grow when the user is not logged in

There are a number of these social networking worlds the most famous of which is Second Life by Linden Labs. Second Life uses the concept of lands to parcel up the virtual world, with many of the concepts from real life such as real estate, being applied in the virtual world. Users can own land, and can set access restrictions on the land they own preventing access to strangers. Second Life, like Active Worlds, allows users to change the land (terraforming), create objects and script their behaviour using a simple scripting language. This combined with persistence means that the world can change significantly while the user is not logged in.

Second Life also has its own economy based on the Linden dollar. Users can exchange real currencies for these virtual dollars which allow a user to purchase significant amounts of land or objects very quickly. Commerce is an increasingly important part of virtual worlds, even those targeted at children. A number of virtual worlds have been created to specifically promote a particular brand or product such as Coke Studios, Disney Toontown, and MokiTown, whereas others such as Dubit make money through advertising. The more teen and adult orientated worlds such as 'There', Second Life and Habbo Hotel feature tie-ins with commercial and charitable organisations. In Second Life the ability to convert virtual money into real money and in some cases to trade exclusively for real-world money has led to direct commerce with companies offering paid events or commercial services through the virtual world.

Virtual worlds are being used in education in a number of ways: products such as Sloodle and Active Worlds offer 3D learning environments with collaboration via chat being a key feature. Sloodle provides a link between Second Life and Moodle, a virtual learning environment. Sloodle allows users to access html content, post comments and create blog entries in Moodle from the Second Life game world. Active Worlds provides closed worlds created by the server owner using Active Worlds building tools, the 3D interfaces created in VRML (Virtual Reality Modelling

Language) allow users to access text based and multimedia resources together with a chat facility. For example, a user can explore a Martian landscape whilst learning about Mars.

Both Active worlds and Second Life have had considerable interest from the education community, in response the creators Linden Labs have set up Campus Second Life, this is an area of second life where lecturers can deliver seminars and lectures using the second life world. Currently 112 institutions worldwide are using Second Life and 125 use Active Worlds to provide online teaching. The Open University run two projects in second life, the Schome project for the National Association of Gifted and Talented Youth has used a virtual island in Second Life to deliver teaching, including experimentation using the scripting and modelling tools available in second life. The second project DigiLab is providing a new way of accessing library resources through a virtual world. The National Physical Laboratory also has several projects running in Second Life.

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

<http://www.activeworlds.com>

http://www.simteach.com/wiki/index.php?title=Second_Life_Education_Wiki

http://www.activeworlds.com/edu/awedu_participants.asp

Sloodle uses the existing Second Life world and client to deliver its learning and as such uses java and openGL to develop a client that runs on PC and Mac. Active worlds is entirely Windows based using DirectX as its rendering engine. Customers can buy their own servers though allowing for more customised deployments.

Whyville and Club Penguin are both education-focused worlds aimed at school age children. Whyville is specifically designed for use in schools, combining traditional elements of the virtual world with lessons and learning materials on a variety of science and maths based topics. Significantly, Whyville allows teachers to moderate chat and manage accounts for users in their classes.

<http://www.whyville.net>

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

Virtual worlds have always included an element of collaborative development and this continues with open source projects such as WorldForge and Daimonin developing Massive Multiplayer Online Role-Playing Games. Project Darkstar from Sun offers a similar client server virtual world building tool that can be tailored for serious games as shown by their recent MPK20 showcase. Based on Intermediate Mode Interactive's Cosmic Engine, this is a virtual world designed specifically for collaborative working.

<http://research.sun.com/projects/mc/mpk20.html>

One of the benefits of Virtual Worlds, particularly client based applications such as Second Life, Croquet and Active Worlds, is the ability to create and script objects including their in game physics. This allows encoding models of behaviour, changes to user interface or in the case of Croquet, small talk applications into objects that can be added to the virtual world for others to interact with, download and modify,

while remaining in the game. This is managed through a single interface and client system whereas previously several different applications were needed.

Open source developments such as Solipsis from France Telecom and the education focused Croquet are exploring building virtual worlds using a peer to peer structure rather than a central server. The Smalltalk based Croquet allows users complete control over their local world but enables them to collaborate by sharing elements of their world with others through peer to peer networking. The particular aim of this project is to share theoretical models and programming tasks between members of the peer to peer network.

<http://www.croquetconsortium.org>

<http://www.solipsis.net>

All these applications require specialised clients to be installed on the user's computer, but as shown by many of the child-friendly applications virtual worlds can be built using existing web technology. Club Penguin, MokiTown, Habbo Hotel and Whyville all use Macromedia products with proprietary DHTML and Java interfaces to provide their virtual environments. By using existing web plug-ins they are more accessible to ordinary users, but are a lot less flexible for academic use. It is expected that the recently announced BBC virtual world for children will fit into this area with a focus on learning and very limited social interaction

The potential of virtual worlds for education is only just beginning to be explored and research and experimentation continues. There seems to be two main aspects to their use in learning, although in many projects they overlap. The first is learners using the world for collaboration or to access content such as lectures and demonstrations. The second is to use creative and technical skills to actually construct elements in the worlds and share them with others. These worlds, then, are not just engaging, but provide a space for higher level collaboration, simulation, testing of hypotheses, interaction, creativity and performance.

Safety is a key problem for virtual worlds as for anywhere else on the internet. Here issues centre around the ability to upload files and photographs, with some users loading and distributing pornography via this file upload function. Cybersex (text-based simulated sex) is another danger and most child friendly sites attempt to prevent it using chat filters or moderators and will ban users for this behaviour. As with other forms of social networking there is a danger that adults will attempt to 'groom' children for inappropriate contact. There is a phenomenon known as age-play where adults pretend to be children in online worlds to interact with other adults. This has come under the scrutiny of prosecutors in Holland where this kind of behaviour could be considered a criminal offence. Most social networks aimed at children and teens employ a degree of chat filtering to prevent inappropriate language, whilst some such as club penguin and Whyville require parental or teacher consent before chat is allowed. The development of Teen Second Life is also an attempt to protect young people.

The launch of two new virtual worlds for the Sony Playstation 3 will broaden the market for virtual worlds to games consoles. The new games, LittleBigPlanet, aimed

at children and Home aimed at adults will allow considerable social interaction, but as yet it is unclear how flexible they will be in terms of building and scripting. The use of virtual worlds is set to grow and business is already taking the platform seriously. The potential uses of immersive worlds in education may only be bounded by the imagination of learners and teachers.

Emerging technologies for learning volume 2:

http://partners.becta.org.uk/page_documents/research/emerging_technologies07_chapter3.pdf

Presentations from a recent Becta event on virtual worlds and games can be found here from 11 May: <http://events.becta.org.uk/display.cfm?resID=30167&page=1619>

Software and internet news

Becta at the heart of internet safety

Becta is at the heart of a government drive to improve e-safety for children. As part of a review undertaken by the Home Office Task Force for Child Protection on the Internet, Becta's existing Safe use of ICT in education group will become the education sub group of the Home Office Task Force. The group will focus on education and e-safety issues and the new sub group will report directly to the Cabinet Office, putting the issue of e-safety at the very centre of Government. The group will pull together experts from different organisations with the aim of providing a 'joined up' approach, and will offer advice to Government on e-safety issues with a particular focus on education. The group's role and remit will be two fold, firstly to offer advice on policy issues to do with the safe use of ICT in education to Government, and secondly to advise on emerging issues and trends such as educational and technological, and other related areas for example child protection, legal and criminal, that may affect the safe use of ICT in education.

As part of this work, Becta is today publishing a checklist and a guidelines publications for local authorities and Local safeguarding children boards (LSCBs) entitled 'Safeguarding children online'. These publications have been developed in consultation with a wide range of organisations, also with members of the Education sub group of the Home Secretary's Task Force on Child Protection on the Internet. The checklist document highlights potential issues and suggests appropriate action, the guidelines give full advice and guidance on the implementation of safe measures including a list of recommended resources. The documents were launched at the LSCBs event in Birmingham today, copies will be sent by post to every LSCB. The checklist and guidelines are available to download and to order via the Becta publications website:

[Safeguarding children online: a checklist for local authorities and local safeguarding children boards](#)

[Safeguarding children online: a guide for local authorities and local safeguarding children boards](#)

BBC Jam suspended

The BBC Jam service has been suspended. The BBC Digital Curriculum was announced in 2003 as a project to deliver online learning materials to pupils in the UK. It met with some concern from the commercial software market which led to a challenge being lodged with the European Commission over potential State Aid violations. The BBC was eventually allowed to proceed with the service, following certain conditions. The service was launched as BBC Jam. In March 2007 further complaints and allegations that these conditions had been broken led the BBC Trust, the governing body of the organisation, to suspend the service pending a review.

<http://news.bbc.co.uk/1/hi/education/6449619.stm>

Browsing on a smartphone or PDA

Microsoft has released the prototype of a new browser, named Deepfish, designed for portable and mobile devices. Mobile browsing, through smart phones and PDAs, has led to a growth in demand for specialist software that works on devices with limited screen size. Smartphone companies like Nokia ship their own browser software on many devices and Opera Mobile is in this market segment. Microsoft hopes that this new software, with features to intelligently navigate long and complex pages using thumbnails and a zoom feature, will increase sales of its mobile devices. There are two main approaches to designing for mobile users. The first is to code the site in a mobile-friendly way, using specialist CSS for example. The second is to put the onus on the browser software. This second approach is the one favoured by Microsoft. Deepfish is available as a download from Microsoft for Windows Mobile 5.0+ devices. Opera software has announced that downloads of Opera Mobile increased more than 50 per cent from February 2006 to February 2007. A number of education projects, such as Wolverhampton Learning2Go, use handhelds to deliver personalised computing and flexible learning to pupils. There is an active education handheld learning community with a website at <http://www.handheldlearning.co.uk>.

<http://labs.live.com/deepfish/dfblogs/>
<http://www.opera.com/products/mobile/>

Athens Authentication adopts Shibboleth

For years the Athens service has delivered a shared authentication service to further and higher education systems, as well as customers in other sectors. Athens, previously a proprietary system, has been updated with a new OpenAthens project that is based on the Shibboleth standard for authentication that has been adopted by UK education.

The UK Access Management Federation was launched in November 2006 for all education customers to share a common framework for policies and standards for resource access. In the schools sector work is led by Becta and UKERNA. A shared approach across the whole sector should encourage collaboration across the range of learners.

The release of this new service means that Further and Higher Education customers can pay Eduserv, the developer of Athens, for a compatible service rather than have to develop and run their own infrastructure. In the schools sector Becta recommend that Local Authorities or Regional Broadband Consortia provide a shared service for their users.

<http://www.athensams.net/news/2007/OpenAthens0307.aspx>

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

Multimedia accessibility tools

IBM's Worldwide Accessibility Centre has released an open source tool designed to help visually impaired users access embedded media files on the internet.

Researchers noticed that a number of popular sites, like YouTube, normally require the user to click on a soft button to play a file. Without keyboard shortcuts these video/audio files are effectively denied to visually impaired and blind users. The open source multimedia browsing accessibility tool from IBM's Tokyo Research Laboratory allows users to define keys to work within a browser to play, rewind and change the volume of multimedia files. Codenamed the A-Browser it is expected to be publicly launched later this year.

<http://www-03.ibm.com/press/us/en/pressrelease/21230.wss>

In Europe the EU has part funded a project called Robobrain that allows users to send plain text, rich text, html or Word documents by e-mail then on to Braille users. Robobrain offers a range of services that automate the translation of text documents into Braille and speech. This free service currently handles around 400 requests a day but the system is capable of around 14,000 requests.

<http://www.robobrain.org/index.htm>

Open XML Standards for Office Applications

Microsoft Office Open XML (OOXML), the file format used in Microsoft Office 2007 as a replacement for previous binary formats, has been approved as a draft international standard by the International Standards Organisation (ISO). OOXML is a packaging format, using the ZIP format, that can contain different types of file such as images, as well as other binary formats.

There is growing competition in the document format space. OOXML is backed by a range of companies including Microsoft, Canon, Intel and Toshiba. The main rival is the OASIS Open Document Format for Office Applications (ODF). This format is backed by Sun, IBM and Adobe. ODF has already been adopted by ISO in November 2006. OOXML was adopted by Ecma (a European-based standards organisation) in December 2006. It is likely that both formats will continue to be developed in parallel and many applications will include support for both.

<http://www.vnunet.com/vnunet/news/2185312/openxml-heads-iso-vote>

AJAX update

AJAX (Asynchronous JavaScript and XML) is a programming model that has emerged over the past few years to offer greater flexibility and a new generation of efficient, interactive web applications such as Google Maps (<http://maps.google.co.uk/>) and Flickr (<http://www.flickr.com/>). As with all technologies there is a staged maturity that is evidenced through the introduction of standards and work on interoperability.

Microsoft, after shipping its free ASP.Net Ajax 1.0 (<http://ajax.asp.net/>) development tool has joined Adobe, IBM and a host of other organisations in the OpenAjax Alliance. This industry group is dedicated to promoting adoption of the technology, encouraging good practice and raising the importance of interoperability between different applications. AJAX is likely to continue to offer exciting new online services and will be a core part of delivering the growth of Web 2.0 and beyond.

<http://www.openajax.org/>

Internet risk analysis

Security company McAfee has released the results of an analysis of websites across the world, based on their top level domain (TLD). This used McAfee software to rate sites as 'red', 'yellow' or 'green' based on a range of measures of safety with respect to spyware, viruses, exploits and spam.

The results of scanning some 8.5 million websites (around 95% of web traffic) show that some TLDs are significantly more risky than others. Finland .fi had the lowest percentage of 'red' and 'yellow' sites at 0.1% whilst Tokelau .tk had 10.1%. Romania and Russia have the highest percentages of 'red' sites (5.6% and 4.5% respectively) and the .gov domain used by the US government is the only TLD without any in this category. This survey provides some interesting information that could be used as part of educating users about online risks.

http://www.siteadvisor.com/studies/map_malweb_mar2007.html

Public services for children online

The UK Government has launched a version of its Directgov portal designed specifically for children. Directgovkids has information for children on the role of government and the range of public services that are available, along with supporting material for parents and teachers. The site, developed in Adobe Flash, is a bright, friendly graphically intensive exploration of different services such as the police, schools, hospitals, art gallery, town hall and fire station. Some of the site is still 'under construction' as new areas are added to the virtual world.

<http://kids.direct.gov.uk/>

Using the internet to generate interest in democracy, citizenship and local issues is important to public officials. This is also reflected in ongoing curriculum developments led by QCA. Another, smaller scale approach has been taken by Norfolk County Council. It has launched a project called Bus Stop 39 which involves schools contributing to an ongoing story, presented in the style of a blog, with links and references to council services where appropriate.

<http://www.busstop39.co.uk/>

Online Thesis Library

JISC (Joint Information Systems Committee) and CURL (Consortium of Research Libraries) have announced a new project with the British Library to make theses available online through a single portal. The EThOS (Electronic Theses Online Service) repository intends to offer researchers easy access to a wide range of research material and further encourage innovation in the UK.

Research and development is widely recognised as a catalyst for economic development and as such is a key part of the UK economy. CURL and JISC hope that by making access easier, research effectiveness will increase and a wider audience will be able to benefit. Development of the current prototype into a live service is expected to take two years.

http://www.jisc.ac.uk/whatwedo/programmes/programme_rep_pres/ethosnet_announcement_mar07

Conference report

O'Reilly emerging technology conference (ETech)

27-29 March 2007

ETech is an annual conference on Emerging Technology organised by publishers O'Reilly. In the past the event has been influential in identifying key technology trends and developments, such as the move to Web2.0. The main theme of this year's conference was 'magic'. ('Any sufficiently advanced technology is indistinguishable from magic' – Arthur C Clarke, Profiles of the Future).

Magic

The discussion was not about on-stage magicians and conjuring tricks, but a mixture of the magic found in fairy tales and the magic associated with objects and animals as discussed in anthropology.

The theme was not convincing. There were suggestions that magic might become a new metaphor for user interfaces, but the lack of coherence of the concepts (talking mirrors (Snow White), doors that open on voice commands (Ali Baba's 'Open sesame'), objects that only respond to their true owner (the Sword in the Stone)) compared to the familiar desktop metaphor, was not really discussed. This is not to say that magical metaphors may not emerge – just that it isn't clear how this would work.

The idea of a charmed object may be useful: an amulet, a talisman, with a strong association to its owner – and we can already see this to some extent with devices such as mobile phones and MP3 players. Less convincing is the suggestion of a link between magical interfaces and ubiquitous computing: which tends to be about a class of objects and how they work in relation to any user (or at least classes of user), rather than a specific object and the relation to its owner/user.

Adam Greenfield (www.v-2.org/) was appropriately sceptical. He suggested that seamlessness is a very bad idea – when Ali Baba tries to open the doors but gets the words wrong – if he doesn't know how the system works, how does he know how to fix the problem: are they the wrong words, is his tone of voice wrong, are the door motors not functioning? Greenfield would rather have 'seamfullness with beautiful seams'.

Mike Kuniavsky (www.orangecone.com/) noted that as transistor density increases and you get more computing power for your money, the older generations of technology become cheaper to the point at which it becomes affordable to put technology within everyday objects at low cost.

He suggested that the desktop metaphor doesn't work for ubiquitous computing (a term which he acknowledges hasn't settled down yet) and proposed magic as a better metaphor, particularly focusing on the idea of enchanted objects which include the following characteristics:

- everyday (pre-industrial)

- familiar
- physical
- no screen (no assumption of a bitmap or text output)
- not superhuman (we're in control of them not the other way round)

He cited current examples where magic is used as a helpful abstraction: the ambient orb (looks like a crystal ball), Nokia Medallion (a digital amulet), Wii (a wand). 'Good magic does not conceal deceive or cripple – it explains.'

Matt Webb, Schulze & Webb looked at simplification of user interfaces with an emphasis on the idea that individuals can make what they want for themselves: 'the stigma of the amateur is going'. Webb applied this to the idea of programmable 'widgets' that provide specific functionality to a complex device (e.g. a photocopier widget that alerts you when a large copy job is finished, a widget that cuts through the user interface of a washing machine and gives you a single button for the setting that you always use, Chumby <http://www.chumby.com>). The Availabot, a puppet that stands up when a particular friend is online and falls over when they aren't was particularly appealing (<http://schulzeandwebb.com/2006/availabot/>). In contrast to Kuniavsky, Webb noted that screens are cheap; things that move are expensive and hard to do.

Intelligence

A secondary theme was almost whispered. Nobody seemed to want to say the words 'Artificial Intelligence' out loud but this was clearly the idea.

Jeff Jonas, IBM Entity Analytic Solutions (www.jeffjonas.typepad.com/about.html) discussed the identification of patterns in data and queries, particularly in the context of cheating in the Las Vegas gambling industry. He talked about bringing lots of various data together that isn't necessarily obviously linked, and (what seems a powerful idea) storing data and the queries together because as well as existing data being used to answer a future query; there will be occasions when a current query that can't be answered now may be able to be answered at some point when the relevant data arrives. Even more powerfully, multiple queries may in themselves provide answers when they are associated together. As an example, after Hurricane Katrina these techniques were used to link lost (queries) and found (data) people by associating information posted in many different places.

Jeff Hawkins, Numenta (www.numenta.com/) and co-founder of Palm and Handspring, asked 'Why cant a computer be more like a brain?' so it can do some of the things that computers currently can't: visual perception, auditory perception, perception, languages, adaptive behaviours, planning, thinking.

Some argue that this is not possible because, for example, brains are too complex to understand. Hawkins argued that brains are not magic and 'complexity is a symptom of lack of understanding'.

Starting from the structure of the brain's neocortex, Hawkins described a hierarchy that 'builds a model of the world'. This theory – Hierarchical Temporal Memory

(HTM) – can also be implemented as a technology platform – based on the same structure. This platform

- creates a model of its world
- recognizes new patterns
- predicts
- generates behaviour

The system learns common spatial patterns; learns common sequences of patterns; passes sequence names up the hierarchy; and passes the predicted spatial patterns down the hierarchy, creating a hierarchical model of causes. Bayesian methods (belief propagation) are used to resolve ambiguity – to settle on the most probable explanation.

Hawkins introduced an implementation of this model, the Numenta Platform for Intelligent Computing (NuPIC) consisting of a runtime environment, development tools, and an initial set of learning algorithms and demonstrated a basic computer vision system.

A current application area for this approach might be the automotive industry however potentially there is a broad range of future application areas as the approach develops: 'anything requiring precise timing or high order temporal data'. The approach looked potentially powerful but as Hawkins emphasized, the system is in its infancy (a 'research release' was issued on 5 March 07).

Nebojsa Jojic, Microsoft Labs (www.research.microsoft.com/~jojic/epitome.htm) demonstrated analysis and manipulation software based on the concept of 'epitomes'. In the example presented, the focus was on photographic images. One image is generated that epitomises a collection of related images. The generated image, clearly has aspects of different images in the collection but is not a recognisable image itself, can then be used as an index to the original set. Selecting or changing part of the epitome will select or change a subset of the original collection. For example, from a collection of faces, the epitome could be used to select all those that are smiling. There are many other potential application areas notably those with large and complex (e.g. climate, financial) data sets.

Talks with educational relevance

Ralph Koster, Areae (www.areae.net) talked about how the design principles of games could be use to create compelling user experiences in other areas. Koster emphasized that games are based on fun and 'fun fundamentally comes from learning'.

His insights work well, particularly in relation to online experiences such as shopping, but could be equally applicable to educational applications.

- The core action has to be repeatable, allowing the user to develop skill, and grow more confident. Present different challenges and enable competition.

- Everything you did before must matter (never start an interaction with no context). Allow the user to make cumulative choices, following a decision path. What the opponent (eg a competitive bidder on eBay) did last should matter too.
- The user should be able to prepare for the encounter
- The same challenge in different locales should be different, representing a fresh scenario. The territory and topology should affect the outcome. The same action must apply in different contexts and the user should get lots of opportunity to practice (if the action is to hammer – supply lots of nails).
- Offer different tools, and the system should provide different feedback for them (it acknowledges the path from which the user has come).
- Make feedback highly visible (to everyone, not just that specific user).

The game that has only one outcome is boring (even if that outcome is success). Low risk activity for high reward is bad for fun – you need to provide challenges. Fun does not exist where there are no consequences.

Jane McGonigal, Institute for the Future (www.iff.org, www.avantgame.com) started from the perspective that by 2012, quality of life (or 'happiness') will be the primary metric for evaluating everyday technologies and that happiness has three components: pleasure, engagement, and meaning. Her talk focused on ubiquitous (alternate reality) games that make quality-of-life the central issue, through a strong link between the gaming world and the real world.

She gave examples in which the players acted as themselves, rather than playing a role, and involved large numbers of players acting collectively and solving problems in parallel. Some of the games seemed similar to the concept of flashmobs, but generally had a social purpose that could be continued after the games was over. From comments by previous players, the games appeared to have a lasting effect, months or years after the game had ended, with players identifying changes in their conception of the world.

Examples included:

- 'Ministry of Reshelving' – recategorising copies of George Orwell's 1984 in bookstores by moving them from fiction to US History or Current Affairs
- 'cruel 2 b kind' – a benevolent assassination game - firing off random acts of kindness on instructions received by mobile phone
- tombstone hold'em poker – sending players to real graveyards and playing poker based on the shapes of the gravestones (apparently welcomed by US cemeteries which are under pressure to justify the amount of land they occupy)
- 'ilovebees' - receiving calls at public payphones – and helping game characters by answering the calls
- 'world without oil' – based on the idea that oil imports stop – due to launch on 30 April 07

Danah Boyd (www.danah.org, www.zephoria.org/thoughts/) talked about different types of users and the social consequences of technology use. She offered a segmentation of the population by life stages:

- identify formation & role-seeking
- integration & coupling
- societal contribution
- reflection & storytelling

She acknowledged this may not be the right segmentation, but that some segmentation was necessary.

Boyd highlighted the variety in social networking sites and blogs: youths go to MySpace and Facebook primarily to hang out with friends, white collar workers go to LinkedIn for career purposes. Youths use blogs for friends and attention; twenty-somethings either use them for professional reasons or for friends/sex. Older folks are starting to use them for sharing with family, working through health issues, or connecting around hobbies, e.g. Modern Millie (a blog by 81-year old Mildred Garfield www.mymomsblog.blogspot.com/)

Boyd noted the issues that occur when an application that is successful with one audience is opened up to others (e.g Facebook which was very popular with college students, but then became devalued among that audience when it was opened up to high school students).

She noted that technology enables people to pursue their passions, but that passions aren't always positive (e.g. videos of fighting, self-harm). She also highlighted some of the differences in online social experiences compared with their real-world counterparts:

- persistence
- searchability
- replicability
- invisible audiences

Social conventions such as the rules of privacy are changed in the online world. In the future, the additional availability of location data will add to this complexity. This was an engaging talk that was really only able to skim the surface of a complex issue.

Matthew Maclaurin, Microsoft Labs

(www.research.microsoft.com/aboutmsr/techfest/demos.aspx www.spaces.live.com/mattmac) demonstrated Boku, an application in development that tries to offer children a compelling first experience of programming computers and an insight into what they might be for.

The application takes a similar approach to logo of programming objects (in this case virtual ones) to move and interact with their environment and other objects. The application takes a visual programming approach with high level semantics, no typing (the input device is a game controller) and fast turnaround.

Simple characters are located on an island and have challenges. Characters have senses and obey rules set by the user (multiple rules run simultaneously and may conflict). The application was very engaging (for the conference audience at least) and looks very promising. The next step is to trial the application with children in schools. It is not clear how or when the application will be released publicly.

Talks with relevance to developers

Werner Vogels, Amazon promoted what he described as 'web-scale computing' allowing developers to concentrate on what makes their product great and leave the 'heavy lifting' to a range of connected Amazon services that both take away the burden of the resources, provide high reliability and allow for rapid scaling up (and down) when necessary. Services are sold on a pay-as-you-go basis for compute time, messaging, and storage at low prices (e.g. Compute time at \$0.10/server-hour). A range of images (essentially a set of server applications) is available and a community of users (such as Alexa, GigaVox Media and intermediate service provider RightScale) has started to define a number of image definitions that others could use. See aws.amazon.com for more details and the related paper: 'Emerging models for mobilizing resources' (www.johnhagel.com/paper_pushpull.pdf).

Ed Rowe, Adobe (www.adobe.com/go/apollo) presented Apollo, a software platform that provides a link between the functionality of a web-based application and that of a desktop application. The Apollo runtime is a free one-off download which acts as an intermediate layer between Apollo applications and the Operating System (so Apollo applications are OS-independent in the same way web-based applications are). Apollo is based on Flash and HTML (and integrates their respective scripting languages).

Providing features typical of desktop applications means that the application

- can persist when the browser is closed or the internet connection is broken
- has access to the file structures, data and other applications running on the client computer (so for example an Apollo application could take all the address data from a user's contacts list (the desktop side) and display their locations on Google Maps (the web side)).

Apollo (the name is preliminary, and may change) is currently in an alpha pre-release and is expected to ship in the second half of 2007.

Pasha Sadri and Jonathan Trevor, Yahoo! (pipes.yahoo.com) demonstrated Pipes, a free online service that is designed to make Mash Ups easier to create. A visual editor is used to remix data from different Web applications. Pipes is aimed at 'the top 10%' of Web 2.0 users, with the intention that end users will benefit indirectly – so it assumes prior knowledge (particularly, I think, of the parameters that can be passed between the applications). Pipe scripts can be edited through a 'view source' facility. Trevor acknowledged a number of challenges including achieving the right balance between ease of use v. power; discovery (how do you find relevant Pipes or applications/feeds that are relevant to your Pipes), and authentication. Examples of

Pipes in use include: [last.fm](#) , [mr.speaker](#), [babblers](#) (language translation of chat in Second Life).

Other talks

Tessa Lau, IBM demonstrated '[Koala](#)' designed to simplify Web interactions that are either repetitive or complex/ difficult to remember. The software learns the interaction from a demonstration by the user and generates a script that can be repeated. Scripts are displayed as they are generated and can be edited. There was discussion of security issues such as what information gets recorded in a script and how you stop someone running malicious scripts. The application is not publicly available and it is not clear when or how this might happen. One interesting possible application is the ability for a user to document the process of arriving at a software bug.

Tom Loosemore, BBC 2.0 Project ([backstage.bbc.co.uk](#)) talked about the opportunities and difficulties in making television archives available on the Web. He discussed the problems of releasing the back catalogue (lots of issues with rights holders, the need for political will), but offered a technical solution for forward archiving by automating the capture of programmes and metadata that is broadcast over Freeview. A proof of concept system, Pandora was set up with access for BBC internal staff only.

Tom suggested that the main technical barrier to such a system being realised is the amount of storage required and he proposed a storage area network, based on peer-to-peer principles. Each 'Impossibox' starts filling with content from one Freeview channel until it is full and tells a tracker server what it's got. That content is then available for retrieval. This was a really interesting alternative viewpoint to the current proposals for 7-day access to programmes following broadcast, but is a long way from becoming a reality. The BBC is currently trialling video on demand services.

Forrest Higgs ([www.reprap.org](#), [www.3Dreplicators.com](#)) discussed the opportunities presented by low-cost 3D printers. The science fiction aspect of this talk (a machine that can replicate itself) was intriguing, but there also seemed to be a number of practical uses for a machine that can make 3D objects using extruded plastic. Applications include rapid prototyping, small volume production, and use for teaching within D&T (Higgs noted the relative safety compared with a metalworking or woodworking shop). He suggested that a machine could be built for \$400, with plastic raw material at \$4/lb. See also the recent Guardian article 'The 'fab' machine that could spark an industrial revolution'
<http://technology.guardian.co.uk/online/insideit/story/0,,2044800,00.html>

See <http://conferences.oreillyn.com/pub/w/52/news.html> for other coverage of the conference.

Conference report by Theo Wright, Becta

TechNews Information

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