

C H A P T E R 1

ICT exposed

The following chapter looks at the many facets of ICT (a glossary of terms can be found in Appendix A). This includes an overview of the components of a personal computer, computer network and general IT equipment found within the school environment. The software used within primary education is discussed in Part B. And, of course, an overview of ICT in the twenty-first century would not be complete without considering the Internet and the many features it brings. As well as the positive impact the Internet has on our lives, the useful 'Internet dos and don'ts' on page XX provides a reminder of the inherent dangers of the Internet and the steps that can be taken to keep children safe.

What exactly is ICT?

ICT stands for Information and Communication Technology and is not dissimilar to IT, Information Technology. The communication part was added relatively recently and has been adopted by educational establishments. Within industry and the corporate world it is still usually referred to as IT. There are literally thousands of definitions for IT and ICT but in the simplest form, IT can be defined as 'the technology used to manage information' and ICT defined as 'the technology used to manage information and aid communication'. In practice the two terms are interchangeable and refer to devices such as video recorders, telephones, calculators, electronic cash tills as well as computers.

In the context of the primary school classroom, ICT usually comprises:

- ❑ Computers (personal computers – PCs)
- ❑ Laptop computers
- ❑ Computer network
- ❑ Printers
- ❑ Scanners
- ❑ Video and DVD players

- ❑ Digital cameras (still and video)
- ❑ Voice recorders (tape and CD)
- ❑ Interactive whiteboards.

The following sections provide a brief overview of each of the listed technologies suggesting how they may be utilised in the classroom setting.

Computers

Although computers are just one type of technology it is true to say that they do make up the majority of a school's ICT equipment. A computer, often referred to as a personal computer or PC, is made up of a number of components. It will usually include the system unit, a screen (visual display unit – VDU), a keyboard, a disk or compact disc (CD) drive and a mouse. To be correct, the computer is really just the devices held within the casing of the system unit. The system unit houses the central processing unit (CPU), the part that does all the work, the 'brain' of the computer and storage units that hold information while being processed or waiting to be processed. The other devices – screen, keyboard, mouse, etc. – are needed to get information into and out of the computer. These 'add-on' devices are sometimes referred to as peripherals (devices that are on the periphery or perimeter).

Sometimes a PC will have additional peripherals such as a printer, scanner, speakers or digital camera. The devices that are used to put information into the computer such as the keyboard, the mouse or scanner are referred to as input devices. Devices that are used to get information out of the computer, for example a printer or speakers, are known as output devices. Some devices such as disk drives and CD or DVD (digital video/versatile disc) drives can be both input and output devices. Information can be loaded into the computer from a disk, CD or DVD and it can also be copied back onto the disk, CD or DVD at the end of a session (if the CD or DVD are read/write, meaning that they can be read and written to). Disk, CD and DVD drives are often built into the system unit as they are integral parts of the PC.

Collectively, the devices that 'make up' a PC are often referred to as computer hardware.

Schools vary in the way they utilise their computers. Some distribute the PCs throughout the school, placing a few in each classroom, whereas others set up an ICT suite. Depending on the quantity of PCs available, there may be scope for having both an ICT suite and PCs available in some or all classrooms.

In most schools PCs will also be found in the general office, library and the offices of staff with management responsibility.

Laptop computers

A laptop computer (sometimes referred to as a portable computer) is a compact device where the system unit and peripherals such as the screen, keyboard, mouse, speakers, disk, CD and DVD drives are all housed within the same unit. A laptop computer is lightweight and portable and ideal for those working in a number of locations.

It is the government's aim to ensure that all teachers are equipped with a laptop computer by 2006. The rationale is the expectation that teachers will use the laptop both at school and at home, increasing their experience and expertise. The laptop can also be used as a teaching aid in the classroom for one-to-one demonstration or linked to an interactive whiteboard for class sessions.

Computer network

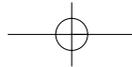
A computer network is a number of computers linked together using cables. The main reason for linking PCs together is so that they can share resources. For example, individual PCs each need their own printer whereas a network of several computers can share the one printer. Networked computers can also share computer programs. Rather than loading the computer program (software) onto a number of individual PCs it can be loaded onto a special computer known as a network server. All the machines in the network can then access the software from the server.

Primary schools use network technology to enable them to share hardware and software as well as providing the opportunity for a number of children to access external resources concurrently. A school's network will usually be linked to the Internet and the Local Education Authority (LEA)'s intranet facilities.

Printers

Printers are used to produce a paper copy (hardcopy) of work created using the computer. This could, for instance, be a printout of a typed document, a picture, a photograph or a graph. There are different types of printers providing a range of quality and speed. The most popular types of printer are the laser and inkjet printers.

The laser printer uses a laser to produce an image on a rotating drum. The image is then transferred to paper by using an electric charge to deposit toner. Some new models of laser printer also serve as scanners, faxes and copiers.



One of the most affordable printers available today is the inkjet printer. In simple terms this printer works by placing small drops of ink onto the paper. The ink is transferred through nozzles that spray the ink directly onto the paper.

Within the classroom, printers are often used to produce a paper record of children's work, either for classroom displays or assessment.

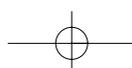
Scanners

A scanner (flatbed scanner) is a device that converts visual information into digital data. The image is transferred to the computer where editing software provides the capability to alter the scanned information. Images can be manipulated in many ways; they can be resized, cropped, the colours changed, text can be added and the quality of the image can be enhanced. Text documents can also be scanned and then edited using Optical Character Recognition (OCR) software. Scanner prices now start at well under £50 for a bottom-of-the-range model making them affordable for school and home use.

Within a primary school a scanner can be used to scan children's work such as paintings, drawings and examples of handwriting. These can then form part of computerised documents such as reports or newsletters. The scanned work can also be included within web pages on the school's website or e-mailed to parents and carers.

Film and voice technologies

ICT provides the opportunity for children to experiment with a whole range of equipment including video and DVD players, digital cameras and voice recorders. Technology develops at a rapid pace and with each new advance the cost of the previous model falls substantially. Modern technologies are now an affordable option both in the home and at school. In the main, the DVD has superseded video, and traditional cameras are now being outsold by the digital variety. These new technologies have been designed to integrate with computer technology: digital photos can be loaded from the camera directly to the computer where they can be enhanced, manipulated and then sent to a printer; DVDs can be played via a DVD drive located in the system unit of the computer and watched on the computer screen. Computer's can also be used to record voice and music.



The opportunities for using these technologies within the classroom are endless. Children as young as three can operate a digital camera and with help can print the photo. Older children will gain immense enjoyment through using video cameras and voice-recording equipment to record events and performances. When planning lessons it is so important to remember that ICT isn't just about computers.

Interactive whiteboards

Interactive (or electronic) whiteboards (IWBs) are the most recent addition to the primary classroom. In simple terms an interactive whiteboard is an erasable writing surface that interacts with a computer to capture writing electronically and enable interaction with a projected computer image. In order to work, the whiteboard needs to be attached to a multimedia projector and a computer. The multimedia projector connects to the VDU socket of the computer and projects the computer's image onto the interactive whiteboard. The interactive whiteboard then connects via a cable into the mouse socket of the computer and can be positioned at the front of the classroom so that all children have a clear view.

Interactive whiteboards work by either using a special pen or by finger touch. As the pen or finger is moved across the whiteboard the mouse cursor follows. Tapping the screen twice with a finger provides the same action as double-clicking the mouse. These finger touch whiteboards are ideal for primary schools where even the youngest children can move their finger across the whiteboard and interact with the computer program.

An interactive whiteboard comes with software that enables it to be used as a copyboard. Teachers and children can write or draw on the whiteboard with their finger or the pens provided and save the image to the computer. These images can then be printed or e-mailed. The software that comes with interactive whiteboards also has built-in OCR. This means that the computer will recognise the handwriting on the whiteboard and turn it into computer text.

A recent report from the University of Newcastle (Embedding ICT, 2005) concluded that the introduction of IWBs has had a real impact on the primary classroom. The response from both the teachers and the pupils involved in the project was overwhelmingly positive. Most (if not all) schools now have at least one IWB with some schools installing them in every classroom. In the main, teachers and children have readily adapted to this new technology, realising the benefits that electronic whiteboards can bring to a classroom session. Training sessions for teachers has greatly helped with the integration, providing the skills to operate the boards as well identifying potential uses such as:

- writing over the top of displayed information to highlight and annotate points
- surfing the Internet and displaying websites which the entire class are able to see

- ❑ enabling children to add their contribution to the discussion by writing directly on the whiteboard
- ❑ demonstrating ICT work before the children move to the ICT suite for a session
- ❑ displaying movie files or DVDs from the PC.

The Internet

The Internet has had a huge impact on teaching, providing access to information and resources. Conceived in the USA in the late 1960s, the Internet has grown to be a vast, worldwide network of computers that are linked together, providing a means of communicating and sharing information. Until quite recently most of the information was in plain text with reams of programming code in between. In 1989 Tim Berners-Lee came up with the idea of linking pages of information, making it easy to jump to a document of interest. It wasn't long before businesses began to make software to present these pages and the links between them in an attractive way that was easy to use; this was the beginning of the World Wide Web.

It is estimated that about 30 million people in the UK and about 600 million worldwide now use the Internet to search for information and send e-mails. The World Wide Web is the part of the Internet that most people use. It is made up of billions of linked web pages that contain pictures, text, sounds and animations. The Internet has many uses; here are some of the more popular applications:

- ❑ Keeping in touch with friends and family around the world using e-mail.
- ❑ Copying files to a PC (downloading music and video files).
- ❑ Keeping up to date with the latest news from around the world.
- ❑ Accessing the billions of pages of information held on the World Wide Web.
- ❑ Searching for bargains and buying goods and services.
- ❑ Creating websites.

No one owns the Internet as such. Some large organisations own the computers and cables that make up the Internet but no single person owns all the information stored in the web pages. Equally, anyone can put information on the Internet and that is why there are billions of pages available. No one checks that the information on the Internet is correct or true so it is important to always double check facts by looking at more than one website or cross-checking using books or other sources of information.

Connecting to the Internet

Connecting to the Internet is known as going online. Going online requires a computer, a means of physically connecting to the Internet and the services of an Internet Services Provider (ISP) to enable access to the many networks that make up the Internet.

Computers can be physically connected to the Internet in a number of ways, the most popular method being via a telephone line (dial-up). Because computers and telephone lines generally don't speak the same language, a special piece of equipment is needed to do this. This equipment is called a modulator demodulator (MODEM). Computers store information as a sequence of digits 1 and 0 (digital format) and this needs to be converted to electrical voltages (analogue format) before it travels down the telephone line. It then needs to be converted back into digital format at the other end so that the receiving computer can read it. Most computers these days come with a built-in MODEM and are referred to as 'Internet ready'.

Connecting to the Internet using a MODEM can be slow and there is the added inconvenience of not being able to use the telephone to make or receive calls at the same time. Because of these problems, people are moving to Broadband, a high-speed Internet connection, typically ten times faster than dial-up Internet. With Broadband, information is transferred at a fast rate and the telephone can still be used when online. When speaking on the phone only a small part of the capacity of the telephone cable or line is used; Broadband technologies make use of this spare capacity.

Once physically connected to the Internet it is necessary to invest in the services of an ISP. Broadly speaking, ISPs invest in and manage extensive computer networks and provide links to networks across the world. The costs and services on offer can differ but in general an ISP provides access to the World Wide Web, use of e-mail, space for a website and access to news-groups and chatrooms.

For further information on accessing the World Wide Web and e-mail, see Chapter 4.

Using the Internet in school

Computers and the Internet are now a part of children's everyday life and while the Internet is undoubtedly of great use to children, it also has a darker side. There are two main sources of danger to children: they could come across unsuitable sites while surfing the Internet, and/or they could 'meet' undesirable characters through e-mail contact or in chatrooms.

A chatroom is a collection of people sending messages to each other via the Internet. The conversations happen in 'real time' so, unlike e-mail, there is no time delay before getting a response to a message. It is widely acknowledged that some adult sexual predators use chatrooms to 'groom' young people and attempt to arrange face-to-face meetings. It is important to educate children, from an early age, about safe online practices. The Net Smart rules set out by the NCH (formally known as the National Children's Home) can provide a good starting point for talking about the potential dangers. There are five things that a child should never do and six things that he or she should always do (see opposite for a photocopiable list of these Internet 'dos and don'ts').

Internet dos and don'ts

- × Never tell anyone you meet on the Internet your home address, your telephone number or your school's name, unless your parent or carer specifically gives you permission.
- × Never send anyone your picture, credit-card or bank details, without first checking with your parent or carer.
- × Never arrange to meet anyone unless your parent or carer goes with you and you meet in a public place. People you contact online are not always who they seem, even people who become pen friends or 'keypals'. People don't always tell the truth online – no one can see them.
- × Never open attachments to e-mails unless they come from someone you already know and trust. They could contain viruses or other programs which would destroy all the information and software on your computer.
- × Never respond to nasty or suggestive messages. Always tell your parent or carer if you get such messages or if you see rude pictures while online and report them to your Internet Service Provider.
- ✓ Always keep your password to yourself, do not share it with anyone.
- ✓ Always check with your parent or carer that it is okay to be in a chatroom.
- ✓ Always be very careful in chatrooms. Even if a chatroom says it is only for children, there's no way at the moment to tell if everyone there really is a child. It might be an adult or an older child trying to trick you.
- ✓ Always get out of a chatroom if someone says or writes something which makes you feel uncomfortable or worried. Make sure you tell your parent or carer.
- ✓ Always be yourself and do not pretend to be anyone or anything you are not.
- ✓ Always stay away from sites that say they are for people over 18 only. The warnings are there to protect you. Adult sites can sometimes cost a lot more on your phone bill too.

Search engines and filters for children

Educational networks usually include filters to make sure that unsuitable information cannot be accessed within the school environment however children will use the Internet in other locations and it is important to ensure that they are aware of search facilities that do afford some degree of protection. Search engines such as Google, Yahoo and MSN do not censor information although they do aim to block pages that contain text or images that are illegal. Search engines specifically designed for children, however, do filter out web pages considered to be unsuitable for a child either due to the nature or the complexity of the material. This can afford a degree of protection but the choice of search engine cannot be monitored if a child is surfing the Net unsupervised.

The more popular search engines for children are probably Yahoooligans, Ask for Kids and KidsClick! These are all suitable for younger children although they can be restrictive. For more information on using search engines, see Chapter 4.

The next level of protection is the Internet Filter. Filtering software controls the sites that can be accessed regardless of the search engine used. The majority of filters use a combination of methods to prevent access to objectionable material, including using a list of banned sites, banning sites that contain specified keywords and blocking pages that contain barred words or phrases. Filters such as AOL and Net Nanny have received a great deal of publicity through television advertising campaigns.

References and useful websites



Embedding ICT, 2005 – *Embedding ICT in the Literacy and Numeracy Strategies*, April 2005, University of Newcastle – report of the effectiveness of electronic whiteboards:

www.becta.org.uk/page-documents/research/univ-newcastle-evaluation-whiteboards.pdf

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| AOL | www.aol.com |
| Ask for Kids | www.askforkids.com |
| KidsClick! | www.kidsclick.com |
| NCH | www.nchafc.org.uk |
| Net Nanny | www.netnanny.com |
| Yahoooligans | www.yahoooligans.yahoo.com |