

Technical guide: guidance for consultants

These guidance notes are intended to assist consultants in giving advice about some of the technical issues that arise in schools. Consultants are not expected to operate as ICT technicians or network managers, nor to offer advice on specific software. However, where pupils are prevented from accessing the full ICT entitlement through inadequate management of ICT resources, consultants must be prepared to help schools resolve the issues.

In some schools, a lack of particular hardware or software prevents pupils from accessing certain aspects of the programme of study; to use sound, for example, pupils will require speakers, headphones and microphones and sound cards fitted to the computers. In these schools, you will need to be sensitive to the way in which the school organises its funding and its relationship to your LEA. Where possible avoid discussion of finances but make sure you understand how your LEA has allocated ICT-specific funds such as Standards Fund allocations for National Grid for Learning (NGfL) or Regional Broadband Consortia (RBC).

In other schools, rules and policies on ICT resources restrict pupil access to the ICT curriculum. These often arise from a low expectation of what pupils can do and an inappropriate reliance on a business model of ICT resource management. For example, it is not uncommon for pupil access to software features such as macros to be restricted because of the perceived dangers to the network. In these schools you will need to be particularly sensitive to the relationship between the school's senior management, head of ICT and network manager/technician. You may need to remind schools that managing user behaviour is as important as implementing a technical solution in maintaining ICT resources, and that access to the curriculum is of paramount importance.

In other schools, lack of resources and technical implications are used as excuses to avoid certain areas of the curriculum. This situation often arises where ICT is perceived as a mechanism to deliver key skills or to service other areas of the curriculum. Consequently, there is no reason to extend ICT usage into, for example, multimedia applications. You will need to remind these schools of the requirements to deliver full pupil entitlement. In addition you will also need to suggest a variety of means to overcome their technical problems.

In the following section you will find a discussion of the most common technical issues and a number of possible solutions. The list is not exhaustive, nor are the solutions the only ones possible. The section has been arranged in three parts: software applications, using peripherals and infrastructure.

Software applications

Consultants should encourage schools to consider the suitability of the software they use. A wide variety of software is used in schools and it is essential that the software does not unnecessarily restrict pupils' access to the curriculum.

Suggest that schools conduct a software audit matched to the requirements of the sample teaching units. Such an audit is likely to identify staff training requirements as well. Software should include the required features but not be overly complex.

For example, manipulating a photograph may only require a feature such as **crop** or **sharpen**. It can often be achieved by using the basic software which comes with the camera.

Note that in the training units and sample teaching units, certain software packages have been used to demonstrate specific points. These are examples only and choices may be modified to suit local schools.

Installation

Software tends to offer a range of options on installation. Schools should ensure that all required components are installed and are accessible by the user.

Clip art

Many activities require pupils to make a reasoned choice of image, sound and/or video. Schools should check that the range of clip art, sound and video is sufficient to enable pupils to take part in the activities. Schools will usually need to supplement the clip art that is supplied with their software.

Copyright

Schools need to be aware of the issues surrounding copyright. All software, including shareware or other applications downloaded from the Internet, should be properly licensed.

Teachers and pupils will also need to be made aware of copyright restrictions or limitations on text, images or other media downloaded from web pages or scanned into a computer. Information about copyright for materials published on the Internet can be difficult to find. If in doubt, schools should seek advice from the webmaster of a site; this can usually be done by e-mail.

Using peripherals

Classroom management

Most schools have a limited number of devices to capture images, sound and video. To ensure that all pupils have opportunities to capture and manipulate images, video and audio, schools will need to monitor and manage pupils' access to the equipment.

Encourage schools to consider the location of multimedia computers. Siting of equipment is crucial in allowing access by pupils and to avoid bottlenecks. This can be achieved by:

- clustering computers in one area for a pupil carousel;
- alternating computers around the room.

Many difficulties occur when external peripherals must be connected to the computer to allow data to be downloaded. Encourage schools to select equipment that uses a USB or FireWire port. This will prevent the need to reboot the computer. It is also beneficial to use a computer with the relevant port on the front rather than the back.

Ask schools to consider the amount of technical instruction pupils require to operate peripherals. They should consider the experiences pupils bring to the lesson: many will already be familiar with using cameras, for example.

For pupils who need instruction, suggest using:

- teaching assistants, other adults or network technicians;
- other pupils to peer tutor, either in the same group or, perhaps, the sixth form;
- step-by-step guides;
- less complex equipment.

Where resources are limited, suggest using a carousel system over a number of lessons, possibly covering a number of units. For example, *sample teaching units 7.1, 7.2 and 7.3* offer opportunities for using images, sound and video. Encourage schools to be proactive in monitoring pupils' experience of using sound and video.

Capturing images

Cameras

For most applications, high-resolution images are not required so VGA resolution is sufficient. Suggest to schools that when buying cameras, it may be preferable to buy a number of low-resolution models rather than one with a high specification.

Encourage schools to think about how the image will get from the camera to the computer. Cameras from which the images can be removed may be brought into use more quickly. Schools should consider the use of:

- cameras that save to floppy disc or CD;
- cameras that save to removable media such as smart cards, ensuring that sufficient card readers are attached and accessible.

Cameras that need cables should be avoided where possible.

Scanners

Where there are few scanners on the network, schools may find it easier to scan an image as a separate file rather than scanning directly into an application (for example via TWAIN).

Scanning can be made easier if schools:

- Set up a number of scanners on several computers. Cheaper scanners provide adequate image quality for most uses.
- Use scanners with one button operation. This will load and run the specialised software automatically.
- Set the default folder to a shared area. This will avoid each user logging on separately to scan as they can pick up their image from the common folder.

Advise schools that the software supplied with a scanner is as important as the image quality. They should ensure that the user can easily adjust the dpi and colour depth to modify image size and that the software is able to output a vector graphic from a line drawing.

Capturing audio

Sound cards

Capturing and manipulating sound requires the computer to have a sound card installed. Suggest that schools install the ports on the front of the computer and ensure that there are at least three ports: line in, line out and microphone. Sound

cards may also have other ports, such as MIDI in and MIDI out. Suggest that the subject leader liaises with other departments, for example, the music department, to see whether they will also require them in their teaching.

Encourage schools to think about how to organise the pupils when using sound. They should consider:

- using headphones (think about hygiene);
- using speakers (if they are powered speakers, have they enough power sockets?);
- using unidirectional microphones.

Software

Software for the capture and manipulation of sound, should allow the user to:

- edit – copy, cut and paste segments of sound;
- layer – handle one, two or more sound files at a time;
- sample – use a range of sampling frequencies;
- save in a variety of formats.

Capturing video

Cameras

Encourage schools to use webcams as video capture devices. These are inexpensive and most use a USB connection. The majority of video-capturing activities can be carried out using a simple webcam in the classroom. If required, a webcam can be attached to a laptop to carry out video capture in remote locations. If schools wish to use camcorders, ask them to consider how they will be used, by whom and how the images will be downloaded into the computer.

Software

Software to manipulate video, should allow the user to:

- edit – copy, cut and paste segments of video and audio;
- layer audio – add, remove and amend audio over the video;
- sample – use a range of image size and frame rate;
- output in a range of video formats (e.g. avi, mpg, QuickTime).

Before using video with pupils schools should ensure that they understand the technical difficulties. Because of the volume of data that must be processed, video places considerable demands on computers and the network infrastructure.

Encourage them to test thoroughly to ensure that the video hardware and software are compatible with the audio applications and the operating system.

Infrastructure

Schools need to ensure that their computer equipment is capable of carrying out the full range of activities within the National Curriculum. Encourage schools to think about how they will achieve this. Suggest:

- adjusting allocation of rooms and timetabling;
- upgrading or replacing computers.

For example, in a school that has several computer rooms but only one that is equipped with computers capable of handling audio, with careful timetabling arrangements or a class carousel, all Year 7 classes will be able to use audio.

Computer room

A feature of the Key Stage 3 Strategy is whole-class interactive teaching. The ability to display pupils' work or demonstrate techniques to the whole class is essential. Schools will need to consider how this can be achieved within their own computer room; for example, a data projector connected to a computer can be very useful. Encourage schools also to think about how they create space for work away from the computers. It may be possible to rearrange a computer room or use adjacent areas.

File sharing

The necessity for users to share files and access prepared files is a requirement for both the teaching and training units. A common file-share enables users to save and collect files across the network. This can be done in a variety of ways. Suggest that:

- all pupils can use the same user name to log on;
- permissions are set to a folder on the network allowing read, write and change.

You should encourage schools to recognise that pupils will need to create, change and delete files and that a common file-share area may require monitoring. Suggest that they may need to address explicitly their expectations of pupil behaviour in such a system. It would be helpful to develop 'rules' to ensure that the system is not abused, and a system to ensure that common areas are monitored.

Prepared files

It is essential that pupils are able to load prepared files. Suggest to schools that they follow these procedures.

- Set a folder with read-only access for pupils but read/write access for staff and/or the network technicians. This enables files to be stored and accessed but not changed by pupils.
- Set up a common templates folder with appropriate access. This enables easier access to files from within applications.

You may need to discuss with schools how they will manage this facility. Schools will need to decide whether members of staff should be able to upload files directly or whether this is best managed through a network manager. Allowing staff to save files directly removes administrative delays but does require staff to be technically aware and competent.

Bandwidth

Some of the activities described in the teaching units may generate files that are larger than many schools are accustomed to and this may have an impact on the network infrastructure. Saving video files back to the server, for example, may expose bottlenecks in the network which will require active management.

You might suggest that, as a short-term measure, schools adjust the timings of some activities to prevent all the retrieval and saving of these files from being clustered around the beginning and end of the lesson. Suggest that, in the longer term, they consider moving computers used for video and audio to another network segment to ease traffic across the whole network, especially if this can be done with switches rather than hubs or by upgrading parts of the network.

Network storage

Larger file size will have a considerable impact on disc space. Schools will need to manage both the physical disc space available and the file-saving habits of pupils and staff. Suggest that schools encourage their users to retain incremental versions of their work as it develops, but to delete files that they no longer need. This can result in a substantial demand for disc space for each user. Schools will need to manage this demand. You might suggest these procedures.

- Use a fixed disc space allocation. This places the onus on the user to monitor the size of their saved files, and the teaching programme will need to take account of this to ensure that users understand and follow the procedures.
- Monitor total disc space used and provide variable allocations per user. This places the onus on the network manager to monitor usage.
- Monitor total disc space used and allow users to save files as and when required. This places the onus on the network manager to monitor free disc space and notify heavy users when necessary.
- Archive pupils' work at the end of each teaching unit rather than at the end of each term or year.
- Add more hard discs.
- Compress server disc space.

Further advice and guidance

Where possible, consultants should avoid discussion with schools about particular pieces of software, technical know-how and configuration issues. Always refer schools to the appropriate support body, either their own managed service provision or the LEA support system.

The following websites offer advice on a variety of technical issues of which schools should be aware.

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

BECTa publishes a wide range of information sheets that are updated regularly.

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

This site is run by BECTa to provide advice on a wide range of technical issues.

<http://www.ngfl.gov.uk>

The National Grid for Learning site offers a wide range of services including advice on school websites.

<http://safety.ngfl.gov.uk/schools/>

This site is specifically concerned with safety on the Internet.