Working with Computers

NUT HEALTH & SAFETY BRIEFING

●●

This briefing gives guidance on health and safety precautions for teachers and pupils working with information & communications technology (ICT) equipment, including computers, keyboards, display screens or visual display units, laptops and printers.

Many schools have dedicated ICT suites, while others locate all or some of their computers in ordinary classrooms. Whatever a school's ICT strategy, the equipment should be safe and comfortable for both staff and pupils to use.

The briefing is divided into 6 main sections, each examining a particular area of concern.

1. *What the law says.*
2. *Teachers' Duties and Responsibilities.*
3. *Good workstation ergonomics for Teachers and Pupils.*
4. *Safety Issues in Computer Suites.*
5. *Safety issues in the Classroom.*
6. *Health and Safety Hazards.*
7. *ICT Equipment Checklist for Safety Representatives.*
8. *Appendix A:The Legal Framework.*

What the Law Says

The law makes employers responsible for ensuring the health and safety of those affected by their undertaking. In schools this means that teachers, non-teaching staff and pupils are all entitled to see that proper precautions are taken to ensure their safety. The law also assists school employees by giving their trade union safety representatives rights to information and consultation.

General legal obligations on health and safety are set out in the Health and Safety at Work etc Act 1974. Specific legal standards for computer safety are set out in the Health and Safety (Display Screen Equipment) Regulations 1992, known as the "DSE Regulations". These standards apply automatically only to those employees who fall within the Regulations' legal definition of "users" (i.e. those who habitually use screens as a significant part of their normal work). The NUT's position, however, is that education employers should follow the standards set out in the DSE Regulations at all times. There should be no arguments about who is specifically covered by the Regulations and who may not be. All teachers, non-teaching staff and pupils should be entitled to this level of protection.

Detailed information on the legal framework governing ICT use is set out in Appendix A.

Teachers' Duties and Responsibilities

Teachers, like all employees, are required by law to take reasonable care for the health and safety of themselves and others, including pupils, and to co-operate with the employer by following the rules and procedures laid down for health and safety.

Teachers supervising lessons using IT equipment must therefore follow safety guidelines for correct use of equipment and also ensure that they are followed by pupils. It is extremely unlikely that teachers could be held to be legally responsible for any injury arising from misuse of ICT equipment provided that they had sought to ensure that proper procedures are followed. In any event, even where a teacher has failed to fulfil the duty of care, it is the employer who bears "vicarious liability".

Where schools allow teachers to make use of school laptop computers at home, the NUT regards it to be the school's responsibility to ensure that this equipment is appropriately insured. Teachers should not be expected to bear the cost of insurance or of loss or damage to laptops used at home.

Good Workstation Ergonomics for Teachers and Pupils

One of the most critical factors affecting the health of computer users is the design and layout of the workstation. A badly arranged workstation can lead to the adoption of a bad working posture with consequent back pains, neck pains as well as the risk of serious repetition injuries such as tenosynovitis and carpal tunnel syndrome or visual poblems. Ergonomics is about ensuring a good 'fit' between people and the equipment they use. Clearly the likelihood of pupils or staff suffering health problems linked to computer use is related to the amount of time spent using them.

The most important factor in workstation design is adjustabilty. This is particularly important in schools because a wide range of users of different sizes and shapes will be using the equipment. Choosing equipment on the basis of price alone will almost always be a false economy.

As well as the equipment being adjustable, users must know how to make the necessary adjustments. The adjustments should be easy to make and it should be possible to make the most common adjustments from the working position.

Particular problems are likely to arise in infant schools where pupil desk heights and chair sizes will not be adaptable to suit adults. Teachers should always ensure that, as a minimum they sit on a chair designed for an adult when working with a very young child.

Set out below is advice on the features of workstations which require particular attention in schools.

Keyboard

A comfortable keying position must be achieved for all users who must not be either hunched over the keyboard or having to stretch out to reach it. It may be necessary to push the display screen further back to create more room for the keyboard, hands and wrists. It is important to keep wrists straight when keying, and not overstretch the fingers.

Mouse

Most devices are best placed right beside the keyboard. Users should be encouraged to relax their arm and keep their wrist straight. Smaller pupils should not have to stretch their arm across the desk to reach the mouse. Very young pupils may need a mouse designed to fit a

child's hand. Left-handed users are likely to find a left-handed mouse more comfortable to use so these should be made available on request.

Chair

It is important that the chair is adjustable to accommodate a wide range of heights. To have forearms in the correct keying position, a short user will have to raise the chair height. The seat back should have a height and tilt adjustment, a seat height adjustment, a swivel mechanism and castors or gliders. Teachers and pupils must be made aware of how to carry out the adjustments necessary. The user should have a staight back, suppored by the chair with relaxed shoulders. Feet should rest flat on the floor. If they don't, a foot rest will be needed. Chairs with arms can cause problems since they can prevent the user getting close enough to the equipment comfortably.

Display Screens

Users need to be able to swivel and tilt the screen into a comfortable position. Whatever position is chosen by the user, the screen needs to be free from glare and reflections. This can be achieved by moving the screen, or even the desk and/or shielding the screen from the source of reflection through use of blinds.

Document Holders

The document holder should be positioned to minimise neck movement for users.

Desk

It is desirable to use desks which are adjustable in height, preferably with a separate keyboard area which is also height-adjustable. This will enable each operator to achieve an optimal combination of screen and keyboard. If there is no alternative to a fixed height desk, the adjustability of the other workstation elements, particularly the chair, is of even greater importance.

Pupils with Special Educational Needs

It is important to ensure that workstations are desiged to meet the needs of all pupils and staff, including those with disabilities. LEA advisory staff, physiotherapists and specialist teachers may be able to provide advice during the planning and designing stage.

Safety Issues in the ICT Suite

Although the following advice would apply to all computer use in schools, given the amount of computer equipment in an ICT suite and the length of time that staff and pupils will spend there, it is particularly applicable to ICT suites.

Lighting

Levels of lighting should be slightly lower than lighting recommendations for standard classrooms so that there is appropriate contrast between screen and background environment. 'Category 2' lighting is the standard recommendation for ICT suites.

Reflection and Glare

Pupils and staff should be able to see displays adequately. If there is too much reflected light on monitor screens, blinds may be necessary. Semi-translucent blinds stop glare from the sun but let in some light. Vertical shades are best for reducing low-angle sunshine, particularly in

east and west-facing rooms and they can be easier than horizontal blinds for gaining access to open and shut windows.

Temperature and Humidity

Ideally the temperature of an ICT suite should be 18-24 degrees centigrade, with the humidity between 40 per cent and 60 per cent. It is important that the temperature remains comfortable, even with the computers running for prolonged periods. Fresh air needs to circulate; installing a fan simply moves the warm, stale air without renewing it.

Seating

Good quality seating, which supports the back is important if pupils and staff are going to be seated for extended periods. Seating should be height-adjustable so that monitors and keyboards are correctly positioned and pupils do not have to look up or down at the monitor for prolonged periods. See section on workstation ergonomics for further information on these aspects.

Flooring

Flooring or carpet should be non-slip and anti-static. Ease of cleaning and noise reduction are other important factors to consider.

Space between Workstations

BECTA (British Educational Communications and Technology Agency) recommends that there should be a minimum of 1 metre between workstations at which one pupil is working, but 1.5 metres enables two pupils to work comfortably together. There should be at least 850mm of clear space in front of the computer table for a chair and circulation space. If tables are arranged back to back there should be 1.2 metres of space between them. This will allow wheelchair users to pass. Pupils' bags must not be allowed to block the gangways, thus creating a tripping hazard.

Noise

Problems with noise can be minimised if there is a facility whereby teachers can switch off computers centrally.

Cabling

All cabling should be inaccessible to children and boxed off.

Fire Exits

Fire exits must be kept clear at all times. They must not be blocked by computer equipment or pupils' bags.

Safety Issues in the General Classroom

Some safety issues are more relevant to working with computers in the classroom.

Siting of Equipment

Equipment should be situated where it will not cause a hazard with trailing cables and away from water supplies.

When using laptops, they need to be located on firm desks or tables. Procedures should be established to ensure that when laptops are moved, they are moved safely.

Health and Safety Hazards

The following sections give NUT advice on a variety of health and safety issues ranging from physical hazards such as eye strain, headaches and repetitive strain injury (RSI) to safety considerations when using particular kinds of equipment such as laptop computers and wireless area networks. The NUT's guidance also refers where appropriate to guidance from BECTA (British Educational Communications and Technology Agency) for which contact details are given at the end of this document.

Pregnancy and Display Screen Work

Many women are apprehensive about work at a display screen while pregnant. Although debate continues as to whether screen use poses any real risk of problems in pregnancy, the NUT advises that it is sensible to err on the side of caution, particularly since stress is seen as a factor which can adversely affect pregnancy.

The NUT therefore believes that women who are pregnant, or considering pregnancy, should have the option of not working with display screens. Women who continue to use screens during pregnancy should be able to take breaks when desired and their workstations should be adapted to accommodate their specific needs.

Repetitive Strain Injury (RSI)

One of the major problems arising from ICT work is RSI, which describes a range of conditions characterised by pain, numbness or discomfort in the muscles, tendons, nerves and joints of the hand, wrist, forearm, elbow and upper arm, and sometimes the shoulders and neck.

The HSC's Approved Code of Practice and guidance to the Display Safety Equipment Regulations (see Appendix A) includes a range of advice which seeks to minimise the risk of RSI. This includes guidance on the layout of workstations (furniture and equipment) and on work processes. The HSC advises taking breaks from keyboard work of between five and ten minutes every 50-60 minutes, while the RSI Association recommends a break of five minutes in each half hour. The HSC also emphasises the importance of being relaxed, since RSI can be caused by tension and working under stress which tenses the muscles and restricts circulation.

Other steps to prevent RSI can include providing adjustable keyboards and wrist rests and ensuring users know how to use them properly, and providing copy/document holders and adequate space around the workstation as well.

RSI due to Mouse Use

Using a mouse may give rise to greater risks than using a keyboard because use of a mouse concentrates activity on one hand and on one or two fingers, which makes aches and pain in the fingers, hands, wrists, arms or shoulders more likely.

Electromagnetic Emissions

Concern about electromagnetic emissions, particularly about the possible effects they may have on pregnancy, has led computer manufacturers to make "low emission" screens. Equipment should state whether it meets the voluntary "MRP2". It is now also possible to "spot check" electromagnetic radiation emission levels of computers with relatively inexpensive, easily-used meters.

Epilepsy

Display screen use cannot cause epilepsy and is unlikely to cause problems to sufferers of most forms of epilepsy. Photosensitive epilepsy, however, is a rare form of epilepsy which

puts the sufferer at an increased risk of experiencing an attack through display screen work. It is unlikely that this form of epilepsy would become apparent for the first time through working with display screens but, as a precaution, enquiries should be made of parents where children are known to be suffering from epilepsy or are in an epilepsy risk category.

Skin Rashes

Skin rashes are sometimes reported amongst display screen workers. In many cases environmental factors contribute to this problem but static-electric fields building up around screens, low level X-ray emissions and ultraviolet radiation given off by screens may be linked to skin rashes. Again, further research is needed into this association.

Stress

Stress has been identified as a problem amongst ICT workers. Again, factors contributing to this have included hot and noisy environments, poor workplace design, machine failures and social isolation.

The best means of combating stress is by observing the need for regular breaks from continuous screen work.

Risks due to use of Laptop/Notebook Computers

Many schools offer laptop computers to pupils and staff for use within and outside school. Their portability is their main advantge. Some children, or even staff, may, however, still find them too heavy.   Staff and pupils should also recognise that carrying a laptop/notebook computer in a designated bag may constitute a security risk. Using an ordinary bag may help to disguise what it being carried and so deter thieves.

Laptop/notebook computers have to be compact enough to be easy to carry, resulting in design compromises like smaller keyboards and screens.   Laptop work is therefore less comfortable than work at standard sized equipment during prolonged use.   Careful consideration needs to be given to where and how laptops are used in schools. It is worth noting that it is possible to purchase regular-sized keyboards to attach to these computers. Teachers who spend a lot of time at home working on their own laptop computer may wish to consider this.

Specific training and information should be given for laptop users on minimising risks, including sitting comfortably, angling the screen to minimise reflections and, wherever possible, placing the laptop on a firm surface at the right height for keying.

The HSE has suggested that the following ergonomic factors be taken into account when choosing portable computers:

- choose a lighter weight model of 3kg or less, with a large and clear screen (14 inch diagonal or more;
- select one with the longest battery life possible;
- choose a lightweight carry case with handle and shoulder straps.

For further information for schools, please refer to BECTA Information Sheet "What is a portable computer" (see end of document).

Electrical Hazards

The Electricity at Work Regulations 1989 require all electrical systems and equipment to be constructed and maintained in a safe condition. When planning a new computer installation, it is common for schools to discover they need some rewiring, especially as, until recently, few classrooms were built with adequate consideration of future requirements.

Power cables must be carried in trunking that separates them from voice and data cables.

Any cabling within 'hand's reach' should be secured within trunking. Sufficient space in main trunking routes should be designed to accommodate future needs. Power cables should be secured and covered and should not trail. All electrical work should be undertaken by suitably qualified staff.

Other issues to look out for are stray leads, trailing flexes, frayed leads, damaged plugs and coiled cables. See the NUT health and safety briefing, 'Electrical Safety in Schools' for full guidance on safety precautions.

Asbestos

The installation of ICT cabling and other associated building work may disturb asbestos which may be present in ceiling tiles, insulation board and other materials. Removal of asbestos-containing materials must be carried out by licensed contractors. For further information, see the NUT's 'Asbestos' briefing.

Wireless Local Area Networks

Schools are increasingly making use of wireless networks in an attempt to increase access to ICT. It is particularly beneficial for schools with no space for a computer suite.

A wireless local area network (WLAN) connects computers together and enables them to communicate with each other. It can provide more freedom and flexibility than a wired network and can transmit and receive information through air, walls and ceilings. Data is received from radio transmitter nodes suitably spaced around the school.

The health and safety implications of using wireless networks are not fully understood, but, according to the British Educational Communications and Technology Agency (BECTA), it is likely that the levels of radiation used in wireless networks are significantly lower than those found in mobile phones. They also fall within the agreed safety limits set out by the National Radiological Protection Board. The NUT will monitor the views of experts on this area and will reconsider its advice to members if either BECTA or the NRPB changes its guidance on the health and safety implications of WLANs.

The US Federal Communications Commission advises users to remain at least two inches from a wireless LAN PC card and eight inches from a base station. These distances should be greater if some form of external antenna is used.

It is, of course, important to have wireless networks installed by specialists in accordance with the industry standards for network cabling.

For further information for schools please refer to BECTA information sheet, "Wireless Local Area Networks (WLANs): advice and issues for schools" (see end of document).

Interactive Whiteboard Projectors

Use of interactive whiteboards with projectors is becoming increasingly common in schools. Certain precautions should be taken to avoid discomfort and possible damage to the eye. Training in the safe use of the equipment is essential.

BECTA advises that projectors should, wherever possible, be placed out of the reach of the pupils. A ceiling mounted projector is the ideal solution as this avoids trailing wires and reduces the possibility of projector beam dazzle. This option enables whiteboard users to look at the class without directly looking at the projector beam. When using a data projector it is important to ensure that all staff and pupils are aware of the potential danger of staring directly into the projector's beam. Users should be encouraged to keep their back to the beam and avoid standing in the beam while facing out towards the class. Pupils should always be supervised whilst the projector is operating. Projectors should be professionally fitted and adjusted, so that the 'keystone correction' provides a correct 'rectangular' image onto the screen. The cabling should be professionally incorporated into any trunking.

If there is a requirement for the equipment to be mobile around the school, it is important to ensure that the unit is anchored firmly when in use, and that trailing power cables are covered and secured.

In a bright room, rather than increasing the brightness of the projector, blinds should be used. Using a more powerful projector could lead to discomfort and possible damage to the eye. It is very important to follow the manufacturer's instructions. Warning notices should be displayed prominently on the equipment and pupils and teachers should be discouraged from staring at the beam. Risk assessment should inform good practice within every school. Training in the use of the equipment should include all health and safety issues.

BECTA also advises that it is advisable to position whiteboards at a comfortable height for use by pupils. There will often need to be a compromise between pupils being able to see the screen from across the classroom and being able to interact with the screen. If the screen needs to be fitted at adult height, then it might be necessary to provide a small, secure platform that younger pupils can use in order to reach the screen.

Further Information

Health and Safety Commission: "Display Screen Equipment Work: Guidance on the DSE Regulations" (L26, ISBN 0717604101, £5.75); "VDUs: An Easy Guide to the Regulations" (HSG90, ISBN 0717607356, £5.00); and "Working with VDUs" (INDG36(rev1), single copies free of charge); available from HSE Books, Tel: 01787 881165; and

BECTA (British Educational Communications and Technology Agency): a range of advice and guidance on ICT issues in schools:

- Information Sheets Index Page, www.becta.org.uk/technology/infosheets/index.html
- "How to work safely with ICT", "Planning the safe installation of ICT in schools" and "Safe use of ICT in schools", attached and accessible from Index Page above
- "Wireless Local Area Networks (WLAN): advice and issues for schools", accessible from Index Page above

DfES video: "Making IT Fit: Accommodating Information Technology in Schools", 1995, free from 0207 273 6718.

Action Points for Safety Reps

Make sure that:

- you secure your right to be involved in consultation on the introduction of ICT equipment in individual schools; and

- you use the guidance set out above and the attached NUT checklist to ensure that proper consultation takes place and proper safety precautions are implemented and maintained.

ICT Equipment in Schools:
Checklist for NUT Safety Representatives

The following checklist will be useful for NUT health and safety representatives when the installation of IT equipment is planned.

Pre-installation

> Has a risk assessment been carried out and have you been given a copy?

> Where are the computers coming from?
>   • if donated, are they legitimate?
>   • if purchased, has the purchase been properly investigated?
>   • have they been electrically checked?
> Has a siting plan been drawn up for layout?
>   • is any structural work required?
> Where are the computers to be installed?
>   • has the power source been determined as adequate?
>   • will ventilation be adequate?
>   • will lighting be adequate?
>   • will the workstation be adequate?
> Has installation plan been agreed?
>   • who will install?
>   • will any change/closure to work be needed?
> Have plans for computer usage been drawn up?
>   • do we know what they will be used for?
>   • do we know who will use the computers?
>   • has relevant software been obtained?
> What security precautions will be applied?
> What fire precautions will be applied?
> Has the school set an appropriate budget for maintaining its computers?

During use

> Is the siting being monitored?
>   • lighting, ventilation, seating, workstation;
>   • are trailing cables being checked?
> Is each computer being properly maintained?
>   • Who is maintaining it?
>   • Are ventilation, filters, ink, chemicals being checked?
> Are chemicals etc stored properly?
> Are the computers insured?
> Have all users been trained?
>   • Has the training properly covered screen time, health and safety etc?
> Are they observing safety precautions, screen time, rules for use?
> Are they being offered eye tests etc?
> Are proper fire precautions being observed?

Appendix A: The Legal Framework

This section sets out the legal duties and requirements for health and safety which employers must follow regarding the use of ICT equipment; and sets out recommendations on good practice which will ensure that these legal duties and requirements are met.

Some of the legal requirements on employers set out below do not apply automatically to all categories of employees. The NUT, however, regards these requirements as "good practice" for all ICT users and believes that the recommendations in this guidance should be followed for and by all teachers, non-teaching staff, school pupils and college students, whether they are using this equipment in schools or at home.

The duties of employers in relation to ICT equipment generally are laid out chiefly in the following four key pieces of legislation:

- the Health & Safety at Work etc Act 1974;
- the Management of Health & Safety at Work Regulations 1999 ("Management Regulations");
- the Workplace (Health, Safety and Welfare) Regulations 1992 ("Workplace Regulations"); and
- the Health and Safety (Display Screen Equipment) Regulations 1992 ("DSE Regulations").

Full details of the generic requirements of the first three pieces of legislation are set out in separate health and safety guidance documents available from the Union. The following sections summarise those general requirements as they apply to use of ICT equipment.

a.   Health and Safety at Work etc Act 1974

The 1974 Act imposes duties of care on employers both towards employees (under section 2) and towards non-employees including, in the case of schools, pupils (under section 3). Employers must take steps to ensure the health, safety and welfare of employees and not to expose non-employees, such as pupils in schools, to risks to their health and safety.

The 1974 Act also requires employers to prepare a health and safety policy statement which includes, inter alia, the procedures for safeguarding health and safety with which it expects employees to comply. Procedures for the safe use of ICT equipment should now be an important element of the employer's health and safety policy statement.

LEAs are bound by these requirements upon employers. Governing bodies of foundation and voluntary aided schools are similarly bound as the employers of staff in those schools. Governing bodies of other LEA-maintained schools are not employers but they still have duties of care to school staff and pupils under s.4 of the 1974 Act due to their "control of premises".

As well as complying with the general duties and requirements placed on them by the 1974 Act, employers must comply with the more specific requirements of the Management, Workplace and DSE Regulations.

b.   Management of Health and Safety at Work Regulations 1999

The Management Regulations complement the general duty upon employers under the 1974 Act to ensure the health, safety and welfare of employees by placing a legal requirement upon employers to assess and reduce risks to health and safety in the workplace. Under the "risk assessment" process, employers must:

- identify hazards arising out of work equipment, work processes and activities undertaken on the premises;

- assess whether they are putting the health and safety of workers and others at risk and to what extent; and

- implement measures needed to prevent or control the risks identified.

Risk assessments must be revised regularly in order to keep them up-to-date. The presence of computers in schools means that a further range of risks must be assessed and any appropriate additional precautions taken. The risk assessments will need to be kept up to date and revised whenever the level of use or types of use change or new equipment is acquired.

c.   Workplace (Health, Safety and Welfare) Regulations 1992

The Workplace Regulations also expand upon the general duty of care under the 1974 Act. The Regulations set general requirements in four broad areas: the working environment, safety standards, welfare facilities and good housekeeping arrangements. Their requirements are less specific to use of ICT equipment than those under the DSE Regulations.

d.   Health and Safety (Display Screen Equipment) Regulations 1992

The provisions of the DSE Regulations apply specifically to the design and use of ICT equipment and workstations. The DSE Regulations are accompanied by the HSC's ACoP and Guidance Notes which give further details of the precautions needed to ensure that the requirements of the Regulations are met. This document draws extensively on the provisions of the DSE Regulations and the HSC's ACoP and Guidance Notes.

The DSE Regulations apply automatically only to employees who fall within the Regulations' legal definition of "users" i.e. who habitually use screens as a significant part of their normal work. They do not apply to employees who work only occasionally on ICT equipment and are not therefore legally defined as "users"; and they do not apply to pupils since they are not employees. Employers are, however, still legally bound by their duties under other health and safety at work legislation to take measures to protect occasional users. Such duties include the general risk assessment requirements of the Management Regulations and the provisions of the PUWER and PPE Regulations (see the separate NUT briefing on Work Equipment).

The NUT's advice is that education employers, in considering and putting into place the health and safety precautions required to protect teachers and pupils using ICT equipment, should follow the good practice set out in the DSE Regulations at all times. There should be no arguments about who is specifically covered by the Regulations and who may not be.

Employers' Duties under the DSE and other Regulations

As noted above, the general duty of care on employers means that all education employers have to take certain steps to ensure the health and safety of employees and pupils, even where they do not come within the specific requirements of the DSE Regulations.

Areas covered by the DSE Regulations include the ICT equipment itself, the working environment, the organisation of work and the health and safety information and training provided for employees. The DSE regulations place five key duties upon employers which are outlined in the following sections together with the requirements which they must follow to discharge these duties.

a.   Conduct a Risk Assessment of Workstations

The DSE Regulations place a specific legal duty upon employers to carry out a risk assessment of workstations for "users". They must assess the risks to health presented by any display

screen work that such employees undertake.

Even if workers or others using ICT equipment are not classified as "users" under the DSE Regulations, employers will still have to carry out an assessment of the risks to health presented by such work under the general risk assessment obligations imposed by the Management Regulations.

The HSC's ACoP and Guidance Notes make clear that safety representatives should play a full part in the risk assessment process. They should be consulted by the employer and the information provided by them and by the workers involved should be taken into account in determining the safety precautions to be implemented.

Health and safety representatives may carry out informal assessments of risks involved in use of ICT equipment during their safety inspections or otherwise under their rights as a safety representative. These should not be confused with, and do not replace, the employer's risk assessment.

The main risks to health associated with ICT work are RSI upper limb pain and discomfort; eye and eyesight defects; fatigue and stress; epilepsy; facial dermatitis; electromagnetic radiation; and effects on pregnant women. These health concerns are addressed in more detail later in the guidance.

b.   Ensure workstations meet minimum requirements

The definition of "workstation" includes the furniture used in connection with the ICT equipment as well as the equipment itself. It covers the keyboard and other input device such as a mouse or trackball, software, disk drive, telephone, modem, printer, document holder, work chair, work desk, work surface and so on. In addition, aspects of the immediate work environment such as noise, light, temperature, humidity and space are included.

Workstation design and layout should be planned before any equipment (i.e. computer trolleys, tables, chairs etc as well as hardware) is purchased. Schools will need to consider issues such as the suitability of mobile or static workstations in terms of both access and safety. The positioning of equipment is very important. Workstation design should enable users to reach all necessary equipment without stretching and should be clear of obstruction.

Workstations should be designed to meet the specific needs of pupils with physical disabilities and other special educational needs. It is sensible to consult LEA advisory staff, specialist teachers and other professionals during the planning and design process.

The following sections set out a summary of the points which the HSC's ACoP and Guidance Notes advise should be examined.

>   Equipment

Display Screen - Clearly-defined characters of adequate size; stable screen image without flicker; easily adjustable brightness and contrast; easily tilting and swivelling screen; separate base for the screen or an adjustable table; glare and reflection-free screen.

Keyboard - Tilting keyboard, separate from the screen; sufficient space in front of keyboard to rest hands or arms; matt surface to avoid reflective glare; easy-to-use; adequately contrasted and legible symbols on keys.

Work Chair - Stable, allowing easy freedom of movement and comfortable position; adjustable height (seat); adjustable height and tilt (seat back); a footrest should be made available, if appropriate, needs to compelment the desk height. Pupils should not be sitting on chairs that leave their legs dangling.

Work Desk/Surface - Sufficiently large, with low-reflecting surface; allow a flexible arrangement of screen, keyboard, documents and related equipment; document holders, may

be necessary and, if used, must be stable, adjustable and positioned so as to minimise the need for uncomfortable head and eye movements; adequate space for a comfortable working position. Depending on the size of the monitor, worksurface needs to be between 800 and 1000 mm deep.

> **Environment**

Flooring –Should be non-slip and anti-static. Cleaning and noise reduction factors are also important when selecting a floor covering.

Space Requirements - Sufficient clearance for postural changes i.e. thighs, knees, lower legs and feet and should allow a comfortable position for the arms and wrist. Stray leads and flexes should be re-routed, secured and covered. Room design should allow freedom of movement around the room, allowing wheelchair users to pass.

Lighting - Should be appropriate for all the tasks performed at the workstation; prevention of glare through positioning of artificial lighting and positioning of equipment at right angles to windows. Levels of lighting should be slightly lower than for standard classrooms so that there is appropriate contrast between screen and background. Recommended level is 300 - 500 lux, measured horizontally at work surface height.

Reflections - Positioning of workstations must prevent sources of light, such as windows, or work surfaces from causing glare and reflections on the screen; windows should be fitted with blinds or other means of preventing daylight shining on the workstation.

Noise - Noise emitted by equipment should be kept to levels which do not distract attention, impair concentration or prevent normal conversation.

Radiation - All electromagnetic radiation emission (except visible light) should be reduced to negligible levels.

Heat - Equipment belonging to any workstation should not produce excess heat which could cause discomfort to operators or users. Ideally the temperature of an ICT suite should be between 18 and 24 degrees centigrade.

Humidity - Ventilation and humidity should be maintained at levels which prevent discomfort and problems of sore eyes.

> **Temperatures**

Minimum temperatures - For workplaces generally, the Workplace (Health, Safety and Welfare) Regulations specify 16ºC. For classrooms and other workrooms in schools, however, the Education (School Premises) Regulations 1999 set a higher minimum standard of 18ºC.

Maximum temperatures - Although there is no maximum temperature specified in either set of regulations, all employers have a duty under the Workplace Regulations to take all reasonable steps to achieve a reasonably comfortable temperature in the workplace. In such cases, where windows or other openings not provide sufficient ventilation employers must provide supplementary ventilation systems such as provision of fans. The TUC recommends that humidity should be maintained at a comfortable level of between 40% and 50%.

> **Software Systems**

Software must be suitable for the task, easy to use and adaptable to the level of user's knowledge; no checking facility should be used without the knowledge of the worker.

> **Employees with Disabilities**

The HSC advises that wheelchair users may have special requirements for both their chair and work surface (e.g. height). In practice some wheelchair users may need a purpose-built

workstation but others may prefer to use existing work surfaces.   The HSC's advice states that, clearly, the needs of the individual here should have priority over rigid compliance with the details given in the Schedule to the Regulations as regards seating and work surfaces. The Disability Discrimination Act requires reasonable adjustments to be made by employers to normal arrangements to cater for the needs of disabled employees.

c.   Plan work so there are breaks or changes of activity

Jobs should be designed well, both in terms of the physical work environment, eg the location and siting of equipment, the sitting positions for the work, and the job content.   Overwork in poor ergonomic conditions leads to stress, tiredness, and can give rise to other health and safety hazards such as eye strain and headaches and RSI.   This can be prevented by good working practice, including maintaining a regular flow of work, interrupted by regular breaks; working with furniture and equipment that is comfortable and convenient; and being relaxed, since RSI can be caused by tension and working under stress, which tenses the muscles and restricts circulation.

The HSC advises that where work cannot be organised so as to contain natural breaks, then deliberate breaks or pauses must be introduced. The HSC stresses that such breaks should be included in working time.   It advises taking short breaks of 5-10 minutes every 50-60 minutes as opposed to longer but less frequent breaks.   The RSI Association, however, recommends a break of five minutes in each half hour from keyboard work.   In schools, normal timetabling will probably restrict the time at which pupils and teachers work on ICT equipment but these limits should be observed for such work both during and out of school hours.

d.   On request arrange eye tests, and provide spectacles if special ones are needed

Eyestrain is the most common health problem reported by workers using display screens.   The DSE Regulations set out minimum requirements as above for screens, including requirements concerning the characters on the screen, image, brightness, contrast and freedom from reflections and glare.

The DSE Regulations also give "users" the legal right to eye tests on request when they commence screen work, at regular intervals thereafter, and if they experience visual difficulties.   These tests are to be paid for by the employer and provided by a registered ophthalmic optician or a registered medical practitioner with suitable qualifications. Employers may offer a "vision screening test" but must still pay for a full eye test if requested.   If a test shows that the worker needs corrective spectacles, then the employer should meet reasonable costs.   The NUT believes that any employee required to work with a display screen, whether a "user" or a more occasional operator, should be entitled to a regular eye test paid for by the employer.

e.   Provide health and safety training and information

The health and safety risks of excessive ICT work, particularly keyboard use, are well known. Given that pupils may also spend long periods on computers at home, schools must make sure that they are trained in computer use and health and safety.

The NUT advises that clear health and safety guidance for both pupils and teachers should be drawn up and preferably circulated as well as displayed.   It should include advice on:

·   the risks of RSI from excessive keyboard use;
·   the length of time to be spent at a computer screen and the need for regular breaks;
·   the importance of proper posture and seating relative to the keyboard and screen; and
·   safety precautions when using the equipment, including adjusting the workstation and furniture, switching machines on and off, not eating or drinking at workstations, and not interfering with power connection or moving computer equipment without seeking assistance.