

Ergonomics, Health and Safety



The term 'ergonomics' is derived from two Greek words: 'ergon', meaning work and 'nomoi', meaning natural laws. Ergonomists study human capabilities in relationship to work demands.

-- www.ergonomics.org

What is Ergonomics?

Ergonomics is the study of how working conditions, machines and equipment can be arranged in order that people can work with them more efficiently. As computers are probably the most ubiquitous type of machine in today's work and learning environments, the issue of ergonomically sound interaction with them has come to the fore. In general, computers are clean, quiet and safe to use. However, poor interaction with and positioning of computer equipment can lead to health problems such as eyestrain, swollen wrists and backache. Problems can be avoided by good workplace design and by good working practices. Prevention is easiest if action is taken early through effective analysis of each workstation.

There are a number of practical steps that can be taken to achieve an ergonomically positive environment and, furthermore, to promote a safer learning environment. These are:

- Positioning of the person and equipment
- Arranging a safe learning environment
- Taking regular breaks

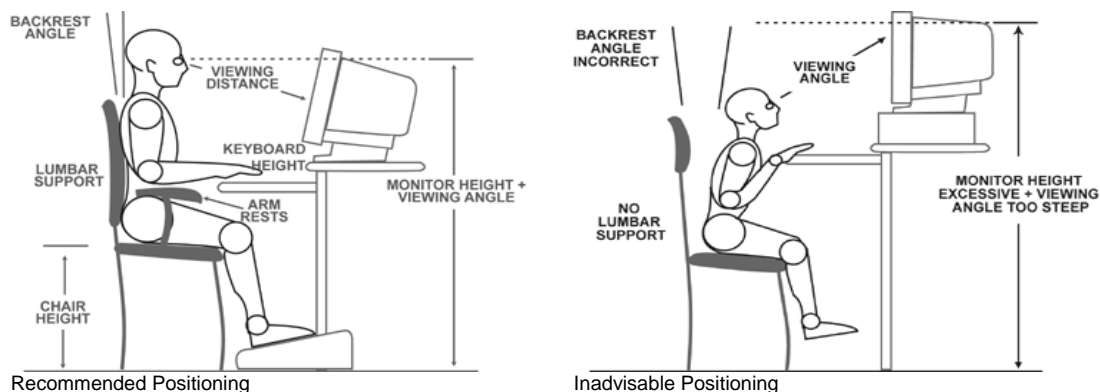
For students with disabilities, it is advisable to consult with an occupational therapist in relation to ergonomics.

Positioning

Body positioning and the positioning of equipment are fundamental to ensuring a comfortable and healthy interaction with computers. The following recommendations can help to reduce the risk of health problems:

- Sit up straight rather than slouch forward
- Use supports such as foot rests, wrist rests and adjustable chairs
- Adjust equipment to the correct height, distance and angle

The diagrams below highlight some positive and negative body and workstation positioning.



Arranging a Safe Learning Environment

The term 'workstation' refers collectively to the computer, the monitor, the keyboard, the desk, the chair and the space provided for doing work. Workstations should be comfortable and have sufficient space to allow for freedom of movement. A minimum of 4.65 square metres of floor space for adults is recommended for office or similar environments. Adequate space between workstations should be provided for students both in a classroom and computer

suite context. This should exclude space taken up by fixtures such as presses and filing cabinets.

As computers can generate heat, a well-ventilated room is an important consideration. Coiled cables also give off heat and may need to be rerouted. In addition, securing and covering trailing cables is necessary if hazards are to be avoided.

The following table identifies how specific aspects of our environment can be organised to create the right ergonomic conditions for a safer learning environment.

Environment	Health and safety considerations	Ergonomic Recommendations
VDU (visual display unit)	<ul style="list-style-type: none"> Avoid discomfort caused by reflective glare and eyestrain Protect eyes against moisture loss 	<ul style="list-style-type: none"> Take adequate breaks regularly Adjust contrast and brightness Focus on distant object regularly Use an anti-glare screen with older monitors Adjust height so that the top of the screen is at eye level Position in a downwards viewing angle Make sure the screen surface is clean
Keyboards	<ul style="list-style-type: none"> Prevent wrist strain which can develop into RSI (repetitive strain injury) 	<ul style="list-style-type: none"> Use a wrist rest Type with wrists floating above the keyboard Keep elbows relaxed Keep mouse at the same height as keyboard Tilt the keyboard to the most comfortable position
Chair	<ul style="list-style-type: none"> Prevent back problems 	<ul style="list-style-type: none"> Adjust chair to a suitable height Tilt seat for lumbar support Allow adequate knee clearance under the desk Do not sit in the same position for long periods
Light	<ul style="list-style-type: none"> Prevent visual fatigue Avoid reflective glare 	<ul style="list-style-type: none"> Provide natural light if possible Position monitors at right angles to windows, otherwise use blinds Avoid strong artificial lighting
Noise	<ul style="list-style-type: none"> Minimise distraction caused by noise 	<ul style="list-style-type: none"> Use headphones for software containing audio Position printers or photocopiers away from workstations
Heat	<ul style="list-style-type: none"> Prevent discomfort caused by heat 	<ul style="list-style-type: none"> Ventilate rooms but avoid creating draughts Turn off equipment when not in use Consider air conditioning
Electrical Safety	<ul style="list-style-type: none"> Prevent accidents 	<ul style="list-style-type: none"> Leave technical repairs to experts Reroute, secure and cover stray leads Replace frayed leads and damaged plugs Avoid overloading extension leads Be aware of coiled cables overheating

Regular Breaks

Computer users, both in workplaces and in schools, should be encouraged to take regular breaks if working for protracted periods on a computer. This may mean leaving the workstation for a few minutes every hour to avail of a work-break or to engage briefly in some other work-related activity. Not only will this allow eye muscles to readjust, it will also refresh all of the body's muscles, promoting personal health and a safe learning environment. By encouraging such practices in schools, teachers are reinforcing the importance of human-computer interaction, allowing students to form positive habits at an early stage in their development, ones that they can take with them into the world of work.

Health and Safety issues in the Classroom

How to work safely with ICT in your classroom

ICT offers a range of benefits for teaching and learning, but all computers and devices need to be used with care. This material looks at the health and safety issues involved in using computers in general, in the classroom and in the ICT suite.

- Ensure that no cabling is trailing on the floor.
- If you are using a data projector, make sure that all leads are safely located, and that pupils don't walk around the back of working areas which have cables.
- If you are using an interactive whiteboard, ensure that all children can reach it without standing on anything.
- Children should be supervised at all times during the operation of data projectors or interactive whiteboards. Ensure that pupils never look directly into the beam of the projector, and if presenting to the class and entering the beam, pupils should not look towards the audience for more than a few seconds. Ideally they should keep their backs to the beam at all times.
- If you are working with programmable toys such as floor turtles, create a clearly defined working area; use markers or seating to define the work space to ensure that pupils do not accidentally fall over equipment.
- Ensure that all electrical installations are carried out by a qualified electrician.
- All equipment must be of a reliable standard and should be checked annually by qualified electricians.
- Follow health and safety guidance regarding the height, position and distance of monitors and keyboards from pupils when working.
- Locate the computers in areas where pupils can sit and work without distracting or disrupting others in the class.
- Ensure that this area is kept clear of school bags as pupils may trip on scattered school bags.
- Ensure that procedures for connecting peripherals (such as scanners, digital cameras, webcams, control technology equipment and monitoring equipment), adhere to school health and safety guidelines or manufacturer's instructions for safe use.
- If pupils are using laptops, ensure that they are located on firm desks or tables.
- Ensure that area that contain have a no drinks policy to prevent spillages on electrical equipment

Fire safety in the classroom

- Electrical equipment fires require either Carbon Dioxide or Dry Powder fire extinguishers. Electrical Fires are categorised as Class E type fires.
- Paper based displays should not be placed above where electrical equipment is located. If electrical equipment goes on fire, it will reduce the possibility of the fire spreading along that wall.
- Sockets area should be cleared of dust and scrap paper on regular basis to reduce fire risk.

Relevant Web Sites

The Ergonomics Society

www.ergonomics.org.uk

This site explains ergonomics and related terms, features school projects, news items, publications, conference proceedings and Web links relating to the subject.

Ergonomics.org

<http://ergonomics.org>

This Web Site is dedicated to the exchange of information between the fields of ergonomics and the Alexander Technique. Suggestions and contributions from ergonomists and from Alexander Technique students and teachers are most welcome

Health and safety section on the Becta site

http://schools.becta.org.uk/index.php?section=lv&catcode=ss_lv_saf_hs_03

Some advice from Becta on basic health and safety issues in schools relating to ICT equipment and use.

Note: While the advice sheets aim to act as a guide, the inclusion of any products and company names does not imply approval by the NCTE, nor does the exclusion imply the reverse. The NCTE does not accept responsibility for any opinions, advice or recommendations on external web sites linked to the NCTE site.

This Advice Sheet and other relevant information are available at:
www.ncte.ie/ICTAdviceSupport/AdviceSheets