2023

Display Screen Equipment

Contents

Foreword

The original version of this document dates from 2005 (2 years before the invention of the iPhone!): not surprisingly it focussed entirely on the use of desktop and laptop computers.

The technological landscape has changed beyond all recognition since then and so this guide now looks at mobile devices as well and also considers the needs to teachers and other adults, not just young people

Three main factors act together to cause a risk of injury from working with computers, tablets, phones and similar devices.

They are:

- habitual bad posture and technique;
- working for extended periods of time without a break; and
- too great a frequency of working.

Extended use seems liable to become the cause of many injuries.

Control measures are largely those of promoting good practice. Everyone must understand what should be done, and how to do it. This guidance shows how.

Teachers and other adults are urged to take a precautionary approach, particularly with young people as, due to their youth and inexperience, they may be less aware of the dangers. They may be more prone to musculoskeletal disorders or back pain because their bodies are still growing and because they can often be quite casual about posture.

It is recommended that the risks are controlled largely by influencing people in the way they work. People should be informed of the harm that can result from bad practices and trained in how best to look after themselves and others.

This guidance for school managers and employers sets out a framework wherein this health and safety policy might be organised and managed.

Disclaimer

The scope of this guidance covers those hazards that are recognised and accepted at the time of its preparation and which, at that time, were considered to be significant. Where opinion is divided on the best means of controlling a risk, this is pointed out.

1 Introduction and Background

Since the advent of the smartphone and tablet, screens are an integral part of our lives on a daily basis. Despite various scares over the years, there is no evidence of large scale harm, on a physical basis at least.

However, in the workplace, extended use of Display Screen Equipment can cause various health effects. This guide highlights the problems and gives suggestions for mitigations.

Many habitual users of computers or other display Screen Equipment (DSE) experience pain brought about by a combination of bad working practices and overuse. In extreme cases this can even develop into or even disability.

Who is a 'DSE User'

According to the HSE

The Health and Safety (Display Screen Equipment) Regulations apply to workers who use DSE daily, for continuous periods of an hour or more. We describe these workers as 'DSE users'. The regulations don't apply to workers who use DSE infrequently or only use it for a short time.

It is also worth pointing out that the regulations apply to employees: so learners are not specifically included. Although there is an overall duty of care for them.

The Risks

DSE usage is a recognized health and safety hazard.

The main risks are musculoskeletal disorders particularly to the upper limbs and back, visual fatigue and mental stress.

Some upper limb disorders are sometimes referred to as repetitive strain injury, or RSI. The risks to individual users are often low, but can become significant when devices are used often, for long periods of time at a stretch, and compounded by and bad posture.

The arrival of laptops, tablets and mobile phones has made this situation worse. Have any of us not spent at least some time using screens sprawled on a sofa?

That, however, is beyond the scope of this guide. We are limiting ourselves to DSE use in the workplace.

The Law

In every workplace, work with DSE by employees should comply with Health and Safety legislation: specifically the Health and Safety (Display Screen Equipment) Regulations 1992 (as amended).

These regulations do not specifically apply to learners using DSE in schools or colleges as they are not employees but Health and Safety Law applies to all who may be affected by activities in the workplace. So the provisions therein can act as a guide to good practice.

By following this guidance, employers and teachers will be seen to be complying with their duties under Sections 3 and 7 respectively of the Health and Safety at Work etc Act 1974 (HSWA).

H&S guidance on the use of DSE in the workplace is aimed at for adults, underpinned by research and case studies on adults. Aside from any other issues, in the UK at least there are very few young people in the workplace.

Until relatively recently, little research has been carried out on the H&S effects on young people using DSE.

However evidence of harmful outcomes to young people is growing (although it is proving very difficult to disentangle from other societal factors).

However, it would be prudent to take a precautionary approach. So it is presumed that:

- the problems that adults can have are also met with by children, and
- guidance for adults should, in general, apply to children also.

There are some additional concerns that are specific to young users, or from working with the entire ability range or wide range in body size.

Health and safety arrangements

There are three levels of responsibility here:

Firstly, the employer, the Local Authority or Board of Governors, has the duty of care.

They must ensure that the workplace, equipment, services and working procedures are in good condition and present no foreseeable risk of harm; They must give suitable information, and training to teaching staff and other employees and ensure there is adequate supervision and management.

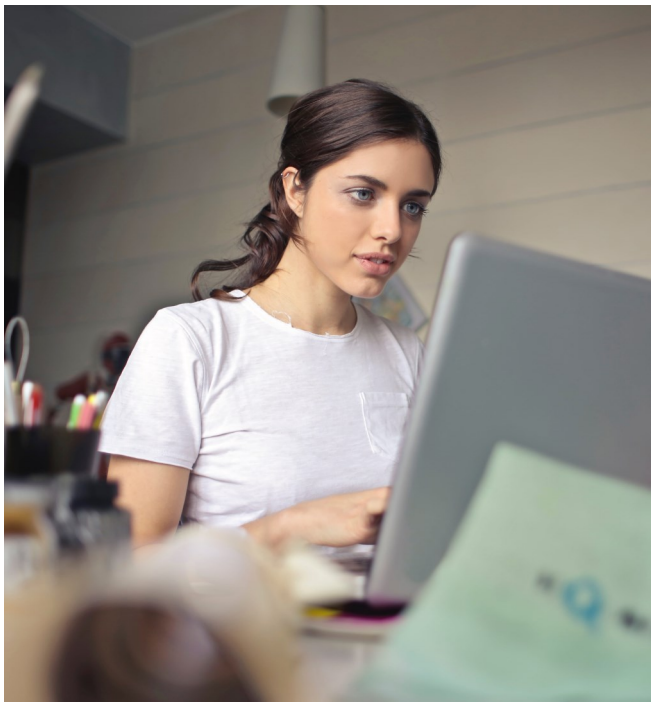
Furthermore, they also have a duty of care for learners.

Secondly, teaching staff, and others, have a duty of care for the learners.

Thirdly, each DSE user, has a personal duty of care to him or herself because the prevention of injury is dependent on following sensible practices, such as will be outlined later.

This expectation of personal care and responsibility is less in young people due to their inexperience.

With much homework being done on DSE equipment, the duty of care exercised by the school or college should not be confined to what occurs within school premises, although responsibilities related to work at home greatly diminished.



2 Health Risks

While generally low-risk devices, excessive use of Display Screen Equipment (DSE) can lead to a variety of physical injuries that can, in extreme cases, develop into serious and debilitating conditions.

Physical harm

Some of the more common injuries from working with DSE are to

- neck
- shoulders
- back
- arms
- wrist and hands
- as well as fatigue and eye strain.

These generally result from lengthy use of DSE and are more liable to occur if incorrect posture and poor technique are used.

The term musculo-skeletal disorders (MSDs) is used to describe a number of conditions such as carpal tunnel syndrome or tendonitis. (But they are also referred to as repetitive strain injuries (RSI) or work-related upper limb disorders (WRULDs) and other terms

Whatever the name, these are progressive conditions and, in most cases, have various factors that combine to result in the RSI. They can cause injury to the nerves, muscles and tendons in the fingers, hands, wrists, arms, elbows, shoulders, and neck, which if ignored, may lead to long-term damage.

Signs can include backache, and tingling arms and wrists. Extreme consequences have been constant pain and physical disability where it becomes difficult or impossible for the victims to hold or grip even small items like a pen or a cup. Some victims have been unable to continue in the same employment

Visual fatigue

DSE work does not cause permanent damage to eyes, nor does it make existing defects worse but it can cause visual fatigue; symptoms felt include blurred vision, red or sore eyes and headaches. This can lead to the user adopting awkward posture – and this can lead to the MSDs described above.

Because display screen users tend not to blink as often as they ordinarily would doing other tasks, the eyes are not lubricated as much as normal. Therefore the eyes may become dry, causing discomfort. The risk is greatest for wearers of contact lenses. The effect is made worse by a dry atmosphere.

Another cause of possible discomfort is the strain of maintaining the eyes focused for a long stretch of time on near objects. Users should therefore be encouraged to focus on distant objects periodically, allowing eye muscles to relax.

There is also a risk of harm to eyesight from the very bright light coming from a data projector. The risk comes from standing in the beam, facing the projector, and staring fixatedly either directly at the lamp, or at an object elsewhere.

It can also make someone aware of eyesight problems they have not noticed before.

Mental stress

Many physical symptoms described by DSE workers reflect stresses arising from their work. Symptoms may be linked to upper limb or visual problems but there is evidence that stress often contributes as well. These should be considered when designing jobs to reduce psychosocial risks in DSE work

Flicker and photosensitive epilepsy

A small section of the population, about 1 person on 10,000, is susceptible to epileptic fits induced by flickering optical sources including computer screens.

Mobile phone issues

Most, though not all, of the use, and overuse, of mobile phones takes place outside of schools and colleges but it is still important to be aware of the issues.

MSDs can develop such as 'text claw', (the unofficial term for soreness and cramping felt in the fingers, wrist and forearm after heavy smartphone use), 'and text neck', discomfort in the neck and spine when you spend long periods of time looking down at your smartphone.

Eye problems are the same as for any other DSE users but there also exists 'Cyber Sickness' (also called "digital motion sickness,") This produces symptoms ranging from headaches to woozy feelings and can occur when you quickly scroll on your smart phone or watch action-packed video on your screen.

There is also the, not insignificant, issue of collisions with people and objects that can happen when a phone user is walking along while looking at their phone.

Image by Lars Ploughman (cropped) under a CC license - unable to find which

Children and Young People

Young people differ from adults in an important respect in that their bones and muscles are still growing. This may make them more vulnerable to permanent injury – though there is not clear evidence to support this.

Use of DSE, particularly smartphones, by children is something of a hot potato at present, particularly in schools.

It is true that there are many issues in relation to behaviour and concentration that may affect learning, although there are also benefits for learners having access to such powerful devices. Fortunately for the authors, this topic is outside the remit of this guide.

According to an article in the Lancet:

The general public and health-care professionals typically perceive extended screen time as negative, with frequent media reports on the adverse effects on sleep, diet, social interaction, and family life. However, the evidence underlying this perception is limited and often clouded by confounding factors including socioeconomic grouping and negative associated behaviours (eg, snacking and reduced exercise).

Recent (2019) guidance from the Royal College of Paediatrics and Child Health (RCPCH), based on a systematic review of available evidence, provides practical, pragmatic advice to children and young people and parents and concludes that evidence for an absolute screen time limit is weak.

(Screen time in children and adolescents: is there evidence to guide parents and policy? - The Lancet Child & Adolescent Health)

3 Use of DSE

Bad posture can arise from one or more factors such as an incorrect set up (of desktop/laptop workstation), not sitting correctly on the seat, or other poor practices. But even with the occurrence of bad posture, the likelihood that this will lead to injuries depends on two other factors also being present:

(i) too many sessions of DSE use of too long a duration.

(ii) too high a frequency or number of occasions a day this happens.

In other words, incorrect use of DSE, if done occasionally, is unlikely to cause harm, but doing so repeatedly, for long periods of time, puts the user at a significant risk of injury.

Breaks

The law says employers must plan work so there are breaks or changes of activity for employees who are classed as DSE Users but there is no legal guidance about how long and how often these breaks should be..

You should ensure that no one is allowed to work continuously with DSE without a break of at least 10 minutes every hour. In general though it is better to take short breaks more often, rather than longer ones less often. For example 5 minutes every half hour is better than 10 minutes every hour. Ideally, users should be able to choose when to take breaks, though this is clearly not applicable to learners in a classroom setting. It should also be borne in mind that some learners use DSE in successive classes.

With children and young people, breaks in work should be more often and could be shorter. Breaks allow those muscles and tendons that were in constant use to relax.

As an alternative to actual breaks, it is possible to stop DSE work to do other tasks. In an office environment, this could include going to meetings or making phone calls. In the classroom it could involve discussion activities, practical work or any other activity. Teachers should include this variety in their plans for the lessons.

Breaks or changes of activity should allow users to get up from their workstations and move around, or at least stretch and change posture.

In as far as it is possible, break times in schools and colleges should not be used for personal DSE use such as texting or keeping up with social media. (Though unless there is a total ban on smartphones, this will be all but impossible to enforce).

Some organisations have recommended exercising during keyboard breaks. The benefits of increasing activity in all aspects of our lives, including work, is well-known and this should be encouraged where appropriate.

Screentime and Children

In 2019, the World Health Organisation (WHO) recommended that children under two should not have any screen time, whilst children aged two to five should have no more than one hour a day of sedentary screen time.

However, the WHO's recommendations have been criticised by some experts in the UK, including the UK's chief medical officers who stated that there is no sufficient scientific evidence available yet to produce guidelines on optimal amounts of screen use or online activities.

WHO-NMH-PND-2019.4-eng.pdf

4 Workstations

This section refers to the use to 'workstations' which are places where DSE workers carry our their work for significant periods. While much of the advice is suitable for all users of DSE, those using it on an occasional basis need not be concerned if they are not following all of these recommendations.

This section is of more relevance to office or admin staff, or any other adults who are likely to spend extended periods using DSE. However, it should also be considered for learners if they are using desktop/laptop computers for more than brief periods.

The computer workstation should be fitted to the user such that the computer can be used in comfort effectively and so that the risk of harm to the user is negligible.

Laptops, tablets and phones

For extended DSE work, these devices are not suitable without modification as they do not allow for sufficient flexibility in setup to customise the arrangement adequately for the individual.

If they are the devices to be used, then external keyboards and mice must be provided. Wireless devices can be used with tablets as well as laptops.

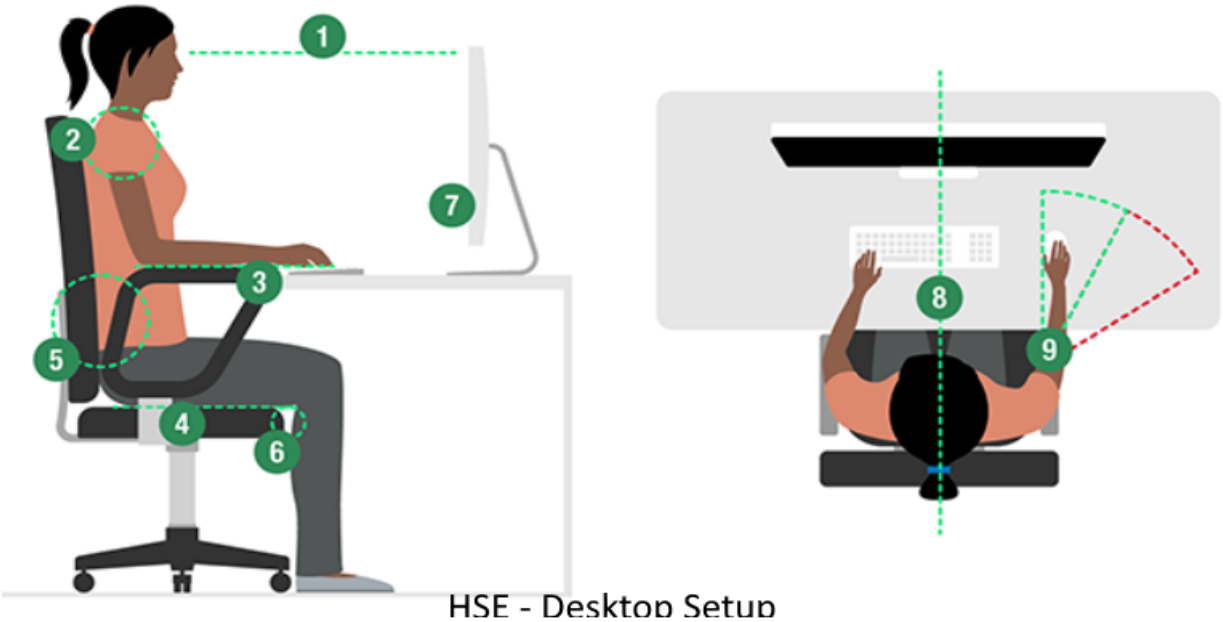
If being used for short periods, try to comply with the guidance in this section as far as is possible.

Setup

When seated at a computer workstation, the body posture should conform ideally with the following points:

Chair & Table

- The seat should be of a height so that the elbows are at the same height as the keyboard, the upper arms hang vertically or slightly forward and the lower arms reach out with the fingers just above the keyboard when the lower arm and hand are horizontal. In almost all cases, this will require an adjustable chair.
- The chair should also be stable and the spine should be erect, or tilted back by no more than 5°. The chair should also provide suitable lower back support.
- The chair should be deep enough that there is a gap of 2-3 cm between the front of seat bottom and the back of the knee



HSE - Desktop Setup

- When sitting normally in the chair, the feet should sit comfortably flat on the floor. A footrest may be needed.
- The wrists should not be bent – neither up, down, nor sideways from the line of the forearm.

The screen

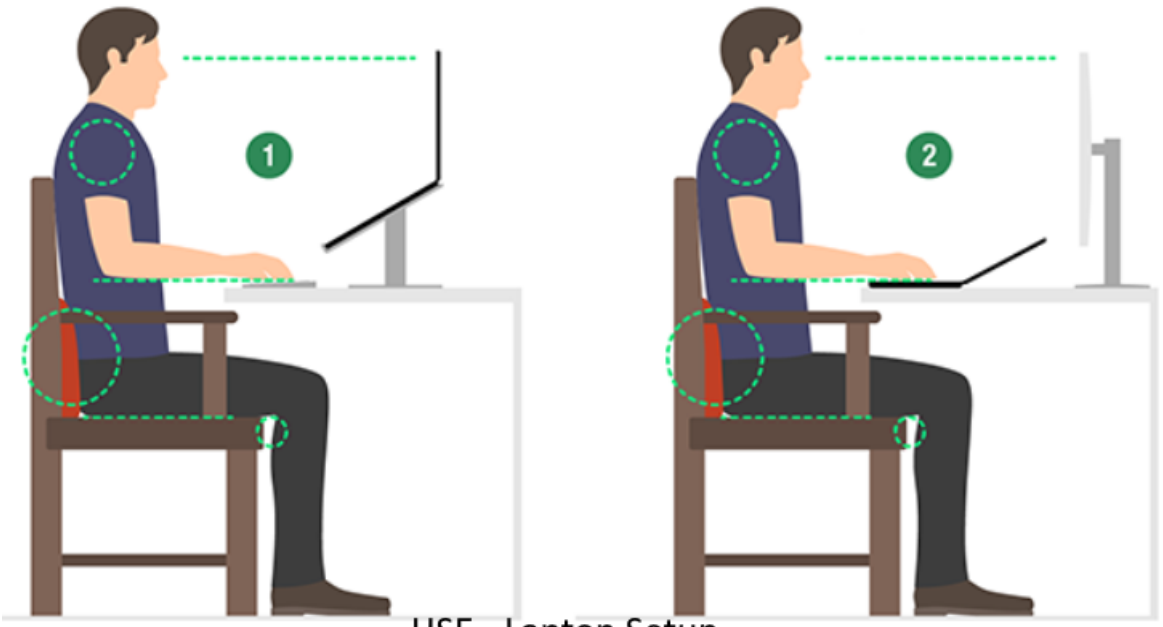
- The screen should be positioned directly in front of the user so that neither the upper torso nor neck should be twisted when looking at it.
- It should be positioned so that the top of the screen is approximately at eye level. In the case of laptops (or tablets) this will require a stand of some sort. Alternatively, an external screen can be provided and the laptop's normal keyboard and trackpad used – though an external mouse is strongly recommended.
- The screen should be of a suitable size, bright enough, without flicker and with adequate contrast for easy reading. Settings should be adjustable

Mouse, trackpad etc

- In the case of tablets, and many laptops, touchscreens are the norm. For many tasks these may be preferable but in some cases they can result in excessive reaching out movements.
- Mice and trackpads or graphics tablets should be placed as close as possible to the keyboard to prevent reaching.
- There should be support for the user's wrists or forearms. The desk surface may be sufficient, if not a separate support should be supplied.
- The input devices should be cleaned and maintained so that they work smoothly. They should also be adjustable by the user: eg switch mouse buttons for left-handed use.

The Environment

- In addition to the normal requirements for a good working environment (ventilation, noise, temperature etc) there should not be glare from the device's screen. If there is then curtains or blinds may be required.
- The user should be able to shift posture to stay comfortable. In particular, the movement of legs should not be restricted by clutter under the table, nor by fixtures such as side panels, struts, spars, or cupboards.



HSE - Laptop Setup

4

Bad practice

The following are examples of bad practice to be avoided on a regular basis:

- Extending an arm continually to use a mouse or other device.
- Twisting the neck to view a screen which is not in front of the seat or is too low/high.
- Twisting the trunk to operate a keyboard or other device which is not centrally in front of the seat.
- Twisting the neck and peering downwards to read off a paper document placed to the side of the keyboard.
- Looking up above eye-level to view the screen.
- Looking down at a laptop on the lap or on a low table.
- Leaning forward to view the screen.
- Slouching backwards.
- Flexing the wrists by more than 15° in any direction from the line of the forearm to use a keyboard or mouse.
- Using the top of a cupboard or chest of drawers as the workstation.

5 Other issues

Training

All users should be trained on the risks from DSE usage, and on safe behaviour and practices.

However, the type and amount of training will vary depending on the group.

Adult DSE users and teaching staff should have training on the risks and how to minimise them and then they in turn can pass this information on, as and when appropriate, to any of the learners in their care.

Reasonable Adjustments

As with other areas relating to the workplace, employers have a duty to make any reasonable adjustments that are required for their employees to carry out their work effectively and safely.

Some examples of this include:

Providing gel wrist supports or an ergonomic mouse to minimise wrist injuries.

Providing chairs with a level of lumbar or other support suitable for the individual concerned.

Providing footrests for workers of short stature.

Providing prescription eyewear, if needed, for the employees to look at the screen.

(normal prescriptions accommodate distance vision and close up vision / reading. But much DSE work is at a distance of around 1m: too far for reading and too close for distance vision so may need a specific prescription.)

These are in addition to the reasonable accommodations for disability, pregnancy etc.

Electromagnetic radiation

Despite numerous scares over many years there remains no evidence that emission of electromagnetic radiation (EM) particularly from mobile devices causes any health risks.

The latest concern relates to 5G phone signals but has no more merit than previous scares.

As a subset of these scares, there have been periodic concerns raised about the effect of EM on pregnant women (or more specifically on their unborn children). Many scientific studies have been carried out, but taken as a whole their results do not show any link between miscarriages or birth defects and working with DSE. Research and reviews of the scientific evidence will continue to be undertaken. In the light of the scientific evidence, pregnant women do not need to stop work with DSE.

However, if there is real anxiety that cannot be allayed then it does not matter if it has no foundation in fact. The anxiety itself will cause stress in the mother and potentially har to the unborn child. In this case, reasonable accommodation, see above, should be made.

Working at home or remotely.

While teachers and most other staff and learners in schools and colleges will not be working from home there are occasions when this becomes relevant:

- Teachers (in particular) marking or planning
- Occasional remote work due to 'snow days' or other closures.
- Remote work in the (hopefully unlikely) event of another pandemic.

While it does not apply to learners, if employees are required to do work at home, or elsewhere that is not their normal workplace, the employer's duty of care still obtains and so they have a duty to ensure that the employees have whatever equipment, including adjustable chairs, separate screens, keyboards or mice.

Home Liaison

All work on DSE, whether at home or school, can contribute to upper limb disorder or back pain.

Since facilities and furniture at home may be poor ergonomically it is important that learners and their parents or guardians are made aware of the potential dangers, and of ways of reducing them.

In addition to learners carrying home the right message, parents or guardians should also be made aware of the risks through the usual channels of communication such as the normal correspondence, parents' meetings etc.

Other measures such as training specifically devised and run for parents, or briefings to the local press, might also be beneficial.

The self-check list in Appendix 1 has been devised for use by pupils aged 10 or over and should be used at home as well as in school.

Risk Assessment

Like any other potentially hazardous workplace activity, where there is more than a very minor use of Display Screen Equipment a risk assessment should be carried out.

The HSE produces a very thorough checklist document that can be used for this purpose so there seems no point in attempting to produce another one.

It can be downloaded by clicking on the image or using the link here

https://www.hse.gov.uk/pubns/ck1.pdf

6 Smartphones

The modern smartphone is a device undreamed of by the authors of the last version of this guidance. There is no doubting that they have great potential as educational tools and great power for good.

There is also no doubting that their usage can be a cause of many serious problems especially, but by no means exclusively, for children and young people.

The very nature of these devices, unlike most computers, means that the usage in the classroom, where it happens, usually involves the use of the learner's own device. This blurring of home and school/work can create its own problems. In addition, as is the case in many other areas, what happens at home has knock-on effects in the classroom.

Schools and colleges have no power to control the usage of these devices other than on their own premises but they should be aware of the problems and attempt to bring. influence to bear where possible and appropriate.

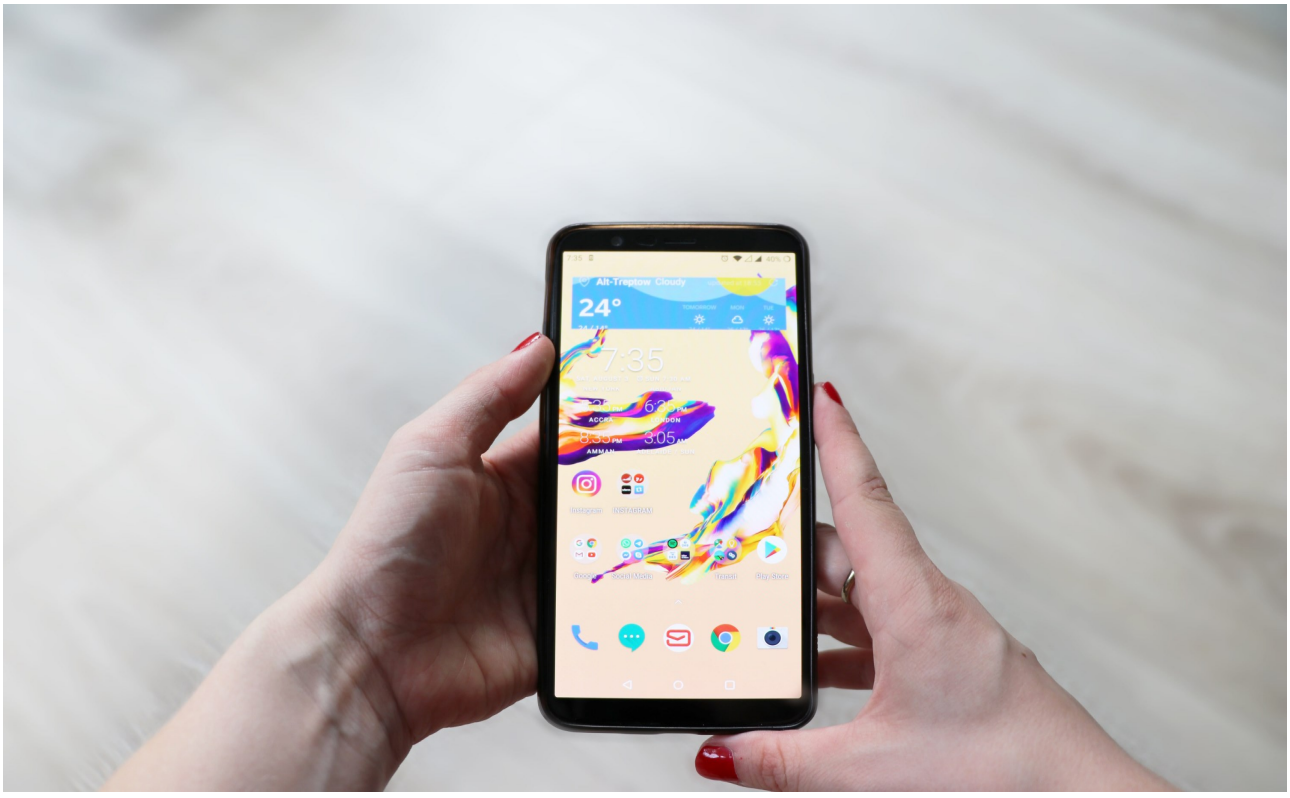
People who have routinely to work with smart phones, tablets and other hand-held devices must be considered a DSE users and thus all the steps mentioned earlier in this document should be taken to ensure their safety. However, very few people will use their phones in this manner.

Used correctly smart phones, tablets and the like should not pose any significant additional risks. They are rarely used for long periods continuously and are almost always supporting a work activity rather than being the focus of the activity.

The keypads on these devices are not designed for long periods of use or for work requiring significant information input; for this sort of work a correctly set up workstation or laptop is always the best option.

These smart devices are intended for occasional use as a notepad, an aide-memoire or to occasionally enter information into a checklist or pro-forma.

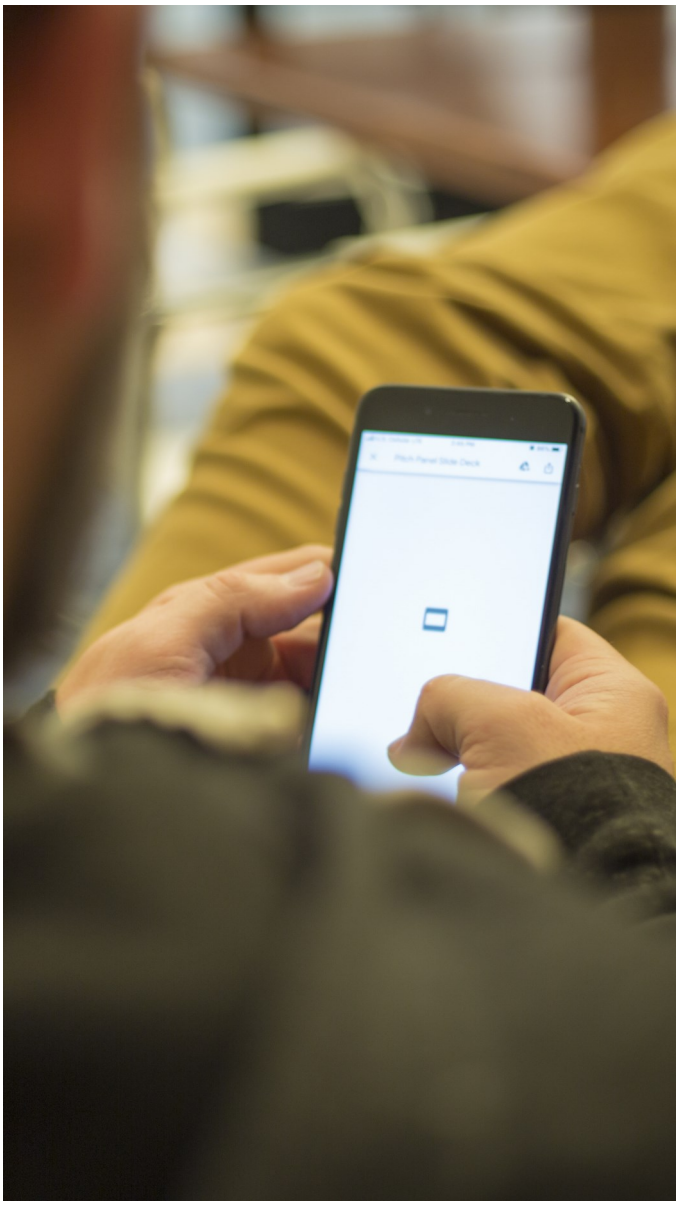
Because the keypad and screen are in the same place when a portable device is used the user tends to angle their head down or raise their arms.



In either case, holding the posture that has to be adopted for any extended period of time runs the risk of developing neck and upper limb conditions.

These risks can be reduced by sensible use of the equipment and some basic instruction to users. The basic advice which employers should be giving to workers who use this equipment should include;

- When interacting regularly with the screen have the tablet flat or only slightly angled to ensure that your wrists are not in awkward positions.
- Use a light touch when interacting with the screen.
- Avoid glare on the screen.
- Keep the screen clean so that you can see the display.
- If you find yourself leaning forward to view the screen enlarge the image or text.
- Try to place the tablet on a surface rather than holding it.
- If you need to use the keypad for prolonged periods consider using a blue-tooth external keyboard.
- When reading from (as opposed to interacting with) the equipment use a stand or tilt the tablet so that the need to bend your head forward is minimised.
- Remember that movement is important. If you find yourself using the device for more than 10-20 minutes take a short break to stretch your hands, shoulders and neck.
- Relax your eyes regularly by looking into the distance.



7 Self-check for learners

The self-check list below has been devised for use by pupils aged 10 or over and can be used at home as well as in school.

You don't need to worry about this assessment if you are only using your computer/tablet for a short period of time.

Many of these do not apply to tablets or laptops unless they have external keyboards, mice or possible screens. This is fine for short spells but they area not suitable for lengthy periods of work

You can check your own computer station by answering the questions below. Go through the list and put a tick in the yes or no column for each one.

The appearance of a "No" means something needs to be changed. It may only need a simple adjustment of the chair height or screen to correct the problem. Also a "No" may tell that your posture is wrong, or the way you work needs changing."

Question	Yes	No
Are your wrists fairly straight in line with your forearm (that is, not bent up or down nor to either side more than a little bit)?		
Can you see the screen without tilting your head up or down?		
Are you able to work at the device without twisting your neck or your back?		
Can you see the letters on the screen easily without sticking your chin out or leaning forward?		
Are your upper arms relaxed at your sides (that is, are your elbows below your shoulders) when you are typing?		
Have you changed the way you are sitting in the last few minutes?		
Have you taken a break from the keyboard or mouse for at least 10 minutes in the last hour?		
When using the keyboard, do you use the keys lightly (just a little more than the minimum required to press the keys down)?		
When using the mouse do you rest your hands lightly on it without tensing your fingers?		
Do you relax your finger after clicking the button on the mouse?		
Can you work comfortably at the computer without any sharp edges (such as the edge of the desk) contacting your arms or body?		
Do you feel comfortable when sitting at the computer?		
Can you work at the computer without feeling tense?		

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