

### NEU Guidance for Members, Reps and Local Officers

***Use of data projectors is common in schools. This briefing advises on precautions to be taken to avoid discomfort and possible damage to the eye.***

#### ***Different types of data projector***

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This briefing refers to three main types of data projector available to schools:

- the traditional data projector, requiring a ceiling-mounted or floor/table-top projector unit;
- the ‘ultra-short throw’ projector, which is mounted above the display screen and therefore out of the line of sight of the user; and
- the rear-projection whiteboard, in which the projector is sited behind the screen.

The second and third kinds of projector cited above boast significant advantages over conventional projection systems. In particular, they both offer solutions to the problems of projector siting and the consequent potential for eye damage which are the principal drawback of traditional data projector configurations.

#### ***Guidelines for users of data projectors***

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When using a data projector, the following guidelines should be adhered to.

- Never stare directly into the projector beam;
- Keep your back to the beam as much as possible, and avoid standing facing into the beam for more than a few seconds at a time (the use of a stick or laser pointer<sup>1</sup> is helpful in this regard); and
- Always step outside the projector beam when turning to face the class for more than a few seconds.

Teachers and support staff should:

- ensure that pupils are always adequately supervised whilst the projector is operating, and have been trained to follow safe routines of projector use.

When purchasing or using projectors where there is likely to be a person in front of the beam, consideration should be given to the use of a method of brightness, such as a neutral density filter or brightness adjustment facility. These modifications can be removed or adjusted for other purposes such as cinema projections, where there is no intention of anyone being positioned in front of the beam, so allowing the projector to be used to its full image quality potential.

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<sup>1</sup> Laser pointers should be kept securely, and pupils prevented from misusing them, e.g. attempting to aim the laser beam into the eyes of other people.

It is very important to follow the manufacturer's instructions on the safe use of data projector technology. Warning notices should be displayed prominently on or in close proximity to the equipment, in particular reminding all users to avoid staring into the projector beam at all times. Risk assessment should inform good practice within every school. Training should be provided for all users of the equipment, which should include all relevant health and safety issues.

### > **Installing Data Projection Equipment**

Interactive whiteboard equipment, of any type, should only be installed by properly qualified personnel. It is essential that a survey of the rooms in which whiteboards will be installed is carried out before purchasing any equipment. This point should ideally form a part of the purchase agreement. Furthermore, 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. In advance of the commencement of any work, checks should also be made as to the possible presence of asbestos - either in the wall to which the screen is to be attached or in the ceiling to which the projector is to be fixed. Where there is any doubt in the matter, appropriate professional advice should be taken prior to further steps being taken. More information is available in the NEU health and safety briefing Asbestos in Schools, available at <https://neu.org.uk/>.

Secondly, projectors should, wherever possible, be placed out of the reach of the pupils. A ceiling mounted projector is the preferred solution as this reduces the likelihood of photochemical damage to the eye from projector beam dazzle and avoids trailing wires. As mentioned above, an even better arrangement is to use ultra-short throw' projectors. These enable the device to be mounted above the screen, in such proximity to it that it is impossible for a user to directly expose their eyes to the beam.

### > **Screen Accessibility**

Consideration needs to be given to the height at which the screen should be positioned. The aim should be that both staff and children are able to reach the board comfortably. This, however, is easier said than done. For primary classes especially, there is likely to be a considerable disparity between the relative heights of pupils and teacher. It is clearly unacceptable from an equalities standpoint to restrict access to the board to users over a certain height.

Lowering the screen too far, however, could place staff at an increased risk of developing musculo-skeletal disorders (MSDs) as a consequence of needing to spend a significant amount of time stooping and bending to reach the lower parts of the whiteboard. Screens placed at too low a level can furthermore have an adverse effect on the quality of the projected image. Where the projector is ceiling-mounted, as recommended above, a 'trapezium effect' tends to occur if screens are positioned at heights of less than about 60 cm from the floor.

A simple method of improving pupil access to a whiteboard is for pupils to be issued with soft beaters – such as those used in playing the glockenspiel. This gives the smaller children an increased 'reach' and improves the control of those with poor motor skills. A further aid to whiteboard access has been the development of software for interactive whiteboards which positions toolbars at the bottom of the screen rather than the top. This is undoubtedly helpful, although of course it does not solve the problem of reaching other whiteboard content that still remains at the top of the screen.

Some interactive whiteboard users have experimented with the use of a platform on which smaller children can stand to enhance their ability to reach all areas of the board. There are now a number of commercially available platforms on the market, specifically designed for this purpose. There are arguments against the use of such platforms, as they can present a further set of health and safety risks – mainly in terms of slips, trips and falls.

The view of the NEU is that, notwithstanding the advantages of raised platforms in terms of pupil inclusion, a risk assessment would need to be conducted in each case of a platform being installed. Such a risk assessment should take into account the size and layout of the classroom in question, as well as the age and possible behaviour of the children taught in that room. A careful balance would need to be struck between maximising pupil inclusion whilst minimising the risk of injuries being sustained by people falling off, or tripping over, such an aid.

One of the most innovative solutions to this problem is the use of an A5 or A6 USB graphics tablet. This equipment offers a number of clear advantages, including

- the removal of the need for whiteboard users to go anywhere near the projector beam – or even to get out of their seats at all;
- the whole of the projection surface can be covered with just a few inches of pen movement, regardless of the user's physical stature, and largely regardless of most physical disabilities; and
- they are relatively inexpensive.

#### > **Problems with remote controls**

Data projectors come with remote control devices to facilitate their ease of use. In most cases these will operate well and will moreover help to keep the user out of the projector beam. In some cases, however, handheld remote control devices fail to communicate properly with the projector except at very close range. Such concerns should be taken up in the first instance with the ICT technician and/or senior member of staff responsible for ICT at the school. It may be that the matter will need to be referred to the supplier or the manufacturer. Under no circumstances should teachers stand on chairs or other furniture in an effort to gain sufficient proximity to the projector.

#### > **Optimum viewing conditions**

In a bright room, rather than increasing the brightness of the projector, blinds should be used. It is generally viewed that a maximum of 1500 ANSI lumens is adequate for projection equipment in most classroom environments, except in the most extreme ambient lighting conditions, where it is advised that window blinds are used rather than increasing the brightness of the projector. Using a more powerful projector could lead to discomfort and possible damage to the eye. Where the visibility of the screen is adversely affected by glare from the sun at any time of the school day, black-out blinds (or similar) will be needed.

#### > **Mobile Data Projectors**

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.

## > **Static electricity**

Most electronic devices are sensitive to, and may be destroyed by, static electricity discharges. Electronic equipment such as computers and data projectors should be switched off and sited at least 2m away from apparatus which produces static electricity, such as a Van de Graaff generator.

### ***Laser Pointers***

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Like beams from data projectors, laser pointers can also cause eye damage. A survey of UK ophthalmologists reported 159 incidents of eye injuries from laser pointers since 2013, mainly affecting young children. There is anecdotal evidence that laser pointers have been taken into schools by pupils and shone at members of staff or other pupils. Due to the availability of high power laser pointers (they are easily purchased online), there is the potential that such laser pointers could cause sight damage to individuals in schools. There have also been reports of pupils shining lasers at school bus drivers even from the bus or at bus stops, and this has the potential to cause serious accidents.

As with beams from data projectors, laser pointers should never be pointed directly at a person's eyes. While there are legitimate uses of low power lasers in schools, such as physics teachers using lasers to demonstrate characteristics of light, it is unlikely that there will be many, if any, situations that necessitate pupils taking lasers into schools. DfE guidelines allow for laser pointers to be included in a school's list of prohibited items that can be searched for, confiscated and destroyed. More information is available in the 'screening and searching pupils for prohibited items' briefing available at <https://neu.org.uk/>. A Public Health England video on the dangers of lasers is available [here](#), and may be a useful teaching resource.

### ***Frequently Asked Questions***

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#### **Q. Why should I not look straight into the beam of a data projector?**

A. You would actually find it very difficult to look straight into the projector beam. If you attempted to look towards the projector lens, you would immediately want to avert your eyes – this is called an 'eye aversion response'. This is just as well, because if you didn't look away you could over-expose your eyes and cause photochemical damage to them. It's not unlike trying to look straight at the sun – and the level of risk is about the same, in fact.

#### **Q. So as long as I don't look straight at the lens, I'll be OK?**

A. It's not as simple as that. Going back to the comparison with the sun, we all know that if you try and look straight at the sun, you will get a very powerful eye aversion response. As before, this is beneficial, because if you carried on looking straight at the sun, you would cause serious damage to your eyes. However, if you look a little to one side of the sun, or above or below it, the eye aversion response diminishes, but the risk of injury to the eye remains at a similar level to looking straight at it.

Looking into the beam of a whiteboard projector is somewhat similar. If you stand in the projector beam and attempt to look straight into the projector lens, a very strong eye

aversion response will be experienced. Like the sun, though, when you look towards the area around the projector beam, the eye aversion response is greatly reduced or even unnoticed, but the risk of photochemical damage to the eye remains at a comparable level to looking straight at the lens.

**Q. At what point in relation to the projector is it safe to look, then?**

It is not possible to state accurately at what point in relation to the projector you can safely look. This is why if you are standing in front of the whiteboard to use the interactive features, you should keep the beam behind you and you should avoid turning to face into the projector beam. It is not a problem to turn and face the class occasionally, but not for more than a few seconds at a time (current scientific research puts the maximum exposure limit at about 10-20 seconds).

**Q. But that's impossible! How can I stop and explain things to the class, or take questions, if I can only turn around for a few seconds?**

You should step outside the beam altogether if you need to face the class for more than a few seconds. There is no risk to the eye if you stand outside the beam when facing in the direction of the projector.

**Q. All right, but how do I know when I'm in or out of the projector beam?**

A. Simple. If you can see your shadow on the whiteboard, you are standing in the beam.

**Q. How do I get pupils to avoid this risk?**

A. You need to get your students into the routine of walking up to the whiteboard, using it without turning round towards the class, moving outside the beam when they've finished and then turning to return to their seat.

**Q. I noticed recently that I seem to experience spots in front of my eyes for some time after I must have accidentally been looking into the projector beam. Is this evidence that I've been injured?**

A. If you've been following the above advice, you are not at risk. However, the sort of after-effects you mention are not uncommon when using data projectors – in much the same way as you can experience various kinds of visual disturbance after attending a function at which a lot of flash photography has been carried out. They are not of themselves evidence of damage to the eye.

**Q. Since the installation of a computer projector in my classroom, I have been plagued by headaches. What can I do?**

A. In the first instance, you should seek medical advice from your GP in order to establish the cause of the symptoms and receive appropriate treatment. If using the whiteboard equipment does appear to be one of the triggers of your headaches, you should request an individual risk assessment for your use of the data projector. This will need to take account of your symptoms, and the fact that they occur despite following the control measures set out in the general risk assessment. Additional control measures will then be required in order to adequately manage the risk to you arising from your use of the equipment. Possible measures might include a time limit on spells at the whiteboard; reducing the brightness of the projector lamp and/or the wearing of tinted glasses. If these strategies failed to help, the employer might have to consider the purchase of an ultra-short throw projector or rear projection unit in order to satisfactorily resolve the problem.

**Q. My school has introduced a lot of these projectors with little or no concern for the health and safety of the users. No risk assessments seem to have been done, and the training we have received has made no mention of safety risks or how to avoid them. I'm worried - what can I do?**

A. Firstly, you should consult your NEU health and safety representative at your school, or in their absence, the NEU school representative. Raise your concerns, and show them a copy of this NEU guidance. If the matter cannot be resolved adequately at school level, you should get in touch with your NEU health and safety adviser or alternatively contact the NEU Adviceline in England on 0345 811 8111, NEU Cymru in Wales on 029 2046 5000, or NEU Northern Ireland on 028 9078 2020..

### ***Safety Representative's Checklist***

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- Does the employer have a comprehensive policy on interactive whiteboard projector safety?
- Does the policy reflect NEU advice?
- Does the policy cover use of the equipment by staff and pupils?
- Is the policy widely disseminated to both staff and pupils, with a clear and visible summary posted in areas where such equipment is likely to be used?
- Have the main safety points been made clear to all potential users at the outset, i.e. when such equipment is purchased or set up for the first time?
- Has suitable training been provided for staff, both in their own use of the technology and in the management of pupil safety in the vicinity of such equipment?
- Is the equipment set up in a safe way in all areas where it might be used?
- Is the training and information shared with new staff and pupils on starting at the school?

### ***Further Guidance***

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Further advice can be obtained from the following sources:

#### **Health and Safety Executive (HSE):**

<http://www.hse.gov.uk/radiation/nonionising/whiteboards.htm>

#### **British Educational Communications and Technology Association (BECTA):**

BECTA was the government agency leading the national drive to ensure the effective and innovative use of technology throughout learning. BECTA provided a range of advice and guidance on ICT issues – including health and safety issues - in schools. Regrettably, BECTA closed in March 2011. Its website was archived on the National Archives site, and its health and safety pages can now be found at:

[http://webarchive.nationalarchives.gov.uk/20110130111510/http://schools.becta.org.uk/index.php?section=lv&catcode=ss\\_lv\\_saf\\_hs\\_03](http://webarchive.nationalarchives.gov.uk/20110130111510/http://schools.becta.org.uk/index.php?section=lv&catcode=ss_lv_saf_hs_03)

The archived BECTA pages include a specific section on data projectors – click on ‘Projector Health and Safety Issues’ for more details.

**Public Health England guidance on lasers:**

<https://www.gov.uk/government/publications/laser-radiation-safety-advice/laser-radiation-safety-advice>