

Interactive Whiteboards and Pupils with Additional Support Needs

Notes for Schools

Interactive Whiteboards (IWBs) are currently very popular but they are relatively expensive items so before a board is purchased and installed, a number of issues need to be considered.

IWB issues may be general, but - importantly as this directly impacts the local authority's statutory obligation to observe the Disability Discrimination Act, through its Accessibility Strategy - may also be very specific, as regards pupils with additional support for learning needs. 'Making reasonable adjustment' to include **all** pupils is something that needs to be borne in mind **first** when planning interactive whiteboard use, not as a final afterthought once possibly irreversible steps have been taken. If in doubt, contact your authority's Additional Support Needs Quality Improvement Officer (or equivalent) as well as technical staff. Please feel free to contact CALL [Centre-Scotland](#) for information/advice.

For example - a few of the most basic and important points -

- Many whiteboards are poorly positioned in classrooms as regards overall visibility and accessibility. Better planning and liaison with technical staff, movable stands and/or height adjustability would help.
- Many pupils with physical impairments and/or learning difficulties cannot manage to hold and manipulate a special stylus (aka 'pen' or 'wand'), therefore need a board that allows for direct operation by finger touch.
- Pupils who use wheelchairs or have significant mobility/balance impairments may need a height adjustable board as they may not be able to stretch or use platform or steps safely etc.
- Many pupils may be distracted and confused by shadows of the presenter or user, thrown by a front mounted projector, obscuring parts of the screen, and/or they may be unable to move out of their way.
- Some pupils may or be unable to understand or comply with the need to avoid looking into a front-mounted projector beam.
- As pupils with ASN may be moving in between a Learning Centre and classrooms, boards or solutions that they can use ideally should be available throughout the school at least sometimes (movable)

There is no 'best' board, and 'one size' does NOT fit all!

This paper aims to help you to review your school's needs before interactive white board purchase.

General Issues

Choosing a particular make of Interactive Whiteboard

There is no IWB or installation solution guaranteed to be suitable for every child/classroom/school. It is likely that within any authority (indeed even within a single school) a mixture of different whiteboard/installation solutions will be needed, to suit specific circumstances and to meet pupil needs. A mixture is OK.

When the technical details of the various different boards seem confusing, it may seem easiest to just leave the choice of board to the authority's technical experts, and/or to go with what another school bought and that is supported by local training. However, only **your** school staff know the key details of your own

school's classroom layouts, staff experience and expertise (and/or training needs), class composition, Additional Support for Learning needs issues, mix of existing hardware and software resources and so on, so you need to be informed and involved as much as possible, and to be prepared to have to argue the case, if necessary, for a system designed to meet your pupils' particular needs, rather than a 'standard' system.

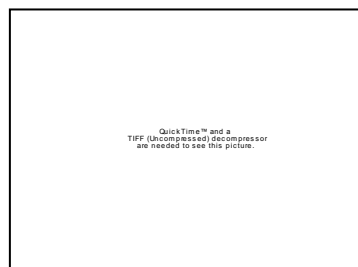
Broadly, interactive whiteboards are -

- either fixed to a wall or on a mobile stand.
- either operated by a special stylus (wand/pen etc.), with a tough hard surface (eg. Promethean, RM ClassBoard), or can be operated by direct finger pointing, with a membrane surface (eg. Smart Board). Until recently, you couldn't change a system that needs a stylus into one that reacts to direct finger touch. However there is now a new product worth investigating that can be operated by both/either stylus or finger, the Hitachi FX-DuoBoard (See http://www.hitachisoft.de/fr/test/Hitachi_FX-Duo.html and below for more details – though not much is known as yet).

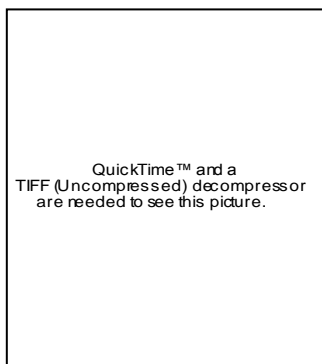
Options

You may be able add special features to deal with some of the barriers that standard IWBs (whether stylus or finger) present to pupils with ASN, such as:

- short throw front projection - reduces shadows, prevents pupils looking into beam, provides height adjustability (usually a manual handle). Promethean's ActivBoard+2 is an example. The illustration shows Smart 600i series board.



- Or - expensive – an all in one rear projection unit (cuts out the shadow, no trailing connecting wires, but less easily height adjustable and quite a bulky unit),



As well as the various different makes of IWBs, there is another slightly different kind of alternative that is proving extremely popular in the special school / unit sector, amongst teachers of pupils with significant / complex additional support needs.

Interactive Plasma Screens

This a large size touch monitor known as the 'interactive plasma screen', that requires no projector (thus no replacement bulbs) at all, and therefore throws no shadows. It has easy to operate electrically powered height adjustability (on wall mount or mobile stand). These are simple to use, give very bright and clear images, and are very robust – but they are significantly more expensive. For details, see www.inclusive.co.uk/plasma/index.shtml

QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.

Naturally these options add to the costs so you need to be clear about what exactly is needed and how it would work. For example, if you use a short throw front projection system set at its lowest level for use by Nursery or Early Years pupils, then the teacher risks bashing her head into the projector all the time,

Cost

It may be tempting to go for the cheapest IWB and installation option, but this could be a false economy, if it turns out that the board is difficult to use effectively or does not meet the needs of pupils. Cost has to be balanced up against the requirements of a particular class, group or individual pupil(s). The only truly valid arguments for or against any system are those based on accessibility and on educational issues – **not** cost alone.

Whichever board you are considering, remember too -

- When costing a board, check what is included or 'extra', and total up all the costs of essential 'accessories' such as a laptop computer to run the whiteboard, overhead projector, ceiling mount, height-adjustable mounting, speakers and speaker set up, microphone, cables, any installation costs, and perhaps also wiring adaptations and carpentry work. Take account of replacement costs, eg projector bulbs
- Teacher might want a USB 'clicker' (control IWB from anywhere in room)
- The special stylus for Promethean or RM ClassBoards boards has a nasty habit of disappearing with great regularity – and costs £50-£70 to replace.
- Is the software you need bundled into the cost or extra?
- Will pupils with ASN be able to use the board or will you need to add extra touch monitor or PC? (and would the price of this cancel out the benefit of buying the cheapest board to start with?)
- You might also have to consider other costs, such as purchasing and fitting new curtains or blinds. Even though modern projectors can function in a well-lit room, few can cope with direct sunlight hitting the projection screen. (NB. The plasma screen can cope well with bright light)
- Additional software and staff training will probably be needed. What is available and what does it cost?
- What warranty and support is offered by the supplier, after installation, (and at what cost) and what technical support is available locally.

Once you've added up all the 'extras', cheap systems may not look quite so cheap, and, possibly, 'all-inclusive' options not quite so dear.

Making Decisions

Senior School management and classroom staff, **with Learning Support staff** should

- hold and record discussions amongst themselves
- with regard to visibility, accessibility and usability, think through exactly the who, where, when and how's of IWB use, before selecting hardware and positioning of board, and choosing software and peripherals.
- take a whole school perspective on planning - although a class may currently not contain a pupil with difficulties that prevent him or her using a particular type of board, there may be a younger pupil coming up through the school that does have such problems.
- coordinate closely with technical staff to establish what is possible and advisable, technically. For example, brightness, bulb type and lamp life and resolution, for the overhead projector, cable length (usually 5 metres max) for board location etc.

Computer

- It is advisable for the computer controlling the interactive whiteboard to be connected to the internet, for easy access to online resources, eg. Clicker Learning Grids or TextEase files (see also Resources section below).
- Consider whether you want the computer also to be attached to your network so staff can share resources and pupils can access files before or after the whiteboard session, on their own or with a partner?

- Consider the facility of being able to attach a second monitor (using a video splitter), or another PC or laptop without having to waste time disconnecting a permanently-connected computer, or having the child with ASN use the teacher's computer (Eg for a child with visual impairment or limited hand function to use their own touch screen or alternative access method, eg. joystick or switches, as part of a group whiteboard session).

Installation

- Schools need to manage whiteboard installation fully. Do not leave it to the technical services or company to install the whiteboard in any classroom without full discussion and detailed instructions left about *exactly* where it is to be positioned.
- Rearrange the room before installation if possible. Clear the wall, if it is to be wall-mounted, and think about drawing on the wall or sticking a correctly sized paper up at the exact height you want it.

If you do not do this, you may come back after a holiday to find it installed too low or – usually – far too high, over a radiator, in direct glare from window or lights or any number of other inappropriate locations, necessitating a complete upheaval of the whole room. (Without instructions, technicians sometimes tend to take the line of least resistance (ie nearest to power and/or network point).

Sharing Interactive Whiteboards?

Schools may think of minimizing costs and maximizing use by envisaging a shared facility, but this is not always realistic. Sometimes it means the board ends up fixed somewhere that **nobody** finds convenient, or is found to be too cumbersome to move around quickly enough, so is not used effectively by anyone. (Or the special stylus continually gets lost!) However, a mobile board or plasma screen may be the best solution for small group or individual work with pupils with ASN, especially when there is a need to withdraw to a less distracting environment, or to include a specific pupil in various different rooms.

Software Issues

Some schools buy a particular board because a member of staff has seen and liked a particular piece of software or set of resources that goes with that board. It is certainly worth checking what bundled software comes with each IWB and looking carefully at which software suits your pupils best. Most staff like 'ready made' resources, that saves them from having to search for or create their own. For this reason, perhaps, the ActivPrimary or ActivStudio software bundled with Promethean Boards is popular. Easiteach software (based on TextEase, and available from RM for use with Smart and/or RM ClassBoards) is also good.

But you need to be clear that as an interactive whiteboard is basically just a big pointing device (the same as a mouse), actually **any** software (that requires just a mouse and not a keyboard to operate) can be used on the whiteboard, so there is no need to restrict hardware choices to one particular board just because of a software issue. Promethean 'Activ' software will also run on a Smart board (a wee hub is needed) and Easiteach will also on a Promethean, if required. This means that even if a school has more than one type of IWB, teachers do not necessarily have to learn and operate 2 different software systems.

Equally, there are ever-increasing numbers of IWB resources available for online use and/or free download from a variety of sources (see Resources section, below). And new software coming out tends to have been designed very much with IWB use in mind. So teachers do not have to be restricted to the bundled software. Especially for ASN use, TextEase. PowerPoint and Clicker are key software resources.

Additional Support Needs

Teachers of pupils with additional support needs will be aware that:

- To be fully included and to learn from the experience of IWB use, pupils with ASN need to be able to interact with the board and not just watch
- Projector beams and shadows on the screen can cause problems for their pupils
- Boards that require use of a special 'pen', stylus or pointer is usually a 'no-no', direct finger access is much better / essential.
- Height adjustability is essential for wheelchair users or pupils that cannot easily balance, reach, stretch or bend. Use of steps/platform is not safe. Use of pointing sticks etc. is not recommended since children can often not grasp or control these effectively.
- The noisy cooling fans on projectors can be a distraction/barrier for all pupils and perhaps a major problem for hearing impaired pupils
- Much of the bundled IWB software is not relevant or useful for 'their' pupils. Useful software for them is more likely to be generally available, downloadable or self-created, eg PowerPoint, TextEase, SwitchIt software
- Although perhaps all pupils currently can use a stylus, a new pupil could come in at any time, who can't...
- In spite of adaptations, some pupils will never be able to use a IWB in quite the same way as their classmates, but one-off solutions may be found for them, eg. connecting their own monitor or computer, or remote access to the computer controlling the board, by wireless pointer/keyboard or tablet computer.

Screen Size and Image Clarity

Having said all of the above, some pupils with ASN can also get a lot out of using an IWB board just as a large screen (eg. in 1:1 work).

It may seem in theory that 'the bigger the better' is true for pupils with ASN who may be visually or perceptually impaired, or have many difficulties concentrating. However, we need to remember that if a surface is **too** big it can be difficult to take in visually without having to turn the head and being able to scan visually. (Difficult for many physically and visually impaired pupils, and some have tunnel vision or restricted visual fields anyway).

With some boards, particularly front projection IWBs, the image is grainy and unclear and can even throw off a glare, and bigger is sometimes worse.

Also - obviously - if a screen is too big, it will be beyond the arm reach of younger and smaller pupils or those with poorer physical function.

Joystick / Rollerball Users

Pupils who cannot use the board but who need a special mouse or joystick etc. could have this attached to the teacher's computer, which is driving the IWB, while she uses the board. However, this is only feasible if

- a) the pupil is a reasonably reliable user (otherwise chaos could ensue!)
- b) the computer is positioned accessibly. If not, the pupil might use a wireless rollerball or joystick from his/her own desk, for more details see www.inclusive.co.uk/catalogue/acatalog/optimax_wireless_joystick.html

Switch Users

Pupils who can only access the computer by means of single or double switch could, equally, have these attached via the switch interface to the teacher's computer. But the issue for these pupils is much more about software than about access. By definition, applications for use on IWB are designed for access by pointing, not for scanning, so switch users will find it difficult to participate

actively with the software other children in the group/class are using. But some software designed for special needs can be configured so that although it scans and is thus accessible to a switch user, it can also be used by direct pointing, at the same time. Eg. ChooseIt Maker 2, Choose And Tell stories

Summary and Conclusions

For children with reasonable mobility and mild / moderate learning difficulties and reasonable hand function -

A standard fixed IWB set up, with stylus use, may be satisfactory, providing this is well planned and located.

For groups in which only one or two pupils have difficulty with mobility, reaching and pointing, projector beam, shadows, and/or or other aspects of IWB -

A mobile stand will help to ensure that presenter and all pupils in group can be positioned optimally, or can move around as necessary. A height adjustable short throw system would eliminate most problems.

For groups in which only one pupil has difficulty with stylus use -

Consider attaching to the laptop controlling the board an additional touch monitor (using a video splitter) or a wireless mouse, rollerball joystick (or even touch screen tablet PC) that can be operated from pupil's own position. These will show up on the board as if the pupil was standing pointing directly. (Potentially good solutions, respectively, for pupils with visual or physical impairment, but might be confusing for youngsters with learning difficulties.)

For groups where several pupils are likely to have difficulties with projector beam shadows and/or stylus use -

Consider a finger sensitive Smart board (possibly short throw projection). Review what software is required. (A hub to run Promethean's ActivPrimary software on a Smart Board can be bought from Promethean).

For groups of pupils who all have complex additional support needs -

If the money can be found, consider buying instead of an IWB, a large size movable height-adjustable interactive plasma screen that is very bright and completely noise and shadow-free, now generally recognised as the best option for special schools and special classes and groups, see <http://www.integrex.co.uk/presentation/hilo/hilo.htm> www.inclusive.co.uk/catalogue/acatalog/inclusive_plasma.html Where children require highly specialized software anyway, doing without the software bundle that comes with Promethean or Smart boards is no loss anyway.

Otherwise, consider a finger sensitive Smart board (possibly short throw projection), as above.

Going through the checklist below may be a useful way to home in on key issues for particular settings or pupil groups.

IWB Checklist for Pupils with Additional Support Needs

Please complete each section and highlight circle each relevant conclusion/suggestions with a colour. Then review the various suggestions and work out your overall conclusion

Environment / Pupils	?	Suggestions
Can you cut out glare from windows / bright sunlight / black out the classroom if necessary?	YES	Consider position of IWB in room to minimize glare from windows
	NO	Get blackout blinds /curtains fitted in classroom Think about a getting an interactive plasma screen (brighter)
Is there adequate free wall space to mount a board (and to have a group of children sitting round it)?	YES	Wall-mounted system is OK
	NO	Need a system on a mobile stand, rather than wall-mounted
Will the board need to be moved around to different locations?	YES	If occasionally or small distances only, need a system on a mobile stand. If frequently/longer distances, think about getting 2 boards.
	NO	Fixed system is OK
Will the board be used by a number of different presenters	YES	Special stylus is liable to get lost/be locked away – think about using a finger touch sensitive system such as Smart Board, instead of a Promethean or RM Class Board
	NO	Stylus system may be OK

Environment / Pupils	?	Suggestions
Will use of board always be for whole class teaching?	YES	Fixed system should be OK if well positioned. Might want to buy a USB 'wireless remote clicker' so teacher can control board from anywhere in the room (ie. not just from board or laptop)
	NO	For flexible use, with small groups / individuals - or different rooms, obviously - a system on a mobile stand is advisable.
Can your pupils understand and comply about not looking into projector bulb/bulb?	YES	(Are you sure?) Standard system is OK
	NO	Consider short throw or rear projection or interactive plasma screen
Are any pupils distracted/confused by shadows thrown by front projection, or unable to move out of the way of these?	YES	Consider a rear projection system or interactive plasma touch screen
	NO	No issue to consider
Are pupils small and/or liable to be sitting on the ground to view screen?	YES	Fixed system should be OK if all pupils at same height all the time Try to avoid height adjustable short throw projector systems for H & S reasons (If using a height adjustable system check the lowest height it goes down to – some may not be low enough)
	NO	Fixed system OK, appropriately positioned.

Environment / Pupils	?	Suggestions
Can all pupils stand up, balance in standing (while pointing), and reach to a similar height?	YES	Fixed system OK if well positioned.
	NO	<p>For wheelchair users or other physically disabled pupils, a height adjustable system is likely to be necessary (whether wall mounted or on mobile stand).</p> <p>Check the range of heights covered– some (Secondary aimed systems) may not go down low enough.</p> <p>Check how easy it is to adjust height (manual or electrically powered?)</p> <p>Do you need to recalibrate the screen each time the height is adjusted - and how easy /quick is it to do this?</p> <p>May need system on mobile stand, for flexible positioning</p>
Can all pupils grasp, hold and operate a stylus/pen/wand?	YES	Promethean or RM ClassBoards (or similar stylus systems) are a viable option
	NO	<p>Promethean or similar stylus systems are not an acceptable option. Need to get a finger touch sensitive system such as SmartBoard or Plasma screen. Or investigate new Hitachi DuoBoard?</p> <p>Or</p> <p>Need to give pupil an alternative access method to the board, eg. wireless tablet, mouse/ mouse alternative</p>

Some Resources for Interactive Whiteboards

(there are *many* more – just Google them!)

Background Guidance

http://www.ict.oxon-lea.gov.uk/ICT_docs/Information_Sheet_on_Interactive_Whiteboards.doc (downloadable paper)

<http://www.interaktivtablamegoldasok.info/ProjectorandIWBadvice.pdf> (downloadable paper)

<http://maximise-ict.co.uk/IWBs.pdf> (downloadable paper)

<http://www.northerngrid.org/ngflwebsite/sen/smartboard.htm>

<http://www.kented.org.uk/ngfl/ict/IWB/docs/SmartboardRules.pdf>

For Additional Support Needs in Particular –

www.whiteboardroom.org.uk

The Advisory Unit has created a site called 'The Plasma Screen and Whiteboard Room' providing freely downloadable materials, in a variety of board formats, and PowerPoint. There are also web links to software that runs directly from a website- usually Flash programs. They are mostly suitable for young learners and those with Additional Needs. All the materials have been created by practitioners. There are also useful information materials here, eg. tutorials on use of PowerPoint etc.

www.checkthemap.org/links/fun_sites

This resource, which like the one above, is added to continually, provides links to a number of other sites from which huge numbers of free resources are available, that are useful for pupils with additional support needs.

www.priorywoods.middlesbrough.sch.uk/resources/

A favourite site for free fun goodies for pupils with complex ASN, most are usable on IWB and/or switch operation.

www.learninggrids.com/

Free but you have to register. Clicker 5 grids can be used online or downloaded. (Older Clicker 4 grids are no longer available from the Crick site but can be purchased at cost on a DVD, available from CALL Centre.)

<http://www.smart-education.org/>

Free but you have to register. Smart and PowerPoint files for download

General Resources

<http://www.kented.org.uk/ngfl/ict/IWB/index.htm>

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

<http://cardiffschools.net/%7Eroelmann/whiteboard/>

<http://www.ict.oxon-lea.gov.uk/whiteboards.html>

www.learninggrids.com/

Price Guides

We cannot here compare costs exactly, as (a) there are many different possible suppliers who package equipment slightly differently (b) suppliers will do special cheap deals with authorities for bulk buying of boards and data-projectors etc. so we don't know exact prices in any given setting

Standard/Cheapest systems, used via a hand held stylus

- **Promethean Boards** - cheapest, with the most software bundled in (ActivPrimary or ActivStudio for Secondary) - although this software is not necessarily useful for children with complex ASN. Difficult for children with ASN to use because of stylus.
- **RM ClassBoard** - £779 for 60" screen, comes with Easiteach software, possibly the next cheapest option.

Different mountings and height adjustability cost extra

Recommended where some children cannot use stylus

Smart Board – bundled with Smart Notebook Software and Easiteach 'starter' software

Smart Board 600 series –£649 for 48" screen; £920 for 64" screen; £1166 for 77" screen

Plus

Overhead projector, ceiling mount, speakers, cables etc., Different mountings and height adjustability cost extra eg. Mobile Floor stand - £225, Wall mount bracket £39
ActivPrimary ` software is extra

Smart Board 600i series (includes short throw projector & built-in speakers)

large size (77") only available £2,275

Different mountings and height adjustability cost extra

Smart board rear projection series – £5,500 for 50" screen and built in projector and speakers

Hitachi Cambridge Board – £1,215 for 60" screen

See <http://www.projected.co.uk/hitachi-cambridge.htm>

Plus

Overhead projector, ceiling mount etc., & speakers, cables etc., Mobile floor stand £290,
Hitachi DuoBoard - £1,795 for 60" screen, and short throw projector 'all-in-one' unit (finger or stylus) See http://www.hitachisoft.de/fr/test/Hitachi_FX-Duo.html

Interactive Plasma Screens

See <http://www.inclusive.co.uk/plasma/index.shtml> – these seem expensive but remember they are 'all in one' and include height adjustability and speakers and do not require overhead projector – to compare like with like they should be compared with the Smart Board Rear projection unit at £5,550

42" screen **£3,995 (with height adjustable mobile stand or wall lift)**

50" screen **£4,995 (with height adjustable mobile stand or wall lift)**

65" screen **£9,995 (with height adjustable mobile stand or wall lift)**

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