

**Evaluation of the Primary Schools Whiteboard
Expansion Project - summary report**

**Report to the Department for Children, Schools and
Families**

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Introduction

The expansion phase of the Primary Schools Whiteboard Project provided £10 million in 2003–04 to support the acquisition and use of interactive whiteboards in primary schools within 21 local authorities.

The aims of the Schools Whiteboard Expansion Evaluation (Sweep) are to:

- 1 Assess the educational impact and operational effectiveness of the Primary Schools Whiteboard Project initiative.
- 2 Evaluate the Primary National Strategy's whiteboard support network for schools not involved in the Primary Schools Whiteboard Project pilot.

More specifically, its objectives are to:

- 1 Assess the extent to which the use of interactive whiteboards affect standards in literacy and mathematics.
- 2 Identify the effects of using interactive whiteboards on a range of other outcomes.
- 3 Investigate the contribution made by the introduction of interactive whiteboards to the development of pedagogies and to a more general embedding of ICT across the curriculum.
- 4 Evaluate the impact of the project on continuing professional development among teachers.
- 5 Evaluate the effectiveness of the implementation and operation of the first phase of the Primary Schools Whiteboard Project initiative.

The report directly addresses these objectives and is organised in the following sections.

Executive summary of findings

This summary is organised under six headings, a general section and sections for each of the Primary Schools Whiteboard Project's objectives. It concludes with some recommendations.

General points

The interactive whiteboard has been welcomed enthusiastically by a large number of primary teachers and its take-up in schools has proceeded with unprecedented rapidity. This appears to be because it is a resource which is immediately useful to teachers in conducting whole-class teaching, which is a requirement of the primary strategies.

Pupils are universally enthusiastic about the interactive whiteboards, because of their clear visibility ('We can see!'), the easy access they give to ICT through touch, and the added variety they bring to lessons.

In the Primary Schools Whiteboard Project, interactive whiteboards have been permanently installed in classrooms. Although we did not ask teachers whether they switch interactive whiteboards off during the day, the overwhelming impression is that they are switched on first thing in the morning and remain on all day, making them available even when their use has not been planned for a lesson.

The extent to which the use of interactive white boards affects standards in literacy and mathematics

There is a consistent finding across all data that the length of time pupils have been taught with an interactive whiteboard is the major factor that leads to attainment gains. This appears to be the result of the interactive whiteboard becoming embedded in teachers' pedagogy: that is, when teachers have had sustained experience (around two years) of using an interactive whiteboard, they are able to change their teaching practices to make best use of its facilities. The qualitative data strongly support this.

Key Stage 2 mathematics

Analysis combining the data from the 2005 and 2006 cohorts found that averagely attaining pupils of both sexes, and high-attaining pupils of both sexes, made greater progress with more exposure to interactive whiteboards in maths. Progress was measured against prior attainment in Key Stage 1 national tests. Based on an expectation that pupils will on average progress six points (or one national curriculum level) in two years, it was possible to calculate their increased rate of progress. This ranged from two and a half months for girls of average prior attainment to five months for boys of high prior attainment.

interactive whiteboards had little effect (but certainly not a detrimental effect) on progress in maths of low-attaining pupils in either gender group.

When Cohort 1 and Cohort 2 are examined separately it is clear that once the innovation becomes embedded, positive gains are likely to be achieved by pupils of both genders and all attainment groups, thus reducing the likelihood that interactive whiteboards will widen the gap between low-attaining pupils and their peers.

Key Stage 2 science

Analysis of the data for Cohort 2 showed clear benefits of being taught with an interactive whiteboard for all pupils except high attainment girls (where there appears to have been a 'ceiling effect' since the highest possible score is fixed). The most marked effect was for low attaining boys who made some seven and a half months' additional progress when they had two years of exposure to interactive whiteboards as compared to no exposure.

Key Stage 2 English

Positive trends were identified in the combined data for English but these were not confirmed by separate analysis of the data for Cohort 1 and Cohort 2. As measures of attainment in English are less stable than in maths and science, the results are inconclusive and warrant further investigation with larger data sets.

Writing was explored separately because of concern at the poor performance of a high proportion of boys in writing, as compared to girls. Although no statistically significant effects were found (in part due to a reduced data set) a positive trend ($p < 0.094$) was found in boys with low prior attainment who made some two and a half months' additional progress after two years of being taught with an interactive whiteboard.

Key Stage 1 mathematics

Interactive whiteboards appear to have a positive impact in maths attainment at Key Stage 1 (measured against FSP data), once teachers have experienced sustained use and the technology has become embedded in pedagogical practices.

Key Stage 1 science

Use of interactive whiteboards for science was much lower than for maths and English in the first year of the project. However, analysis of the data suggests that girls of all attainment levels will make better progress with increased access.

There are indications that this positive experience may be shared by average and high-attaining boys but we found inconsistent results for low-attaining boys.

Key Stage 1 English

Evidence suggests that once interactive whiteboards become embedded, pupils of average and high prior attainment benefit from increasing exposure to interactive whiteboards.

There is no effect (beneficial nor detrimental) of interactive whiteboards in relation to low-attaining pupils. However, this may lead to widening gaps in progress between low attaining pupils and their peers.

The effects of using interactive whiteboards on a range of other outcomes

The interactive whiteboard is an ideal resource to support whole-class teaching. It acts as a focus for pupils' attention and increases their engagement in whole-class teaching. Teachers tend to spend more time on whole-class teaching when they have an interactive whiteboard (Higgins *et al.*, 2005), but if whole-class teaching is more interactive as a result of the interactive whiteboard, any negative effects from reduced group work may be negligible.

The interactive whiteboard acts as a multi-modal portal, giving teachers the potential to use still images, moving images and sound, and when used in this way, it can address the needs of learners who find text difficult as the only mode of communication. At present only a small number of teachers have the skills to use a wide range of the interactive whiteboard's facilities but the final visits to Primary Schools Whiteboard Project case study schools showed that their skills are still developing through exploratory use.

Although use of an interactive whiteboard in whole-class teaching appears to have relatively little impact on raising the attainment of pupils with special educational needs (SEN), it has a marked impact in engaging their attention and often greatly improves their behaviour.

- Where teachers had been teaching with an interactive whiteboard for two years and there was evidence that all children, including those with SEN, had made exceptional progress in attainment in national tests, a key factor was the use of the interactive whiteboard for skilled teaching of numeracy and literacy to pairs or threesomes of children. This was often done by teaching assistants who had been trained to teach numeracy and literacy.
- The many advantages that sighted children enjoy when interactive whiteboards are used are denied to blind children who need to have

a running 'translation' of the interactive whiteboard's display. The greater pace of interactive whiteboard lessons increases the workload of teaching assistants who support partially sighted and blind children in the classroom. Furthermore, the electronic, often robotic and American sounding adult voices that come from interactive whiteboards can be frightening for totally blind young children.

Young children who have not yet acquired writing skills, and older pupils with special educational needs, are highly motivated by being able to demonstrate their skills and knowledge with the tapping and dragging facilities of the interactive whiteboard. These effects are greatest when they have the opportunity, individually or in small groups, for extended use of the interactive whiteboard rather than as part of whole-class teaching. We have seen only limited use of the interactive whiteboard in this way but in case study schools teachers told us that such use is ideal as a means of assessing pupils' learning.

When teachers have used an interactive whiteboard for a considerable period of time (by the autumn of 2006 for at least two years) its use becomes embedded in their pedagogy as a mediating artefact for their interactions with their pupils, and pupils' interactions with one another. The concept of 'mediating interactivity' is robust. It offers a sound theoretical explanation for the way in which the multi-level modelling (MLM) analyses link the length of time pupils have been taught with interactive whiteboards to greater progress in national test scores year on year.

The contribution made by the introduction of interactive whiteboards to the development of pedagogies and to a more general embedding of ICT across the curriculum

In the Primary Schools Whiteboard Project classrooms the interactive whiteboard is used most frequently for teaching numeracy and literacy and rather less frequently for science and ICT, but it is also beginning to be used by many teachers to teach all subjects across the curriculum. This is a major advance as ICT has not, till now, been embedded across the curriculum.

When connected to the school's network and via broadband to the internet, the interactive whiteboard acts as a portal to a wide range of resources. The use of the internet has greatly increased in many Primary Schools Whiteboard Project classrooms. Teachers model its use rather than pupils using it themselves, but pupils are often invited to suggest queries.

In the case study schools we saw many classrooms where the ambience was of teacher and pupils 'working together', often with attention directed to the interactive whiteboard rather than the teacher for part of the time. The extent

to which teachers make positive use of this shift of attention varies greatly. The most successful teachers are often those who use it as an opportunity to model the role of co-learner with the pupils.

Teachers in case study schools said that the interactive whiteboard was particularly useful in supporting visualisation to assist in teaching difficult concepts or demonstrating skills – for example in using a ruler, thermometer or microscope. These teachers used traditional resources alongside the interactive whiteboard so that pupils had practical hands-on experience to back up the demonstration on the interactive whiteboard.

Teachers almost universally start by using the interactive whiteboard very much as they used their previous traditional whiteboard, but even when pedagogic change is minimal, pupils perceive that lessons are more varied and appear to be better motivated. When teachers become skilled in the use of the interactive whiteboard they are able to use it – and many do use it – to increase interactivity and use a much wider range of resources.

By the autumn of 2006, evidence that the interactive whiteboard was embedded in teachers' pedagogy came from observing new patterns of teacher behaviour. These were either improvements on previous pedagogical practices made possible by the functionality of the board, or completely new practices. Although these had all become routine, instinctive behaviours and part of what is often called 'tacit knowledge', in some cases teachers were able to give clear accounts of how these new practices helped them to teach more effectively.

The impact of the project on continuing professional development among teachers

In those schools where interactive whiteboards were installed in all classrooms at the same time, in many cases replacing traditional whiteboards, teachers have learnt basic skills in how to use them exceptionally quickly, often pooling knowledge and providing mutual help. Learning together when there is a pressing 'need to know' is a powerful strategy. Formal training by school ICT co-ordinators appears to have been much more infrequent than informal day-to-day assistance.

Training provided by local authorities, using resources provided by the National Whiteboard Network (NWN) central team, has been very well received by schools. Although initially little was provided, provision appears to have increased recently in some local authorities, possibly because consultants' time is now less taken up with trouble-shooting.

There has been no training for teaching assistants (TAs) or headteachers and this has been noted at both school and local authority level as an unfortunate gap in provision.

Teachers have not only learnt how to use interactive whiteboards but, because the interactive whiteboard's main function is as an interface to a computer, they have also greatly increased their skills in using ICT, for example making regular use of the internet for lesson preparation and often 'live' use during lessons.

Eighteen months after installation of their interactive whiteboard, the majority of teachers in the case study schools had become highly competent users of the interactive whiteboard as a basic resource, and many were beginning to experiment with using it for a wider range of purposes. However, only those who had received continuing CPD, for example through seeking accreditation with one of the manufacturers, had developed high-level interactive whiteboard skills.

In Primary Schools Whiteboard Project case study schools, many teachers have made radical changes to their lesson planning, creating or accessing their own resources and storing them in either personal or shared areas on the school's server. In the second year some were beginning to notice that time needed for lesson planning had reduced, but others were spending just as long because they were keen to use their developing skills to produce better resources.

By the autumn of 2006 the pool of expertise in interactive whiteboard use resided in the schools where teachers had been using them on a daily basis for more than two years. Local authorities were beginning to look mainly to classroom teachers to provide training for their peers through periods of release from teaching.

The effectiveness of the implementation and operation of the Primary Schools Whiteboard Project initiative

Procurement and installation

The Primary Schools Whiteboard Project funding had a very strong 'pump priming' effect. Local authorities were able to negotiate special prices with manufacturers and schools found additional funding from existing budgets, with the result that the number of interactive whiteboards installed in Primary Schools Whiteboard Project schools during 2004–05 was around double that funded by the Primary Schools Whiteboard Project.

Installation of the interactive whiteboards in so many schools within a short period of time made an enormous demand on providers and installation teams nationally, and in some cases led to poor installation work and technical breakdowns.

The documentation and advice provided by Becta and the DfES was highly valued, but the process of procurement was very rushed.

In most case study schools the interactive whiteboards have been installed too high for easy use by pupils in Key Stage 1, and this frequently causes frustrations or becomes a safety hazard. The best solution appears to be where schools have installed a narrow but well-secured ledge below the interactive whiteboard for children to stand on. Although not ideal, without such a device children will always find other more dangerous solutions.

Project management at local authority level

Local authorities have generally provided good, practical, flexible support to schools.

Local authorities were not funded to support the Primary Schools Whiteboard Project and this placed a considerable strain on their capacity to support schools. However, the administration of the Primary Schools Whiteboard Project required local support from both primary strategy consultants and specialist ICT support units and this has led to many of these people working together for the first time, to great advantage.

Training for local authority consultants

The five two-day training workshops provided by the central team were well attended and highly valued by local authority staff, both for the teaching inputs and free resources, and the networking opportunities they provided with consultants from other local authorities.

However, the plans for collaborative production of resources by consultants across local authorities were not fully realised because, without allocated funding for the Primary Schools Whiteboard Project, consultants were often trying to carry out their previous job in the local authority at the same time.

The NWN web site

The National Whiteboard Network website has not been as widely used as expected by teachers in schools. This appears to be mainly due to lack of awareness and/or lack of need since several manufacturers have good websites and local authorities often provide the NWN resources on a CD. Some teachers appear to enjoy accessing resources from the internet using a search engine, and sharing recommendations of good websites with other teachers. However, headteachers and ICT co-ordinators say that a central resource is needed (perhaps unaware of the extent of the one that already exists).

Technical support and equipment failure in the schools

The extensive use of interactive whiteboards for teaching has made good technical support a necessity rather than an option for all primary schools. When lesson plans, including resources, are stored on the school's server and

the internet is regularly in use as both a preparatory and a 'live' resource, technical failure becomes a serious disruption rather than a discouraging nuisance.

There are substantial costs for primary schools in sustaining the interactive whiteboard initiative. The lifetime of laptops which are used to run an interactive whiteboard all day, every day, over a long period is reduced (in case study schools many of these laptops have lasted for only two years). Data projectors installed in earlier funding rounds have lasted approximately three years and bulbs last on average about the same time, but replacements need to be kept in stock to cope with sudden failures.

Recommendations

These recommendations are divided into two kinds: those which refer to further development of the interactive whiteboard initiative in primary schools; and those which refer to future ICT-related initiatives designed to make fundamental changes to the education system.

Towards further development of the interactive whiteboard initiative in primary schools

Provision of interactive whiteboards

The Primary Schools Whiteboard Project provides considerable evidence of the value of interactive whiteboards in terms of increased pupil motivation and teachers' job satisfaction. There is also evidence of a positive impact on attainment when pupils have been taught with an interactive whiteboard for at least two years, particularly for those of both genders with average or high prior attainment. We therefore recommend that consideration should certainly be given to installing interactive whiteboards in all classrooms in all primary schools which choose to have them. Priority should be given to installing interactive whiteboards in all classrooms in a school as this enables teachers to learn together and ensures continuity for pupils as they move through the school.

However, serious consideration also needs to be given to developing strategies other than whole-class-teaching for using interactive whiteboards to support pupils of lower ability. Whole-class-teaching, especially when conducted at the increased pace made possible with an interactive whiteboard, does not address the specific needs of pupils who are not able to grasp the relationships between symbols and words or concepts without more individual help.

Funding to meet the costs of sustaining interactive whiteboards (laptops, data projectors and bulbs) over time needs to be built into primary schools' budgets. Interactive whiteboards are a powerful tool in the hands of teachers

and the evidence from the Primary Schools Whiteboard Project suggests that they are worth funding.

Interactive whiteboards either need to be installed very low down on the wall in Key Stage 1 classrooms (with teachers encouraged to sit down to teach) or a narrow platform needs to be permanently attached below them for children to stand on. Although not ideal, without either of these solutions children will continue to find more dangerous alternatives to allow them to 'reach'.

Software and resources

Interactive whiteboard manufacturers need to develop interoperability between boards so that existing software and resources can be more widely used.

There is a need for interactive whiteboard materials to be developed for a wider range of subjects. The existing NWN website could be more effectively marketed through the strategy site which is currently much more heavily used.

Staff training

Teachers require continuing professional development in higher level use of interactive whiteboards to bring about the kind of pedagogical changes that are possible with interactive whiteboards. Accredited courses should be provided to encourage teachers to acquire expertise in the use of interactive whiteboards as a multi-modal portal.

The interactive whiteboard has the potential to assist with specialist teaching of children who are dyslexic or have severe difficulties with basic number work. The Primary Schools Whiteboard Project has provided a small amount of evidence that it is a very powerful tool in the hands of an experienced teacher or properly trained teaching assistant working with a small group. We recommend that the primary strategy should carry out pilot studies of its use in this way, as this may provide a way forward for raising the achievement levels of the bottom 20 per cent in ability.

There is a need for basic training in teaching literacy and numeracy, as well as interactive whiteboard use, for teaching assistants (TAs). This is urgent since we have observed that it is often TAs rather than teachers who use the interactive whiteboard for remedial work with small groups of SEN pupils.

Headteachers also need opportunities to develop at least basic skills with an interactive whiteboard to enable them to appreciate interactive whiteboard-related issues when observing teaching in their school.

Technical support

Technicians are essential for primary schools that have interactive whiteboards in all classrooms linked to broadband via the school's server. Some teaching assistants in Primary Schools Whiteboard Project schools have been willing to be trained to take on this role and this opportunity might be a fruitful way forward.

Towards future ICT-related initiatives aimed at transforming the education system

In what follows we assume a model similar to that used in this initiative, namely an initial pilot study, planning for national implementation and, where the pilot is successful, delivery of national implementation.

To maximise the impact of national initiatives on the education system, there is a need to:

- plan the degree of ownership and levels of resourcing needed at all the multiple levels of implementation of the initiative. This includes identifying what specialist staff will be needed at each level and how to train and support them over time.
- distinguish between what can be learnt from a pilot project such as the Primary Schools Whiteboard Project and the issues relating to 'scaling up' and system-level sustainability which cannot. Steps need to be taken to enable these larger system changes.
- identify the channels of communication that will be needed between levels (vertical) and across levels (horizontal) and how best to resource them
- identify issues of technological interoperability that need to be addressed to sustain the initiative, as well as more short term demands on technical capacity to install infrastructure
- map carefully the relationship between the initiative and existing policies and procedures which drive the education system. In particular to identify any conflicts between current policies and procedures and the initiative, to ensure that schools and local authorities are not placed in a position of being unable to deliver on both. This is likely to be the most challenging area for policy-makers because it involves dialogue and policy alignment between different strands of government both across departments and within the DCSF.