From 'bored' to screen: the use of the interactive whiteboard for literacy in six primary classrooms in England

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Abstract

In recent years, interactive white boards (IWBs) have been introduced into many primary classrooms in England. This enquiry examines the ways in which they are being used in the context of literacy teaching, in six primary classrooms in the south-west. Drawing on the perspectives of teachers and pupils, this report reflects on the impact of IWB use on the teaching and learning of literacy. It concludes that, while IWB use appears to have some general effects, such as supporting a more cross-curricular approach to literacy and raising the level of student engagement, their use is not identical in all classrooms. In the classrooms studied, IWBs are used in various ways, according to teachers' technical expertise and experience. To help more teachers towards effective use of the IWB, it is suggested that, rather than the 'top-down' commercial or professional models of transmission training, teachers need a 'bottom-up' approach, that is more practitioner focused.

Key words: multimodality, semiotic code, technology, ICT, interactive whiteboard (IWB)

Background

An interactive white board (IWB) is a touch-sensitive screen that works in conjunction with a computer and a projector. Although the first IWB was manufactured in 1991, take-up has only recently been an affordable option in the south-west of England, after January 2004, when £15m was allocated for the introduction of IWBs into primary schools by England's Secretary of State for Education and Skills. Official support for the use of such technology is also evident in the Primary National Strategy Draft Framework for Teaching Literacy, which encourages ''greater emphasis on the use of ICT to support learning and teaching in literacy'' (DfES 2006, p. 4). This would indicate that research into practice at this point in time could be useful.

Historical perspective

Teaching has always been multimodal, if we define multimodality as using more than one semiotic code or channel of communication. Teachers' spoken words, when accompanied by facial gestures, hand movements and other paralanguage, are in themselves multimodal. Indeed all human communication could be described as 'intrinsically multimodal' (Goodman, Lillis, Maybin and Mercer, 2002, p. 70). However, supported by the 'New Technology', there has been an increase in the number and nature of multimodal texts (Somekh, 2000). IWBs, with their various typefaces, colours, images and animations, are part of a technological revolution in classrooms, that began with radio in the 1950s, and has encompassed television, film, video, computers and CD ROMs. Literacy itself has been redefined to encompass these new varieties of text. Gunter Kress suggests that literacy is neither ''autonomous nor stable'' (Kress, 1997, p. 115) as texts and the ways in which we read them are constantly changing. Brian Street has helped to establish 'New Literacy Studies' (2003) to explore these changes.

IWBs are a recent addition to the classroom, at an important time in the redefinition of literacy. They have been ''hailed as a revolutionary resource for raising pupils' literacy levels and their motivation'' (Le Breuilly, 2004, p. 25). Le Breuilly, an educational consultant, advises teachers that they offer ''more varied opportunities for interaction and discussion in the classroom than other forms of technology'' (2004, p. 25). She advises literacy teachers of many facilities that are simply not possible with non-electronic whiteboards:

- split screens for comparing texts;
- a choice of more various texts including a children's daily electronic newspaper;
- many tools for drawing visual attention to print, including enlargement with the magnifier;
- modification and experimentation with text including removing and substituting alternative words and phrases and the use of hypertext.

Given these facilities and the opportunity they may offer to education, it is important that we understand how IWBs are positioned in a continuum of change.

Previous research

The relationship between the use of IWBs and interactive teaching is an interesting one. Is it the board that is interactive and/or does the use of the board encourage an interactive style of teaching? Interactive teaching is defined by the DfES (2001, p. 8) as when ''pupils' contributions are encouraged, expected and extended''. Smith et al. (2006, p. 443) imply that the use of the boards will encourage this kind of teaching when they describe the boards as ''a pedagogic tool for promoting interactive whole class teaching''. However, Le Breuilly observes that ''interactivity remains in the electronic wizardry of the whiteboard'' (2004, p. 26), suggesting that the advanced technology of the board allows children and teachers to interact with it, but that this will not necessarily promote an interactive style of teaching and learning.

Smith, Hardman and Higgins (2006) set out to investigate the impact of IWBs in teacher-pupil interaction in the teaching of literacy and numeracy at Key Stage 2 (7- to 11-year-olds). They found that in literacy lessons using the IWB, pace was faster, there were more open questions, but ''despite the emphasis on interactivity in the national strategies and the introduction of the IWB, traditional patterns of whole class teaching persist.'' (2006, p. 455). They concluded, ''such technology by itself will not bring about fundamental change in the traditional patterns of whole class teaching'' and ''more reciprocal forms of teaching would only come about with support for teachers in their professional development'' (2006, p. 455).

In summarising previous research into the use of IWBs, BECTA (2003, p. 1) concludes that they ''engage students to a greater extent'' and ''facilitate student participation''. Engagement and participation are important dimensions of interactivity. Further research has confirmed that IWBs are highly motivating to pupils and keep them on task (Bush, Priest, Coe et al., 2004; Cooper, 2003; Levy, 2002) which may also suggest that IWBs could support interactive teaching. It would appear, therefore, that the relationship between the use of IWBs and interactive teaching is yet to be fully investigated and understood.

But problems in IWB use have been identified. BECTA (2003, p. 3) found in their review of research that ''the expectations the whiteboards engender in students ... put pressure on teachers to constantly improve the presentation and content of lessons'' and that ''motivational gains diminish as the whiteboards become more familiar'' (2003 p. 3). They also found that practical issues could be problematic, such as technical support and installation, including positioning and ease of access.

In a small-scale study focusing on the introduction of IWBs into two Sheffield secondary schools, Levy (2002) found that problems included technical difficulties with equipment as well as the inevitable learning demands for some teachers and the need for both ''basic technical training and tailored developmental support'' (2002, p. 8). The nature of this support could in itself be problematic in that there are various models to choose from: 'top-down' approaches, practitioner-focused training or networked expertise.

Carmen Luke (2000) stresses the challenge of mediation between teachers, pupils and electronic texts. She argues that ''today's corporate software designers can easily become the literacy and pedagogy experts of tomorrow'' (2000, p. 71). Teachers need to be critical of the software that accompanies the IWB. It may present a particular approach to a topic such as teaching phonics, which may not reflect the teacher's understanding of the most productive way to teach reading. If training in using the IWB is considered the domain of the commercial producer as opposed to educationists taking an informed and reflective stance, Luke's prophecy could be realised. She argues that there are ''many issues at stake in the 'information revolution' so that we know how and when to intervene with positive and critical strategies for multiliteracies teaching, and how to make the best and judicious use of the many multi media resources available'' (2000, p. 71). The commercialisation of pedagogical tools is an important issue that needs to be recognised and researched.

Research methodology

This small-scale study was focused on seven teachers in six primary schools in the south-west of England, all of whom had an IWB in their classroom and used it regularly to teach literacy. As all the Year 5 classes had IWBs, we decided to focus on this year group. The primary data source for the study included structured classroom observations and taped semi-structured interviews of teachers and pupils involved. It was felt that interviewing teachers and pupils might give different perspectives, since, to satisfy the demands of children's interest in digital literacies, teachers were possibly under pressure to perform with new technology. Pahl and Rowsell describe ''the plethora of digital identities such as console games, internet experiences, text messaging and other digitized media'' (2005, p. 106) that many of our students possess. This may have created a mismatch between teachers' and pupils' enthusiasm and motivation for the new technology. It was also felt important to involve teachers of varying levels of competence and experience generally, so the seven teachers studied included lead literacy teachers, newly qualified teachers and more experienced colleagues. The schools ranged in size and resources. Visits to schools took place in the spring term of 2006.

Four main research questions were addressed:

- How are IWBs being used in primary school literacy classrooms?
- How is IWB use being supported and resourced in primary school literacy classrooms?
- How is IWB use impacting on classroom literacy practice?
- On what area/s of literacy practice have IWBs had the most impact?

Teachers were observed teaching a literacy lesson using the IWB. A taped interview immediately followed. The observations were based around guide questions, relating to the positioning of the board, teachers' and pupils' use of the board, and discussion. The purpose of the taped interviews was to see whether what was observed reflected what the teachers said or whether there were any contradictions. There was a concern that teachers might have been inclined to prepare a special lesson for our visits – a concern identified by Cogill (2006, p. 16) – ''the teachers in some instances went to considerable effort to prepare the lesson for my observation''. Therefore it was stressed at the initial stages that this research was to focus on working practice and not lessons designed to demonstrate particular prowess. The teachers reassured us that the lessons observed were ''what I would have done anyway''. However, given the high pressure teachers face in terms of inspection, we may have to accept that lessons were not typical of those not observed. This is part of the ''fly on the wall'' syndrome that researchers have to acknowledge. In the interviews that followed the observations, we considered that it might have been restricting to discuss only the lessons observed, so the teachers were encouraged to refer to previous lessons if they wanted to make a particular point. This may have strengthened reference to typical rather than observed practice.

In order to ascertain whether the children's perception of the lesson or perspectives on the use of the IWB differed from or confirmed the perceptions of the teacher, the teacher interview was followed by a taped interview with four pupils. These pupils were selected by the teacher, although we did ask for some gender balance and for children who would be able to respond appropriately and critically without being led by the researcher. We were aware that as relative strangers in the classroom, we might have intimidated the children in face-to-face interviews. However, one of us had observed in an earlier study that while drawing, children can become more receptive to researchers' questions (Pagett, 2006). So we decided to follow up the interview questions by giving the children an opportunity to draw an example of what they thought was an interesting use of the whiteboard that had helped them learn. The children were very happy to do this and to annotate their drawings. They visibly relaxed and talked fluently and confidently.

Results

How are IWBs being used in primary school literacy lessons?

In analysing the way in which IWBs were being used, three areas of commonality were apparent: use of pre-prepared screens, use of a variety of multimodal texts and opportunities for integral assessment.

Pre-prepared screens

All the IWBs were being used to support the teaching of literacy objectives. Screens were pre-prepared to scaffold and modify writing, using 'smart tools' to highlight texts in colour and to magnify them for closer visual focus on textual features. For example, one teacher used some quotations from *Romeo and Juliet*. Scaffolds such as a sentence wheel, which helped children to add clauses and phrases to simple sentences, were also used. Annotated pages of children's writing were copied, using the snapshot facility, and saved for future comparison. One teacher referred to saving a block of work and then revisiting it with pupils as a narrative account of what they had learned. She felt this was a meta-cognitive strategy and an important aide-memoire for future learning. Rather than making their own 'PowerPoint' presentations, teachers sometimes downloaded resources. For example one teacher used a resource to teach apostrophes from www.primaryresources.co.uk and then consolidated the learning by using www.bbc.co.uk/skillswise, a site that offered an interactive game on apostrophe use.

Variety of multimodal texts

Images and photographs had been scanned into the IWB and were used as a stimulus for story writing. Video was shown to stimulate discussion on characterisation in the film *Narnia*. Hyperlinks were made to dictionary definitions in a poetry session and the Internet was accessed via *Google Earth* to demonstrate life in Bangladesh. The teacher in this class referred to a lesson where she had used *Google Earth* to home in on Mount Everest. She then used the videos from a *National Geographic* website so the children could see and hear the conditions as climbers made their way to the summit. The children were then able to read and reply to e-mails from a climber actually on the mountain at the time. Because the video material was so graphic, the children were able to use it as a stimulus for their own drama work when they had to 'climb Everest'.

Opportunities for assessment

In one classroom children were engaged by a teacher's prepared multiple choice spelling game, in which correct answers were rewarded with pictures of footballers celebrating. In another, the teacher down-

loaded a grammar game for the plenary part of the Literacy Hour to reinforce the teaching of apostrophes. In a class where the children were preparing a presentation for a school assembly, a camera was attached, allowing the children to film their presentation rehearsal and then play this back for whole class evaluation.

In the lessons observed, these teachers were not using split-screen facilities, music or animation beyond video, Big Books, voting devices, spotlights and scanning in children's work. But reference was made to some of these being used in other lessons.

Pupil interaction

In the taped interviews, most of the teachers talked about children's interaction with the IWB as a key feature of their lessons. Comments included:

- ''I get them to use the pen. They can come up and write their sentence''.
- ''the children can come up and take part in the game by using the controls''
- ''putting some text up on the board and asking the children to come up and annotate the text''
- ''coming up and writing on the board to show how to solve the problem''
- ''getting children up to the board to get them to interact with the board. They love that, very motivated, they love to write or just press the button''.

However, Cogill (2006, p. 39) describes ''a tendency for the teacher to dominate the whiteboard lesson'' and in most of our observed lessons it was usually the teacher using the IWB controls. In only two classes were children invited to use the controls. Only once did we see a group of children interacting with the IWB independently – they were moving words around on the screen in a ''parts of speech'' sorting activity. Primarily the board was being used as the teacher's tool.

How is IWB use being supported and resourced in primary school literacy classrooms?

Smith et al. (2006, p. 455) questioned ''the effectiveness of the in-service training programmes that have accompanied the ... introduction of IWBs into the primary classroom''. Most teachers in our study had had little training in the use of the IWB. Such training was usually limited to that organised by the company representative who installed the board. One teacher commented: ''we've had the company that sold the interactive white-boards ... they actually sent us a representative to teach us how to use them''. Another said: ''we did have a chap come to show us the whiteboard and do a very brief overview''. This kind of training had often been very basic: ''we did have someone to talk to us when it was installed but it was very simple – this is a mouse!''.

Most of the teachers in this research project were learning ''on the job'', spending considerable time preparing their own materials including PowerPoint presentations and downloading material from appropriate websites depending on their expertise. In only one school was there evidence of strategic planning to support the use of the IWB. In this school the co-ordinators for literacy, numeracy and ICT were going to attend a course together on using and evaluating new software for the IWB. In the same school, as part of their performance management, they were about to audit the use of ICT across the curriculum through classroom observation.

How is IWB use impacting on classroom practice?

The teachers recognised the impact of the IWB on their teaching. One teacher said it had changed her teaching completely, ''allowing me to experiment, to be creative''. Most of the teachers, however, saw the IWB as an extra resource, albeit a powerful one, to support their teaching. ''I've got a whole bank of resources now that I can use every year but improve every year'', one commented. Another described the 'flexibility' that the IWB afforded – ''that's a big thing for me, the ability to store things, work on ideas and come back to it''. Yet another commented on how the IWB had helped with classroom organisation – ''it's enabled me to do more things so, for example, you might be having a lot more handouts and papers that might distract them (without the IWB) – fewer distractions''. One teacher recognised that it could lead to more ''whole class, teacher-led lessons – the teacher teaching from the front using pre-prepared PowerPoint presentations''.

Time spent in preparing materials was an issue. One teacher complained: ''what you saw this morning, I've done many of those before and they take their time; now that's what I would say would be off-putting for the less confident teachers in using the interactive white-boards. If they don't know how to produce a PowerPoint, or they don't know how to use a programme they're not going to use them''.

Teachers' understanding of interactivity in relation to the use of IWBs was largely focused on pupils interacting with the IWB, not on interactions with the teacher or with each other. ''Teaching can become more interactive because of the way children can react to what is on the screen and become more involved'', commented one teacher. Another said: ''it's interactive in that you've got something you can then go back up and change and the children can use it and modify it''. Yet another confirmed this understanding when she described interactivity in her teaching as ''getting the

children involved and up from their chairs and using the technology and the hardware that's on offer''.

Most recent research into the impact of IWBs emphasises the motivational effect on pupils' learning (BECTA, 2003). This motivational effect was highlighted by both teachers and pupils in our study. One teacher described her pupils as being ''totally motivated, totally interested and focused'' when she taught using the IWB. Another talked of the ''motivation and attention of children'' and felt it was particularly appropriate for ''visual learners – it helps them remember more, maybe it helps them understand more''. Another described how use of the IWB ''picks up less able, attracts their attention – it's involving and motivating, they perk up''. One teacher was, however, concerned that children occasionally paid too much attention to the IWB, ''they all look whatever is on it. Used to have a screen saver on but started to turn it off to stop them looking at it!''.

Children described their increased motivation in terms such as ''it's more enjoyable'', ''it makes you concentrate better'' and ''it's exciting, it's fun, it's like magic''. A number of children also mentioned that the IWB with its large screen and amplified sound enabled them to see and hear better. Many also felt that lessons were more pacy because of the ease with which the teacher could change screen, ''they don't have to keep rubbing things out like on the ordinary whiteboard. Just press a button''.

In which area/s of literacy practice have IWBs had the most impact?

It is interesting here to compare the teachers' and children's perceptions. Teachers focused on the way the IWB could support their teaching of writing – making it possible to modify texts, to save and revisit texts – and the teaching of reading with easy access to more varied texts, including big books, pictures and moving images. Children constantly referred to the impact the IWB had had on subjects across the curriculum, other than literacy lessons. Referring to work on the water cycle in geography one child said: ''she showed us how evaporation works and actually went through everything; it was actually moving''. Other children mentioned animation as useful to learning, about how things work. For example one child said when referring to science and maths lessons: ''You can get on the protractor and a thermometer which moves''. Interactive games were also cited as being useful for learning, for example one child said: ''If you're doing long multiplication in maths you can go onto the games''.

Asking children to annotate their drawings (see Figures 1, 2, 3 and 4 below) gave more information. Many of the children drew the teacher using and interacting with the board, with pupils often appearing as passive observers. This confirmed what the researchers had seen in the observed lessons, where the teachers were largely in control of the board. In Figure 1 the child has drawn the teacher using the board as her tool with the children firmly seated at their desks. Probably because it was a lesson still fresh in the children's minds, drawings showing the board being used in literacy invariably depicted a scene from the lesson just observed. They also usually showed a text-based activity, such as work with a poem or a set of instructions, as in Figure 1, where the teacher is drawn teaching a text-based grammar activity.

Figure 1

Where the children had drawn themselves using and interacting with the board, they usually drew examples from lessons other than literacy and usually their pictures referred to animation. In Figure 2, the pupil has drawn herself using the board to demonstrate the water cycle in a science lesson – ''This is me above moving the sun''. She describes how being able to move the objects on the board ''help[s] you learn''. There was a recognition of the way the board ''helps you learn'' in other drawings. One child wrote on her drawing: ''It is laid out to me which means I don't forget things when the teacher tells me stuff''. One child referred to the board ''telling you about the past'' and another referred to the board, ''explaining things that a worksheet couldn't''. In Figure 2 the child also refers to the teacher modelling ICT skills that children could use later in the ICT suite: ''the teacher can show them what to do first''. It was noted in the lesson observations that sometimes teachers modelled use such as saying ''I'm just typing in Google now''.

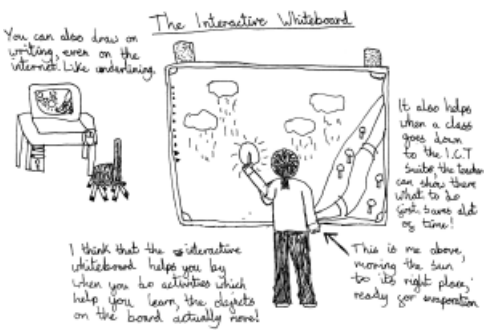

Figure 2

Some of the children merely drew images from the board without showing the teacher or any children. In Figure 3 the child has drawn two boards. One shows a numeracy lesson with ''the maths equipment you have on the bord'' (sic) and the other an Internet webpage ''CBBC Weather Information''. Many of the children in the interviews and in their drawings made reference to how the size of the image on the board and also the sound facility enhanced their learning. The child in Figure 3 writes: ''you can see the maths shapes clearer''. Another child wrote: ''they explain what we need to do'' and another wrote that the white board enabled her to ''see everything inclued'' (sic). Yet another wrote ''I like the IWB because you can make it clap and make noises like hooray''. This was referring to a game where the IWB applauded correct answers.

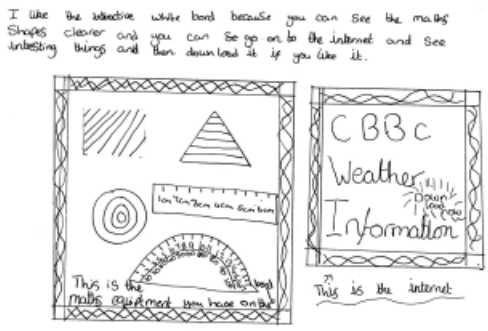

Figure 3

Children's comments were saturated with references to multimodality. In Figure 3 the child writes: ''you can go to the internet and see interesting things''. Another child wrote on her drawings: ''I like the interactive whiteboard because we can watch DVDs and download pictures from the internet, we can video ourselves and look at them''. This echoes the changing nature of texts in a visual culture.

Figure 4

Figure 4 shows an activity that had taken place in the literacy lesson just observed. Again it represents a text-based activity. The children are working as a group moving the words on the board into the appropriate word class. This was the only example of a group of children interacting with the board observed by t he researchers in the course of the study. The child has drawn the five children and highlighted the discussion taking place among them as they are rearranging the words. It is interesting to note that other groups of children were doing the same activity with cards at their desks, and were, in fact, able to complete the activity much more quickly, as the group using the white board discovered that the technology would only allow one word to be moved at any one time.

Conclusions

> *Global communication practices at the beginning of the twenty first century, notably exemplified in internet usage, are increasingly more obviously multimodal, displacing the verbal as the central mode of communication* (Goodman, Lillis, Maybin and Mercer 2002, p. 70).

Teaching and learning in the primary school needs to reflect this change. Potentially IWBs can offer a multimodal approach to teaching literacy and, in practice, our research suggests that this potential is beginning to be realised. All the seven teachers observed were using IWBs regularly to support their teaching and most of the facilities cited as ''advantages of using an interactive whiteboard for teaching literacy'' (University of Hull, 2004, p. 1) were exploited. However there was a range of technological complexity, from a teacher using a few static PowerPoint screens to sophisticated use of animation and sound in a teacher-generated spelling game.

Teachers can maximise the impact of IWBs by investing time in training to become confident users (BECTA 2003). However, for the teachers involved in this research project, provision for training has been limited, often consisting only of commercial packages delivered when the IWB was fitted into the classroom. Such a commercial approach to teachers' professional development has been called into question by Luke (2000). BECTA (2003) suggests that teachers should collaborate and share resources, thus perhaps obviating the need for them to spend time and effort in producing their own materials. In reviewing others' research, Smith et al. (2006) suggest a more 'bottom-up' approach to training, in which ''monitoring and self-evaluation become a regular part of in service training'' (p. 445). This training could perhaps be more powerful if focused not only on technological competence, but also on developing the pedagogical skills to complement the use of the IWB. This would accord with Levy's (2002) suggestion that ''Teachers need to feel confident with technical matters, but also need opportunities to explore broader pedagogic issues from the outset'' (p. 18).

The teachers were using IWBs interactively in order to change and modify texts and were allowing children to use controls – although this was limited and

controlled by the teacher in all but one instance. This accorded with the teachers' understanding of interactivity, which they saw as a property of the board, and not related to pupil–pupil interactivity or teacher–pupil interactivity. When asked if they could give an example of how they might use the IWB interactively, teachers referred again to the properties of the board and not to interactivity as described by the DfES (2001) where ''pupils' contributions are encouraged, expected and extended'' (p. 8). This suggests that the teachers did not feel that the IWBs per se had made their teaching more interactive. Levy (2002), in her research across the curriculum, found that ''some teachers consider that use of the IWB stimulates higher levels of student participation in whole class discussion ... perhaps because of the strong visual and conceptual appeal of the information and learning resources'' (p. 9). This potential for more interactive discourse was not recognised by the teachers in this study, although they and pupils all agreed children were more engaged and motivated when the IWB was used. Higher levels of motivation were found in all children interviewed, a finding that echoes many other studies of the use of IWBs (Cogill, 2006; Levy, 2002; Smith et al., 2006; BECTA 2003). The contradiction between the high levels of engagement they observed and teachers' reluctance to recognise a changed emphasis on interactivity may be related to Levy's finding that ''teachers generally see the IWB as a new item in their teaching tool kit rather than something that might change fundamentally their professional role and practice'' (2002, p. 7).

A benefit identified by the British Educational Communications and Technology Agency (BECTA) is that IWBs ''facilitate student participation through the ability to interact with materials on the board'' (2003, p. 1). However, in most lessons observed the teacher controlled the IWB. There was only one example of pupils working in a group independently with the IWB. One teacher had tried to encourage pupils to use the IWB independently in a group but found that the rest of the class were unsettled, constantly trying to see what the group was doing. This may reflect the fact that IWBs are still a recent and exciting addition to the classroom. However, Smith et al. (2006) suggest a link between students' physical interaction with the board and opportunities for interaction and discussion. Teachers may need to consider how this can be achieved.

The potential of the IWB for effective teaching and learning was more obvious in subjects other than literacy. This could suggest that if teachers take a more cross-curricular approach to teaching literacy, then the potential of the IWB might be realised. An example of this was the teaching of explanatory writing by one teacher who began the session by using a satellite picture of the world, then zoomed in on an area of Bangladesh. The children were able to see and discuss the area and the conditions the people lived in, to inform their written explanations of social processes. Similarly the examples children gave of using thermometers, protractors and investigating the water cycle could be linked with literacy work. Teachers were recently advised that ''there is no requirement for subjects to be taught discretely ... pupils' knowledge and skills can be used across the curriculum'' (DfES, 2003, p. 17).

There has been a huge financial investment to provide IWBs in school. They have great potential for motivating and engaging pupils in sophisticated forms of multimodality. Teachers appear to be addressing the changes in practice that this engenders with very varying levels of support and training. The focus of professional development appears to be on mastering the technology. But we suggest that this should be extended to include an approach that considers the whole context of teaching interactively with IWBs. Teachers also need to consider a cross-curricular approach to using the IWB, giving more opportunities for pupil interaction with the board and each other.

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