What are the effects on teaching with an interactive whiteboard in a primary school?

Abstract
The purpose of this paper is to explore through three pilot interviews with teachers, the use being made of interactive whiteboards in a primary school. As this is such a new technology, little research in the field exists and this pilot examines use by experienced whiteboard users as a basis for further study.

The questions discussed are: What is happening in an interactive whiteboard classroom? What resources and software are being used? How does use affect whole class teaching; the presentation style and pace of lessons; planning and preparation and the professionalism of teachers? Contributions from participants suggest that lesson preparation is easier and more thought through and there is more whole class teaching which raises issues for the pace and structure of lessons. What comes across strongly is the increased enjoyment in teaching and learning. In the conclusion issues for further investigation are addressed.

Introduction
An interactive whiteboard is a relatively new piece of technology that allows computer images to be clearly projected onto a large screen or whiteboard. The board itself operates as an interactive device, so that as the board is touched it behaves as a computer screen activated by using a mouse. Whatever software is available for teaching and learning on a computer becomes available for whole class viewing and interactive learning.

‘Sometimes you encounter a piece of technology that leaves you lost for words…and you realise that this development could bring about major change. That something has come along to really encourage learning’. (Kenny 1998)

This is the way I felt when I first saw an interactive whiteboard in action. My thoughts were that here is a technology that might enable teachers to integrate ICT into teaching and learning and create a whole class learning environment that is truly engaging and interactive. This paper investigates through three exploratory interviews whether or not the initial ‘Wow!’ factor that I first experienced lives up to expectations. How are teachers using a whiteboard? For what purposes? Is it affecting the way teachers teach and the way children learn? Are there factors that help to make this technology effective in the day-to-day activity of a primary school?

Clearly interviews will not unfold the whole story. I intend to use this exploration to extend and build the research questions that will form the basis for a more detailed study on whiteboard use, through a variety of research methods.

The research design
I have purposely expressed my personal view on the potential of interactive whiteboards. Silverman (1993), with many others states that interviews are social events based on mutual participant observation. By recognising that my own beliefs
are a feature of the interviewing process I acknowledge my background perspective: that whiteboards will have a positive effect on teaching and learning. Equally however, with awareness of this preconception I hope to minimise subjective effects.

An extensive search both online and off-line suggested that little previous research exists and what is available tends to concentrate on technical rather than pedagogical issues. Consequently I devised a framework for the open-ended interview questions from previous research into teaching and learning: Moseley et al (1999), Askew et al (1997) and Williams et al (1998). The questions concerned the effect of the whiteboard on classroom practice, factors affecting teachers and their views on children’s learning, though the latter issue is not reported in depth in this paper. The purpose of the interviews was to probe my preconceptions and develop ideas and research hypotheses rather than gather facts and statistics.

The data gathering context
Early in 2001 I interviewed three teachers individually for approximately 40 minutes; Heather, a headteacher from Wessex Primary School, Sarah a teacher of 10 to 11 year olds also from Wessex and Mike from Sussex Primary School. Mike has a class of children aged 5 to 7 but he also teaches older children in the computer suite.

Wessex is a large urban primary school with a recently acquired new building. Staff have excellent ICT access with an interactive whiteboard and a single networked computer in each classroom. Three months earlier the school also had a computer suite with whiteboard installed. The school is in a mixed catchment area; 27% speak English as an additional language and 31% have free school meals. Sussex Primary is an inner city school of medium size; 55% of children have free school meals and 80% come from a non-English speaking background. The school is 10 years old and recently had a new computer suite with moveable whiteboard installed. Pseudonyms have been used throughout this paper.

This sample of teachers was deliberately chosen to represent three viewpoints: Heather, a school manager; Sarah, a teacher with classroom access to a whiteboard and Mike, a teacher who has access only in the computer suite. Although the respondents were not chosen for any particular expertise, each has had approximately one year’s whiteboard experience and according to their colleagues is an enthusiastic user. I deliberately chose enthusiasts for the current purpose so that data on interesting practice would emerge. There seemed little point in interviewing teachers that are only using this new technology in a half-hearted way.

Analysis and interpretation
I analysed the data into four broad themes: the context of whiteboard use, the software and resources adopted, factors affecting teaching and factors affecting teachers. I then examined each theme extensively to identify similar and different views across respondents. Throughout, my aim is to focus on the analysis of whiteboard use rather than general ICT practice.

The context of whiteboard use
Computer suite and classroom use
Prior to the interviews, I had not appreciated that there would be much difference in whiteboard use in these different locations. In the suite, Mike not surprisingly, expects children to spend a large proportion of their time working on a computer. He uses the whiteboard largely for demonstration of ICT software or to show children how to use subject specific learning packages.

Sarah, on the other hand, with full-time access integrates the whiteboard into all her teaching, to present information and provide interactive classroom resources. ‘It’s just become a way of life, ... you know it’s going to be there and it’s a resource that you fully use.’

Both teachers use the board interactively, so that children frequently come out to the front of the class to write on the board or pinpoint answers. The lesson format tends to follow that of the literacy hour. Each spends about 20 minutes giving initial teacher input, and uses the last 10 minutes for a plenary, to show and discuss children’s work on the board or to ask children to demonstrate to the class what they have been doing.

**Subject use**

Most subjects were mentioned by the three respondents. Where visual material is important: art, design technology, history, geography and RE there is constant use of the board in Wessex School. I was not surprised to find that literacy and numeracy were frequently cited by all participants and Heather and Sarah with good whiteboard access, noted the use of ICT ‘totally across the curriculum’.

**Software and resources adopted**

Both Sarah and Mike spoke of having a much larger range of materials available which Heather described as providing a ‘continual change of environment on the classroom wall’.

> It’s a major resource for us ...I can find new materials rather than just stick to the things I have ... At the end of the day it’s resources ... that are newer, that are more visual and that are more colourful ...It’s in front of them, it’s large on the screen. (Sarah)

She employs a wide variety of software to help her teaching:

- **PowerPoint, Publisher and Excel** to prepare presentations or to display information for children
- **Word** templates, particularly for literacy, so that children can come up to the board and build a whole class presentation together
- **Active Board** software for shapes and graph work which enables mathematical precision and different scales to be used
- the facility to scan in text for reading so it is large and clear on the screen
- video, to provide case study material

Mike uses fewer of these resources but like Sarah he enthused about the Internet. They are both using the web to display information, for interactive educational resources, and to download images. Sarah mentioned this last resource in the
context of providing children with the opportunity to view historical artefacts as sources as evidence, so that children can investigate the life and times of the period first hand.

In addition, Heather noted the facility to highlight words, sentences, paragraphs and punctuation clearly during the literacy hour, the use of art and design packages and specialist learning software, for example, LOGO, which whole classes use with the board.

Factors affecting teachers and teaching
Several issues are addressed in this section: the effects on teaching, planning and preparation, teachers’ use of ICT and the effects on the professionalism of teachers.

Effects on teaching
Mike’s major use of the board in the computer suite is to teach ICT and demonstrate software resources efficiently and effectively. Fullan (1995) suggests that innovations are sometimes advocated from the point of view of the promoter rather than the teacher’s needs, so I asked Mike ‘Is the whiteboard just a whizzy way of doing what teachers do well anyway?’ He responded

There are things that … are new and you think well it’s an awful lot of trouble to go to for something that you can do just as well in the old traditional way … But no, I think this really does have a major use and it’s very important … I do not see how you can teach ICT as a whole class unless you have a tool like this … Without it you’ve got four or five children wanting your help and you usually go over the same things and you just do not get to do any proper teaching. … In the latter part of the lesson you’re now able to stand back and see what’s going on and ensure that everybody is having a go.

Heather also believes the boards are changing ways of teaching in her school; ‘Because staff have got these fabulous pieces of equipment in their classroom it just brings a whole new level to teaching.’ She describes this new level in terms of:

- more whole class teaching and interactivity
- increased pace, better lesson structure and more enjoyment in teaching
- better facilities for questioning.

Whole class teaching and interactivity
Heather described the situation at Wessex school.

I’d say there’s a greater emphasis on whole class teaching which fits in with the Government’s point of view… But we always have had this culture of co-operative teaching and learning and prior to this it had to be done in groups. I think surprisingly you can have a greater feel of co-operative culture within a classroom with teachers at the front, working interactively with the whole class. Without the boards you may have had children in groups but probably they’re not working co-operatively.
Peacock (1993) supports this view. His experience in researching inexperienced groups of children undertaking work at a computer suggested that collaborative work did not take place without considerable teacher intervention. The Government is currently endorsing whole class teaching in the primary school for the literacy and numeracy strategies. At the same time they are hoping teachers will embrace ICT, which lends itself to a more individual and interactive style of learning. At Wessex School, perhaps whiteboard access is enabling these two strategies to work together more easily.

**Pace, structure and enjoyment**
Heather feels that the pace and structure of lessons have changed. An important factor she suggests is the planning and preparation of lessons and the good use of presentations to sustain a lesson.

> If you’ve got a PowerPoint presentation you know you’re going to pace the lesson to that extent ... What is important however in terms of structure is the planning aspect. I would say that the quality of learning is much greater, again because of the thought that’s gone into the lesson, and also because of the sheer enjoyment that the teachers have in delivering it and the children receiving it.

This last statement is important for the future of teaching and learning. As Sarason (1971) cited in Fullan (1995) suggests if teaching is not interesting and exciting to teachers then they cannot be expected to create interesting and exciting lessons for children. This view does need to be tempered however with some reservation. Sarah felt that though lessons may be enjoyable, they may occasionally have too much pace and become over-structured.

> I think you can get carried away some times....you know it’s brilliant ... PowerPoint presentation is superb, but I feel sometimes that if you’re trying to provide them with information, if you have too much going on, you can go over the top with it. They’re just too interested in the words coming flying down, ... rather than what you’re trying to say to them. So you have to get a balance between making it very visual so that it keeps their attention and they’re interactive and it not being a complete show.

This was not something I had expected and I feel represents an astute observation. In the return to whole class teaching in primary schools, teacher over-performance is possibly an element to be guarded against if it is in danger of ignoring children’s learning. The possibility of over presentation raises an interest for further whiteboard investigation via classroom observations.

**Questioning**
Heather describes how the teacher has;

> All the information she could possibly want. She can call it up in front of her, therefore the teacher’s probably got more prompts for questioning ... There’s a way the children can find the answers because the teacher can put up this
bit of material, that bit of material. So for asking questions and the information retrieval for children it’s a much more effective process.

Access to more information and a wider variety of resources puts to the forefront the issue of questioning skills and raises a huge area for further research on the quality of interactivity during whiteboard use. As Underwood and Underwood (1990) state on page 94;

‘The issues of the approach taken to questioning, who designs the questions, and whether they are seeking facts or testing ideas, are each of considerable importance in the assessment of the cognitive development of children’

In contrast to Heather, Sarah does not consider that use of the board has changed her questioning style, as she has always used open-ended questions. Nor does she feel that the whiteboard has changed her teaching. This does not disagree with Heather’s view but rather gives a more personal outlook. Sarah felt the main change is to extend her range of teaching via the use of many and varied resources.

It’s much easier because a lot of it now is in a class group, and actually looking at skills between the class especially with literacy and numeracy … It’s much easier when it’s brighter, it’s visual, it’s more colourful and they pay attention a lot more.

The teaching applications she would miss the most are:

- the facility to move backwards and forwards on the board to enable understanding
- being able to retrieve work the children have done the previous day so that she can continue to teach with the same material
- the ease with which it is possible to transfer easily from one package to another so that all resources are accessible and close to hand.

Though she does not feel in general that the board has changed the way she teaches, she acknowledged that it provides resources that are newer and more visual. She also mentioned that children now like history which they never used to, so it is possible that the use of different resources via the whiteboard is having an effect on children and in a positive way, her teaching.

How does use of the whiteboard affect planning and preparation?
I asked this question because I thought that preparation time might have increased with whiteboard use. This proved not to be supported.

Mike felt that in the context of using the whiteboard in the suite, preparation time had decreased. At Wessex School, with classroom access, planning and preparation included the use of electronic folders that are public and available to all staff. The folders hold work schemes, presentations, stored images and worksheets categorised by subject. Both Heather and Sarah felt that through using this system, although time might not be saved initially and even this was doubtful, in the long term it would definitely reduce preparation time. The facility to cut and paste presentations and templates for children rather than having to rewrite or find and
reproduce bits of paper is felt to be a bonus. In addition images stored can be saved for later use, a facility similarly mentioned by Mike. Sarah particularly noted ‘time saving’ as an aspect she would miss if she no longer had access.

Heather also considers that preparation is more thought through and enjoyable.

_The other thing is that the preparation is interesting and exciting, it’s fun to do. And I know I can sit here, that’s all very well me saying as a head it’s fun but I see evidence of what teachers produce and it’s got to have been fun to have produced such zappy things._

Although not a major feature of this report, school management may be an important factor in making planning and preparation easier. Heather spoke about the need to provide and encourage a sharing culture and to become a link person to cross-fertilise ideas if similar material is being prepared across year groups.

**What are the effects on teachers’ use of ICT?**

Veen (1995) showed that teachers’ beliefs change very slowly and that they adopt new media more effectively if they can use them in accordance with their existing beliefs and practices. Watson (1993) reported that effective use of ICT required substantial demands from teachers if they are to integrate activities into a larger scheme of work. Prior to the interviews I perceived the use of ICT via whiteboard access as being easier, more accessible and more attractive to teachers. The views of the participants endorsed my hypothesis.

In Mike’s case he actually stated that he does not feel it is possible to teach ICT satisfactorily without whiteboard access. Sarah uses the board nearly all the time with ICT, not just as a blackboard. She also feels that a positive attitude applies to all staff. Heather summed up the situation aptly:

_It’s a bit of a chicken and egg here because it’s given us a level of expertise in terms of ICT confidence and competence that we wouldn’t otherwise have had because the boards have been the motivator to actually go out and find more skills, because you need the skills to use the boards, but then using the boards, they’re so motivating you go out and get more skills._

Surprisingly, little special training to use a whiteboard appears to be required and one day is felt to be sufficient to get started if teachers are reasonably confident and competent in their use of ICT.

**What are the effects on the professionalism of teachers?**

Heather expressed the view that the school has a feeling of being special which she attributes more to having the whiteboards than having a new school building.

_It’s given us self-esteem, expertise, confidence, competence and just a great big smile factor. It just brings a whole new level of teaching into the classroom._
Sarah feels that using the board is part of keeping up to date, managing change and a necessary part of teaching. ‘Professionally I think you have to learn to adjust and change because that’s progress, that’s moving forward.’

If well managed, I feel that the whiteboard has the potential to increase the professionalism of teachers. Self-esteem is an important factor but the access to knowledge via the internet, the facility to present that knowledge and to produce a professional presentation together with the greater potential to interact with children, must play a part in raising teaching standards and hence the professionalism of teachers.

Conclusions
This short project analysing three interviews from enthusiastic teachers, cannot unravel the whole story of what happens in an interactive whiteboard classroom. Nevertheless the pilot confirmed my view that whiteboards have the potential to:

- enable the integration of ICT into classroom practice
- provide greater interactivity in whole class teaching
- give access to a wide variety of ICT and Internet teaching resources for whole class use
- increase the professionalism of teachers.

Of course all these findings are set in the context of the enthusiastic teacher and there is considerable work to be done to investigate the attitudes of all teachers, including those who have little ICT expertise or are reluctant whiteboard users.

However, I found some surprises:

- The different use of the resource in the computer suite and an ordinary classroom. Consequently when assessing any existing research on whiteboard use or undertaking further research it is of utmost importance to bear in mind the teaching context.
- That over-emphasis on the presentation process might distract children from real learning.
- That planning and preparation time would be perceived as less time consuming in the long term.

The paper also raises several important issues for further investigation:

- Will this new technology redefine whole class teaching?
- Are there particular teaching and questioning skills that will make whole class teaching more successful?
- Will the whiteboard help create teachers who are enthusiastic about ICT and who integrate it into their teaching in a natural way?
- What whole school management is required to ensure that this new resource eases rather than adds to work for teachers?
- What is children’s perception of the interactive whiteboard?
Finally, will any change in teaching through whiteboard use have a positive effect on children’s learning? Not only in providing visible added value for schools through better results, but also by helping to create independent learners and developing children’s thinking skills.

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References


