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Introducing interactive whiteboards into school practice: one school's model of teachers mentoring colleagues

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Abstract

As computer-related technologies continue to evolve, teachers face constant pressure to accommodate and implement new technologies into their repertoire of teaching pedagogies and techniques. The project from which this paper arises looks at the impact on teachers and their teaching in one Victorian secondary school following the acquisition and installation of six interactive whiteboards (IWBs). The report concentrates on the perspectives of two senior staff, and is an analysis and discussion of data relevant to these perspectives gathered as part of a larger ongoing project. In particular this paper is based on observations of two mentor teachers, and interviews conducted with both mentors and mentees. Data for the project was collected through whole-staff questionnaires, focus group interviews, observation and video-recording of lessons in which teachers used IWBs, and subsequent video-stimulated interviews with these teachers. Findings are related to issues including teachers learning how to integrate an innovation into daily teaching practice, problems of technological access and malfunctions, and teacher perceptions of the benefits to students from the innovative IWB technology.

Introduction

In recent years Australian schools have made a considerable financial investment in the purchase and installation of interactive whiteboards (IWBs) for classroom use. As installation involves the IWB itself, a video projector, and a computer to run specific interactive software, the cost is significant. In Victoria most funding has come from schools or clusters of schools, although the state Education Department has purchased several hundred IWBs from three different makers in order to undertake an evaluation of classroom applications of IWBs at all levels of both primary and secondary schooling.

Background

There is evidence from research and benchmark data that ICT applications are not providing teachers and students in many Australian schools and systems with the educational benefits that were expected. In some cases it is because teachers without qualifications and experience with ICT are required to teach in particular subjects, and in other cases it is because teachers lack access to appropriate resources and professional development (Measday, 2005; Becta, 2003). In the case of IWBs there appears to be little professional development available in Australia that links the use of interactive whiteboards with improving teaching and learning, especially in core subjects including English, mathematics and science.

Much has been claimed about the potential of IWBs, including greater interactivity between teachers and students, and increased pupil engagement, motivation and enjoyment, all potentially leading to improvements in pupil attainments (Hall & Higgins, 2005). A recent review of research on the introduction of IWBs in UK classrooms (Smith et al., 2005) revealed a clear preference for their use by both teachers and pupils, noting that the government too is keen to promote this technology. This was substantiated by Cogill (2002) who stated that all the teachers in her study were enthusiastic about the tools this new technology offered, to help structure their lessons, to save time scribing, to attract and retain children's attention and to provide large attractive text and images.

Smith et al. (2005:99) state that it is still unclear whether this enthusiasm is being translated into effective and purposeful practice. IWB technology is expensive, and should be used in unique and creative ways above and beyond that which is possible when teaching with normal whiteboards or other projection methods. However these writers were not able to identify any rigorous studies describing the impact of IWB use on learners' attainment or documenting actual changes in classroom interaction. "Most reports do not distinguish between the broader benefits of presentation techniques and the specific or unique advantages of an IWB" (Smith et al., 2005:92). Similarly the ImpaCT2 study in the UK found that "while they [IWBs] have the potential to be used very effectively in teaching and learning, some observations indicate that at present they are not yet used to their full potential" (2001, cited in Cogill, 2002:12). Cogill argues that the many variables that may be involved in the use of an IWB are as yet largely unknown. Smith et al. state that "the use of an IWB to encourage an interactive environment wherein pupils actively participate in the social (re)construction of knowledge and understanding is presented as a means to transform education … however, it is clear from the literature that this is relatively rare" (Smith et al., 2005: 96). They argue that the unique advantage of IWB technology lies "in the opportunities this technology holds for collective meaning making through both dialogic interaction with one another, and physical interaction with the board" (Smith et al., 2005:99). In their review of literature on IWB use, Smith et al. emphasised that research is needed to collect empirical evidence so that the processes of teaching and learning with this new technology are more fully understood. The present study is designed to address one particular aspect of this need.

While teacher training offered by suppliers provides the basic skills for using an IWB system, this has not been found to provide pedagogical knowledge for integrating IWB use into the curriculum and the classroom to best effect. Smith et al. report that teachers who were already confident ICT users tended to become enthusiastic 'early adopters', able to experiment and develop their own IWB use following initial training. However teachers with less confidence and experience with ICT preferred instead more sustained and individual guidance on a 'need-to-know' basis or as part of more structured continuing support, such as where experienced users work alongside novices. These findings contrast with results reported here. *A lot of the ICT development had been owned by a small key group of people, who had themselves developed huge amounts of knowledge, but they were quite possessive about it. So I had to get ICT out of this little box.* (Principal: interview 25 May 2006) From this Principal's point of view, part of the rationale for investing in the mentors was to make ICT related knowledge and skills available to all teachers. Two other developments suggest that this process had begun earlier. By locating the IWBs throughout the school, one in each of the teaching areas, staff and students were given the message that IWBs were for use in all subject areas and at all levels. The second development was the shift from having all student computers in to reducing the number of labs by creating a number of computer pods around the school.

The previous paragraphs can be summarised by saying that there is research evidence, especially from the UK, that classroom use of interactive whiteboards can make integration of ICT into all subjects easier, and consequently change aspects of pedagogy through increasing the variety and amount of ICT used for teaching and learning. For whole-class teaching interactive whiteboards are reported to be much easier to use than computers, while also allowing the re-use and sharing of resources. Students can benefit through increased opportunities for active participation in lessons and easier collaboration with peers. Interactive whiteboards make it easier to cater for the multiplicity of learning styles present in any class through the use of a variety of resources, materials and approaches.

In September 2005 the Principal and ICT Co-ordinator of Rural Secondary College (RSC) met with researchers from the University of Melbourne to discuss the possibility of undertaking a joint research project based around the school's recent acquisition of six IWBs. Following further meetings, including a visit to RSC by the university researchers, a conceptual model for a research project was agreed on. This conceptual model was further developed into a project that could commence collecting data immediately, and also into applications to the Faculty of Education and the ARC for research funding.

Setting

Rural Secondary College (RSC) is a Year 7 to 12 secondary school situated in a rural area of northern Victoria, approximately 200 km from Melbourne. In 2006 there are 61 teachers, some part-time, and over 800 students at RSC.

In 2005 the school purchased six interactive whiteboards (IWBs), installing one in each of six wings or corridors that defined the RSC teaching spaces. This followed at the start of 2006 with the installation of a seventh IWB in a "flexible" teaching space that was not allocated to any subject area. Also in 2005, RSC was successful in gaining State Government funding to would enable the equivalent of one senior teacher to be released from teaching duties in 2006 to mentor other staff in classroom use of IWBs. The School Executive decided to internally advertise the position of IWB mentor and to ask interested teachers to formally apply. After reviewing the applications and interviewing applicants, the School Executive decided to offer two senior teachers the opportunity to have a significantly reduced teaching load for a year while they assisted colleagues to develop and use teaching materials related to classroom applications of IWBs at RSC.

Aims

For this research project there were two distinct sets of aims, one for the school and one for the research team. The first set relate to teaching and learning at RSC, with the three major aims being to ascertain the perceptions of RSC teachers about the professional development they experienced that specifically related to classroom use of IWBs, the teaching strategies employed when teachers used IWBs, and any related changes to classroom management and organisation. In this report the focus will be on the first of these aims: what are the perceptions of RSC teachers about one aspect of the IWB related professional development they undertake?

The second set of aims, those for the researchers, relate to the methodology being applied. Lessons incorporating the use of IWBs were video-recorded, and each lesson video was transferred to a CD for analysis by researchers. This preliminary analysis of lesson data was supplemented by field-notes taken by a researcher who operated a digital camera. On a subsequent visit to the school a researcher interviewed the teacher using a semi-structured format. These interviews were stimulated by watching an edited video-recording of the lesson.

Research from the UK reported by Becta (2004b) indicates that continuing teacher professional development (CPD) is more effective when it is tailored to suit the content of specific subjects, when the focus is on improving pedagogical skills in a subject context, when classroom use of ICT is adequately backed-up by online support, when teachers work in groups within a community of peers, and when the use of ICT and associated CPD is supported by school administrators.

All but one of these issues is addressed through the CPD model put in place at RSC. As RSC is situated on a single campus it has not been necessary to consider providing teachers with online support for classroom use of IWBs. The other issues are adequately covered through the use of two mentor teachers, who work on a one-to-one and subject specific basis with other staff.

Mentors and CPD

As noted previously, the job description and expectations for a mentor were openly advertised within RSC. In a formal interview with a researcher the Principal of RSC stated, … *my belief has always been that when new technologies or new beliefs or new approaches are in the school, it has to be generated by local champions, because you can't request it or make it happen. It has to be modelled.* (Principal: interview 25 May 2006). During initial discussions between the Principal of RSC and the research team it was planned that funding from the Victorian Education Department would be used to invest in a senior teacher who would act as a mentor in classroom use of IWBs to other teachers. In the end it transpired that two senior teachers were appointed as mentors and were relieved of half of their teaching load. In an interview the Principal of RSC noted that in 2005 some 50 (out of 61) staff undertook professional development offered by INTEL, and he noted interest and excitement from teachers across all curriculum areas. *So that sort of opened my eyes a little bit, so I thought here's an opportunity to spread the knowledge … we said we will identify two people that have great skills and that we believed would be a good team, good partners who would complement each other.* (Principal: interview 25 May 2006).

As was commented on earlier, for the Principal, part of the rationale for funding the mentors was to share the ICT related knowledge and skills among all teachers. This might indicate that the selected mentors were not considered to be the ICT experts among the staff. To protect the identity of the two mentors they will be referred to as Mα and Mβ, and feminine pronouns will be used throughout.

Teachers' concerns	CBAM stages of concern - indicators	Statements/Questions
	6 ***Refocusing*** Teacher goes beyond current uses of IWBs and thinks about future or alternative innovations.	I know something that will work even better than what we are doing now.
IMPACT	5 ***Collaboration*** Teacher works with colleagues to improve teaching with IWB.	I know what I'm doing, how can I help others?
	4 ***Consequence*** Teacher concerns focus on the impact of IWB use on students and learning.	How is this affecting my students?
TASK	3 ***Management***	
	2 ***Personal*** .	
SELF	1 ***Informational***	
UNRELATED	0 ***Awareness*** .	

Table 1. CBAM Stages of Concern. Adapted from Hall and Hord (1987).

Two senior teachers who were both considered good role models for less experienced teachers, were users of IWBs in their teaching, and who came from different subject groupings applied for and were interviewed for the mentor position. Both teachers agreed to work as half-time mentors and half-time teachers. This modified version of the mentor position offered benefits to senior students, as both teachers kept some of their classes, and to teachers throughout the school as the mentors had expertise in a wider range of subject areas than was possible with a single person.

There are several developmental models that categorise stages people progress through as they come in contact with, and try to use, new ideas, objects, or innovations. Beauchamp (2004) identified five stages in the transition from beginner to IWB user for effective teaching: board substitute user, apprentice user, initiate user, advanced user, synergistic user. There are similarities with his definitions of these terms and the better known concerns-based adoption model or CBAM (Hall & Hord, 1987). The concerns-based model suggests seven stages of concern, and we argue that these are critical when considering continuing teacher professional development relating to classroom use of innovative ICT. Because the focus of this report is the mentoring process and the mentors, it is probable that only the highest CBAM levels need to be discussed. In Table 1 the CBAM stages of concern are listed, and the highest levels are briefly outlined, with classroom use of IWBs being the innovation.

In the context of adoption of innovations in school classrooms, Hooper & Rieber (1995) identified five levels: familiarisation, utilisation, integration, re-orientation, and evolution. In this model the two lower levels are labelled “replacement” and the others “transformation”. In a Becta advice document to UK secondary teachers (Becta, 2004a: 24) these five levels are considered in relation to teachers adopting IWBs into their teaching practice. An outline of the two highest levels of these considerations is presented in Table 2.

<table>
<tr><td colspan="3" align="center">Replacement</td></tr>
<tr><td colspan="2">Familiarisation</td><td>Utilisation</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td colspan="3" align="center">Transformation</td></tr>
<tr><td>Integration</td><td>Re-orientation
‘Lead teachers’ who explore possibilities offered by IWBs and ICT for their teaching and for student learning.</td><td>Evolution
Teaching and learning continue to evolve and adapt; teachers are confident to integrate a range of ideas and resources with the aim of helping learners.</td></tr>
</table>

Table 2. Progression in teacher practice. Adapted from (Becta, 2004).

The focus in each of the three models or sequences of stages described here (Beauchamp, 2004; Hall & Hord, 1987; Hooper & Rieber, 1995) is on the process of individual teachers accommodating an innovation, classroom teaching with an IWB, into their repertoire of teaching skills and pedagogic strategies. Only at the highest levels of the CBAM Stages of Concern model, in the stages of *collaboration* and *refocusing* is there any reference to users of an innovation working with colleagues for their mutual benefit. Mentoring between teacher colleagues is a completely collaborative process, and it is only in the Stages of Concern model that this is allowed for. In addition, the Principal saw the mentoring process as being two-way – it would help in the professional development of both the mentors and the staff they mentored. *I think there are two elements in mentoring. There’s the mentoring they do, but it’s the self-development and the development of these two people. They are both people that* *would be reserved, and therefore on their own they wouldn't be successful, but when they bounce things off each other they can support each other*. (Principal: interview 25 May 2006). This aspect of teachers adopting an innovation is not part of any of the models discussed here.

Results and Discussion

This study commenced after all teachers at RSC had completed both general ICT training (INTEL) and later specific IWB training provided by the supplier. Observations of who is using the IWBs when researchers are in the school, appears to be at odds with some of what Smith et al. (2005) have reported. In particular, and this is based on fewer than ten visits to the school, the early IWB adopters are turning out to be a group of relatively inexperienced teachers in visual arts, humanities, and mathematics who do not perceive themselves very ICT literate. This is an issue for further observation and investigation.

When asked whether the early adopters of IWBs were the teachers he anticipated, the Principal commented, *No. Far from it, and it has been really interesting to me that some of the people who have professed to be our ICT experts are the people who have not taken it up. When I think about it, it is because they can understand software and they can use marvellous multimedia programs or whatever, but I think they're afraid because the use of a multimedia interactive whiteboard in the classroom makes you reflect on your teaching practices and the way you go about running your classroom*. (Principal: interview 25 May 2006). Here the Principal is speaking from a position of strength and knowledge. Without making a fuss about it, he had developed some IWB activities and lessons that he used with his senior mathematics class. He was personally aware that using the IWB could change classroom practice.

Both mentors are leading teachers at RSC, and both have extensive classroom experience, one in visual arts and one in mathematics. Data, including observations of mentoring sessions and interviews with mentors and mentees, clearly shows that although there are two very different approaches to mentoring and general support in relation to use of IWBs, the mentoring program is achieving its aims. Of the two mentors, Mα is technically less experienced and knowledgeable. In an interview she commented on the complexities of classrooms and how things change when students are given control of the IWB. She commented that she saw herself as a perfectionist and control freak in the classroom, but as she has used IWBs more often she has begun sharing control with her students. Her approach to mentoring is based around listening to problems and frustrations voiced by a teacher, and then gently offering focused support. This type of approach to mentoring we have categorised as "catalytic". Mα reacts to issues raised by a teacher by offering her own ideas, modelling tools for the IWB, and helping with the preparation of material and activities for use in lessons.

One of the researchers observed a 45 minute mentoring session with Mα and an Art teacher. In this session Mα helped the teacher with technical issues concerning working with images in the "Easiteach" software that was used with the IWBs. The teacher's idea was to develop a class project on Pop Art that involved many images and many links within and external to Easiteach. As they worked through some of these issues they began to consider the possibility of groups of students working in a computer pod in the Art area to make their own multimedia "books" in Easiteach which could be shared with the rest of the class by using an IWB.

Instead of assisting teachers to bring their ideas for IWB activities to fruition, Mβ seems to see her major roles as sourcing ready-made IWB resources and ensuring that the IWB hardware and software function appropriately. Mβ is the more technologically competent mentor, and seems less inclined to assist in details of pedagogy or lesson development. When Mβ was observed mentoring with a History teacher, she found an excellent website related to the teacher's topic but did not suggest how it might be incorporated into an interactive lesson based around using an IWB. At this stage of the project Mβ has not been observed mentoring in both her own teaching areas, and so it is not clear whether the approach used shows unfamiliarity with content and pedagogy in a subject she doesn't teach, or whether she really does believe that providing resources is sufficient for most teachers. We have categorised Mβ's approach to mentoring as "resourcing".

In early March 2006 one of the researchers observed a mentoring session with Mβ and a first-year teacher who was interested in developing a geography lesson using the IWB and with the content based the location of Australian states and territories and their capital cities. Prior to this mentoring session the geography teacher had created a graphic of a wizard with a spell pot. Words could be hidden behind to pot and drawn out at random. Eventually this would evolve into a method of randomly choosing students to come out to the IWB to locate a given state or city on an outline map of Australia.

Mβ praised the concept and the graphic, and talked about the merits of locking the pot graphic to the page so that it would not move and reveal the words it was hiding. For the remainder of this 35 minute mentoring session Mβ helped the young teacher by responding to several "is it possible to" questions. Some of these questions were resource based – *Is it possible to find an outline map of Australia showing state boundaries*? – while others explored technical aspects of the IWB software – *How can students drag this information onto a map and get feedback about whether it is in the right location*? While Mβ appeared to encourage the "is it possible to" type of questions, most of her responses involved finding existing IWB resources from the Internet. This session reinforced Mβ's categorisation as a "resourcing" mentor.

Together the mentors appear to be having an identifiable affect on the nature, quality and quantity of IWB use across the school. A preliminary observation by the researchers is that, unlike what is reported in many previous CPD projects, there is a snowballing or cascading process that is involving more and more teachers. The concept of hiding words behind a graphic object on the IWB, originally used in a geography lesson, has been seen being used in visual arts and Italian lessons. Although there is no formal apparatus in place, teachers at RSC are sharing ideas and techniques, and encouraging one another to use the IWBs.

The researchers have noted the apparent formation of two 'nodes' of IWB users based around two young teachers, each mentored by a different mentor. These young teachers demonstrate some of the characteristics of their mentors in the way they are sharing their IWB skills with colleagues. One young teacher has developed a product that has been given to other teachers, and these teachers seem to use it with a minimal amount of change and adaption. On the other hand, the second teacher showed colleagues how to incorporate new word banks into the "Easiteach" software, and using this as a base some quite diverse activities have been created around four separate word banks.

Conclusions

By the end of May 2006 this research project at Rural Secondary College had been going for fewer than twenty weeks of school. However a considerable amount of data has been collected through observations and video-recordings of IWB use across most areas of the curriculum, and from interviews with teachers. Much has been learned about the mentors and the mentoring process at RSC. Later in the year the project will be expanded to include the perceptions of students about interacting with IWBs as part of their learning.

In this report we have examined aspects of the mentoring process. Although there is no quantitative evidence available, observations by the researchers and comments from teachers suggest that the RSC approach to mentoring teachers in classroom applications of IWBs is achieving levels of success for all stakeholders. Teachers are coming to grips with new techniques for interacting with information and students, the school administration is seeing some changes away from a reliance on "chalk and talk" pedagogy, and students are engaging in IWB-based lessons as well as beginning to produce their own presentations using the IWBs.

The existing models of teachers accepting and using a technical innovation such the interactive whiteboard concentrate on the journey of individual practitioners. Only the Concerns Based Adoption Model (Hall & Hord, 1987) appears to include the developmental stage in which confident and competent teachers share their knowledge and skills with peers. The mentoring process at RSC can be considered as an attempt to formalise and manage the CBAM stages of *collaboration* and *refocusing*.

For the two mentors, not yet half-way through their year of mentoring, this has been a period of personal development and quiet satisfaction with the way things are progressing. The differences in subject background and personal approach of the two mentors has turned out to be a significant factor in the overall success of the mentoring. Teachers have been able to approach either or both mentors, and obtain quite different styles and levels of support. Having two mentors available, even though they also have teaching responsibilities, increases the chance of teachers being able to contact a mentor whenever an IWB-related problem occurs.

There are still many issues to be resolved before all teachers across all subject areas at RSC reach the stage of accommodating IWB use into their teaching practice. So far there has been a lot of IWB use in some subjects including Art, LOTE and Mathematics, but very little in Science. For some teachers it is almost impossible to timetable specific classes into one of the six teaching spaces that have IWBs, and access will remain an issue for some time. Other teachers do not feel they are sufficiently technologically literate to develop lessons around an IWB application. The two mentors are aware of all of these issues and will seek solutions in the second half of the school year.

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