

Finding the way: Signposts in teachers' development of effective interactive whiteboard pedagogies

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ABSTRACT

This paper describes the process and outcomes of an action research project conducted in collaboration with classroom teachers who developed strategies that utilized Interactive Whiteboard technology for improving children's literacy and numeracy. Critical incident stories are used to demonstrate significant signposts in the teachers' development of interactive pedagogies. Recommendations are made for future professional learning initiatives that support effective use of interactive whiteboard technology.

INTRODUCTION

Principles of action learning informed the research approach and support given to Primary School teachers as they identified and developed strategies that utilized Interactive Whiteboard (IWB) technology for improving children's literacy and numeracy. The Community School hosting this collaborative, DEST Innovations funded research project, had a population comprised of students who were largely considered educationally disadvantaged and at risk of not achieving literacy and numeracy benchmarks. Data gathered through Western Australia's Literacy and Numeracy Assessment indicated that many students in the school were performing well below state averages and significant numbers of students were failing to reach state benchmarks in most areas and year levels of literacy and numeracy. The school was operating on a newly built site where access to high quality technology for supporting learning for all students had been included in the design brief. Furthermore, the School had invested in four mobile Interactive Whiteboards, which were available for use by all teaching staff. All teachers had participated in initial professional development sessions and four teachers demonstrated particular interest and engagement with issues and opportunities for integrating interactive whiteboard technology into their classroom practice.

The experiences of these four teachers as they grappled with learning the new interactive whiteboard technology suggested some commonality in the professional learning process. Shared critical reflection during the process of the project and analysis of the teachers' case studies indicated a learning continuum signposted by critical incident stories. The observed developmental continuum of Interactive whiteboard pedagogy will be presented in this paper and located within a review of interactive whiteboard research literature. Recommendations will be made for teachers' professional interactive whiteboard learning.

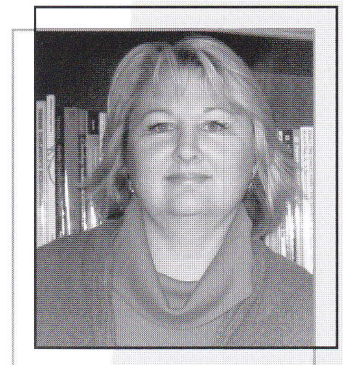
Significance of Interactive Whiteboard technology

The disparity in access to technology across socio-economic and cultural lines is of global concern. Technology is an integral part of social practice and those who do not have meaningful access to technology are clearly disadvantaged.

McCormack and Ward (2003: 81) report that the hands on interactive opportunities offered by the use of Interactive White boards *enhances student learning as well as bridges the gap between school and home*. A national survey of more than 3,000 low-income families affiliated with The Smith Family programs showed that less than 60 per cent of families had a computer at home illustrating that the "digital divide" could compound disadvantage (McLaren & Zappala 2002). Success in both literacy and numeracy is influenced by access to technology. This is acknowledged in the National Plan for Literacy and Numeracy in Schools which involves commitment to professional development and research funding to generate insights into potential ways of using information technologies to enhance the literacy skills of all young Australians (DEETYA, 1999). Further, it is clear that students from disadvantaged families are at risk of being further disadvantaged if they do not have access to technology.

The capacity of Interactive Whiteboard technology to offer students and teachers a range of options in the classroom makes it a potentially powerful learning tool which could assist in bridging the digital divide. The significance of Interactive Whiteboard technology lies in its ability to be interactive and fluid and the ability to integrate with other technologies. For example, the whiteboard can be used like a traditional whiteboard; yet can also operate as a computer screen with a fingertip mouse. It can incorporate word files or pictures, digital images, video clips, Internet material and PowerPoint presentations. Files can be saved and retrieved, revised by students and teachers and then printed.

However, research and experience with ICT teacher development, suggests strongly that for ICT ultimately to impact significantly on student learning, it requires teachers to be competent and critical users of ICT. A critical user of ICT can be defined as one who not only exhibits an ability to use the technology in a way that will



Karen Murcia

Edith Cowan University

Susan McKenzie

Murdoch University

enhance the learning of the students, but who also initiates pedagogical change and challenges educational practices in order to integrate ICT into the curriculum (Durrant & Green, 2000). In light of this, teachers participating in the current research project reported here were encouraged to focus on developing both their IWB skills and also effective pedagogy for its integration into classroom teaching and learning.

New approaches to pedagogy

Many researchers highlight the need for changed pedagogy for successful integration of technology into the curriculum (McCormick & Scrimshaw, 2001). Interactive whiteboard technology can be less than successful if used simply as another chalk and talk approach with little student interaction. Moreover, an Interactive Whiteboard is a tool rather than a teacher, and the use of ICT in the classroom is only successful when teachers make sound use of the principles of teaching and learning (Goodison, 2003; McCormack & Ward 2003). This was found to be the case in the UK Beta evaluation of their Primary Schools Whiteboard expansion project where it was reported that: *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* (Somekh et al, 2007: 8)

Miller and Glover found that teachers needed uninterrupted access to Interactive Whiteboard Technology rather than sharing the technology or having to move it from room to room. It needs to become a part of *the regular pattern of classroom life- the novelty value might provide a temporarily heightened interest but it was only when the full potential was realised that teaching could be enhanced* (Miller & Glover, 2002: 8). Glover and Miller (2001) investigated the introduction of interactive whiteboard technology in a secondary school and claimed that interactive nature of electronic whiteboard technology requires both new approaches to pedagogy and professional development for teachers. Successful integration of any technology into the classroom required more than simply acquiring that technology. *Closing the digital divide requires much more than buying equipment, it requires the knowledge and skills of teachers using the technology, and access to digital tools in the community* (Riel, Schwarz & Hitt, 2002: 147).

Glover and Miller (2001) claim that professional development is most successful when it comprises coaching and mutually reflective activity and it needs to be long rather than short term and characterised by "hands on" rather than demonstration. In relation to the technology itself, it must consider the use of linked multi-media and the possibility that teachers are not familiar with new technologies.

Inadequate professional development and lack of time to develop skills and plan lessons have been identified as barriers to the successful integration of interactive whiteboards into the classroom. McCabe and Emery (2003)

report that teachers found it helpful to pool resources and information, resolve technical problems together and share anxieties. There are clearly benefits when new technologies are introduced throughout the school as teachers learn from each other. The successful use of the technology and its impact is *...mitigated by collaborative, democratic activity; and they occur in situ* (McCabe & Emery, 2003: 9). Similarly, McCormack and Ward (2003: 82) claim that technology tools have added a "new twist" providing varied opportunities to empower students and allow them to take new responsibility for their own learning and *to expand possibilities for collaboration and construction of knowledge*.

Communities of learners

Many researchers have reported that the use of Interactive Whiteboards tends to create communities where teachers and students learn together and from each other. Co-construction of knowledge is central to such a learning community and new technologies can only enhance learning when they are used in a manner that is flexible, generative and responsive to individual students and contexts (Miller and Glover (2002: 6). For example, McCabe and Emery (2003) found that the use of Interactive Whiteboards in primary classes encouraged power sharing and problem solving in the classroom. However, they stress that it is the approach to teaching and learning which drives the democratic style of collaboration and joint problem solving, not the equipment" (McCabe & Emery, 2003: 10). Children often become experts when new technologies are used; *teachers commented that the technological challenge presented to the staff offered even the youngest children a chance to shine because of their home-learned skills with computers and video machines* (Miller & Glover, 2002: 13). Teachers also commented that they benefited from seeing how the technology was used by others and would also like to see models of best practice so they could see what was possible (Miller & Glover, 2002).

Research Methods

Action research principles were utilised in this project as they supported a constructivist approach to professional learning and facilitate real, practical action based on the learning needs of the students in the school. Beaty and McGill (1995) describe action learning has *a continuous process of learning and reflection supported by colleagues, with an intention of getting things done. Through action learning individuals learn with and from each other by working on real problems and reflecting on their own experiences*. The teachers undertook action learning and research as a part of, rather than separate from, their classroom practice. Collaboration between the researchers and teachers was established and project actions cycled between planning, acting, describing and critically reflecting (Murcia 2005).

Planning an action research project

The teachers selected a literacy or numeracy focus for their classroom project. Each teacher's project was then based on an aspect of classroom practice that had as a foundation the utilisation of Interactive Whiteboard technology for improving students' literacy and numeracy outcomes. Teachers were supported in the planning process by professional learning meetings which provided an orientation to international initiatives and research into interactive whiteboard pedagogy.

Reflecting on the action research process

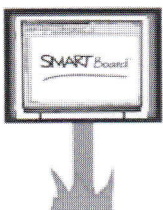
The project provided time for teachers to develop, trial and assess interactive whiteboard teaching and learning strategies. The common focus provided the connectedness, which enriched the whole group's reflective process. Teachers shared their ideas, strategies, reflections and impact assessment at regular facilitated project team meetings. Teachers were encouraged to keep a learning journal and share their experience through interim presentations to the group. Structured exercises were also used to increase the depth and critical nature of the teachers' professional reflection. This collegial sharing of ideas supported and motivated members of the group. The time and support offered by the action team meetings contributed to maintaining the momentum of the project and assisted individuals in writing their final project case study. The case studies were a significant source of research data but importantly enabled teachers to share their project experiences and learning with the broader education community. Grundy (1995) suggest case studies bring enormous satisfaction to the group as they distil the experience of the project and provide assurance to participants that something worthwhile has been achieved. The case studies demonstrated the teachers' professional activities and made their process and outcomes accessible to others.

Signposts in teacher development

The facilitated team meetings were an opportunity to document the Teachers' comments and importantly probe their thinking on issues related to their professional learning journey with IWB technology. This documentation, in conjunction with the Teachers' interim project presentations and final case studies provided rich data for analysis. A mapping exercise was conducted independently by two researchers across the qualitative data. Their independent findings converged and suggested signposts of teachers IWB development. The proposed signposts were then validated and supported by returning to the Teachers' case studies.

Findings

A seven-stage continuum of teachers' IWB development emerged out of the data. This continuum began at the novice level and progressed through to critical use of IWB for facilitating students' achievement of learning outcomes. Each stage was signposted by a significant question that drove the Teachers' professional learning. Further more, critical incident stories were found within the Teachers' case studies and used to capture and communicate the experience of the teachers at each stage. These stories add depth to the continuum and allow the voices of the Teachers to be heard in the sharing of the research experience. Discussion of each stage of the continuum is signposted below and illustrated with a Teachers' critical incident story.



1. Raising awareness: How can I get an IWB in my classroom?

The first time I laid eyes on an IWB I immediately began to see potential uses for the classroom. It was exciting, bright colours,

fast pace and with so many options. Being able to touch and move the words and images on the board was fascinating. There was even a touch of magic as words appeared with a wipe of an eraser. I could see the children in the classroom being captured by this technology. However, I thought having one of these in my own classroom was just a dream. Little did I know that in time I would have a wall mounted IWB in my own classroom.

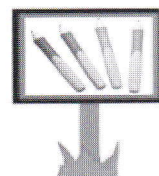
Initial product demonstrations by the suppliers of the IWB were fast paced and visually stimulating. The project teachers were engaged and considering the potential of the technology for supporting their classroom teaching and learning. They valued the interactivity in the board and its potential for supporting effective teaching and learning. Importantly, these teachers made a professional commitment to learning IWB skills.



2. Getting started: Where does this cord go?

I had a vague idea of the IWB's capabilities but I felt I was in the shallow end of the sand pit, without even a bucket and spade. I didn't even know how to turn it on, or even which components I needed in order to make one work. I was a novice and I needed help. I approached a colleague who was happy to help me get started with setting up the board. She even photographed which cord went where, mounted it onto card, labelled the parts, listed instructions and laminated.

There was some degree of anxiety amongst all Teachers when first accessing an IWB. The novice teachers found setting up the board intimidating. Their confidence level did vary and it appeared to be correlated with their general ICT skills development.

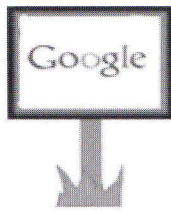


3. Using the tools: What can I do with the IWB?

Most teachers took the time to experiment with the IWB. All of us experienced similar types of problems – learning how to switch the laptop screen display, accessing the wireless network, positioning the projector for maximum space and how to realign the IWB. Over time some of us tried out the IWB software tools like pen types, colours, shapes, shading and screening. I remember writing clearly on the board even took a little practise.

Teachers explored the IWB tools and experimented with their functions. They developed skills in writing on the board and basic actions such as drag and drop. They were observed importing tools

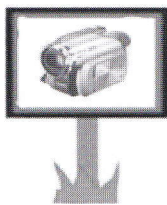
and functions from other types of more familiar software, for example Microsoft power point and publisher. During this stage Teacher's gained greater confidence in setting up the IWB and using it in the classroom with children.



4. *Sifting and using: What ready made on-line resources can I find and use?*

I knew how I would normally teach 'understand number' but was unsure how the whiteboard was going to help me. I heard there were lots of interactive activities and games on the internet so I went searching. I found hundreds of sites that proclaimed to teach and re-enforce the concepts I was aiming for. I spent night after night sifting through on-line interactive activities. I was playing games, shooting aliens, duelling pirates and rolling virtual dice. Every time I found a site that looked stimulating I would bring it into the classroom and spend the proceeding half hour teaching the concepts behind the game. We would then play the game as a group.

Teachers used the IWB as a way to display their computer screen to the classroom. For example, Google searches were conducted and displayed on the IWB so students could observe and learn ICT literacy skills. Interactivity was introduced through ready made on-line activities. Children were using the IWB under the Teacher's direction while observed by the whole class or in small groups. One teacher described these as 'Friday afternoon' activities. Others used the on-line activities to reinforce learning and reward positive behaviour. All Teachers observed over time the variable quality of the on-line interactive materials.

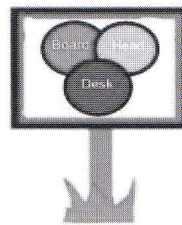


5. *Making resources: How can I tailor make activities for the children's learning needs?*

I had a go at developing my own resources targeted to the children's specific needs and interests. In the beginning, I learned how to use ordering and layering of objects to allow or not allow them into a sorting box. I used pictures from the interactive software gallery and collected others from the internet. I cloned images

and later as I gained more confidence and skills linked in sounds and video clips. I scanned books and recorded myself and later the children reading. There were so many options and I only felt limited by my imagination.

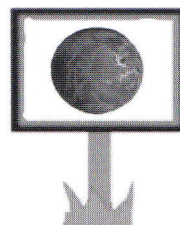
Teachers found that time spent searching for just the right on-line activity could at times be better used for constructing their own interactive activities. The skills used by teachers varied and increased overtime. Activities ranged in their complexity from layering images to linking in sound and video. At this stage the teachers focus continued to be on their IWB skills development but targeted to the specific learning needs of the children in their classroom.



6. *Integrating activities: How can I integrate the IWB into a meaningful learning sequence?*

I experienced a 'Damascus Road' in the form of Book Week. It seemed a fantastic week where learning tasks, IWB and the class all seemed to merge together. I remember thinking 'If this is what it is going to be like – WOW!!!' There was one particular day where everything just seemed to flow. Learning happened at the board, children were thinking and talking; then consolidating their learning at their desk. Experiencing this at the *Board*, in the *Head* and on the *Desk* approach dramatically altered how I viewed the IWB and its place in learning tasks. I was now using the whiteboard as a tool to support what I wanted to teach instead of the board driving what I did.

The teachers' thinking about teaching and learning with the IWB shifted at this stage of their development. The IWB was no longer the centre of the learning experience but an integral component, fluently integrated with a range of learning activities and styles. There was increased awareness of the connections needed between what happens on the IWB with children's talking, thinking and at desk tasks. Each component of the learning became related and consistent. The biblical *Damascus Road* reference made by one teacher reflects the significant realisation and fundamental shift in the manner in which IWB was integrated into their classroom learning experiences.



7. *Embedding in practice: Would I want to teach without an IWB?*

I think I have completely changed the way I teach. I use the board every day, in almost every lesson and for integrating the curriculum. For example, using the interactive notepad supported smooth transitions between learning about large numbers in resources I had created and the linked internet sites which used large numbers in context. The children had an opportunity to be numerate; that is not just able to understand what large numbers were but actually using them in real life situations. My whole practice of teaching had shifted focus. I now had all of the resources of the 'real world' right at my fingertips. I have come to depend on the IWB in my teaching. I find that the first thing I am doing every morning is connecting my board and checking the alignment. The board is always on stand by for use in every learning area.

Teachers had become critical users of the IWB technology. They were purposeful in its use and reflective about its impact on children's learning. The IWB had become embedded into their daily practice and there was fluency with its use. Teachers were preplanning interactive activities but now also using the IWB as a strategy for responding to children's learning needs in the moment.

Emerging Issues

In the identification of signposts in teachers' development of effective interactive whiteboard use, other issues emerged that played out alongside their development and were crucial to its progress. In particular, the *reliability* of the different technologies, the *availability* of effective ICT support and *access* to the IWB technology (for both children and teachers), emerged as significant.

Permanently fixed boards vs mobile

In the early stages of school's use of IWB technology, the teachers had access to mobile IWBs in a common foyer. The rationale was that, "the IWBs would be mobile in order to increase accessibility to what was a very expensive resource". This meant that access to the boards had to be negotiated between teachers and the laptop, data projector and board had to be set up each time the boards were used. In addition, there were the challenges associated with learning how to connect and set up the equipment, positioning the projector and cords to accommodate children and constant realignment of the board if the projector or board were moved. The mobility of the boards clearly led to problems in making the technology user-friendly or effective as a teaching tool which has also been reported in the literature (Higgins, Beauchamp & Miller, 2007). One of the teachers described the difficulties associated with the mobile boards:

In the classrooms with no IWB attached, where one would have to find time to move the mobile board from the upstairs storeroom, locate missing cords, connect it up and the projector, align the screen, train the children in the safe movement around the mobile board with all the cords crossing over the floor? I knew why they were not using the mobile board.

At the commencement of the project the teachers claimed the mobile IWBs for themselves, as they were not being used elsewhere in the school. Once the boards were fixed in their classrooms, the teachers used the boards across the curriculum and engaged the children in their use on a daily basis. These teachers were willing to experiment and incorporate this medium as a part of the learning experiences and this was clearly supported by the boards being fixed rather than mobile. One of the teachers commented, "Having the IWB

mounted I believe was a pivotal moment in our IWB development. It is then that the IWB really launched itself and activities clearly made the transition to learning tasks".

ICT support in the moment

The project teachers experienced technological difficulties throughout the project that clearly detracted from the effective use of the IWBs. In some instances, the teachers felt lack of ICT support and reliability of technology sabotaged their efforts. As the effective use of the IWB depends on the connection between a range of component technologies, any problem with one component can mean the IWB will not function. Problems with technology are frustrating at any time but even more so when the class lesson is abruptly interrupted by failure of the technology to fulfil its function and ICT support is not at hand. For example, there were numerous instances where the school wireless network would drop out, the laptop would not function or the IWB would not connect to other technologies. There were also compatibility issues between technologies. This was exacerbated by lack of collaboration between sources of support and willingness for those from different organisations to work together. For example, it was sometimes the case that the school ICT support based off campus would not address a particular issue because "our school system does not support that particular technology". The availability of effective ICT support emerged as a significant issue in the project.

Techno-resilience

The teachers attribute a great deal of success in using the IWB technology to their *techno-resilience*. Although the project teachers experienced technological difficulties that hindered some of their efforts, their determination to make the IWB technology work ensured they developed their skills in the long term. One of the project teachers describes his determination amid technological difficulties:

There are many times even today when the computer crashes, the scanner doesn't seem to want to connect or the server is down and the Internet unavailable – but it doesn't mean we pack everything up every time this occurs (mind you there have been many a time where I have felt the urge to hurl my laptop out the closed window). We persist and try again. The same applies to the IWB. I am really pleased I persisted with my efforts in using the IWB. I know with certainty that I wouldn't be where I am today in terms my own skill development or have watched the development of my student's confidence if I had given up.

As problems in the use of technology were overcome, setbacks were transformed into steps forward. These steps forward were documented as part of the action research process and then shared and celebrated with project team members. Despite each of the teachers having different levels of ICT skills and experience at the outset of the project, each of the teachers moved steadily forward in their development as the project progressed. Throughout the project it became clear that techno-resilience was bolstered by the support and community created by the action research context.

Children as part of the learning community surrounding the IWB

It was evident throughout the project that the teachers did not use the IWB as another means of chalk and talk but were aware of the importance of bringing children into the IWB interaction. Each teacher maintained a focus on children's development in the use of the technology and ensured children remained at the centre of the learning.

Alongside the teachers' development in the use of IWB technology, children were also developing their skills in its use. The project revealed that the children needed access to the board and the time and opportunity to explore along with the teachers. Teachers reported that it took time for some children to "drive" the IWB yet they were keen to "have a go and take risks". The children often became expert at setting up the board or solving problems. One teacher reported that if her students had problems clicking and dragging objects on the board, they would ask her, "Are you sure you lined up the board this morning?" Children were clearly part of the learning community surrounding the teachers' IWB development.

Recommendations for IWB professional learning

Recommendations for teachers' learning in the use of IWB technology emerged from the identification of developmental signposts in using IWB technology. This research highlighted four conditions or characteristics as crucial to teacher IWB professional learning:

- An effective learning support framework
- A context for constructive collaboration
- Expert input at point of need
- A focus on manageable change and development

An effective learning support framework

Much of the teachers' success in this project can be attributed to their commitment to making the IWB work for them in order to facilitate children's learning. The framework provided by the action research model gave teachers a way to learn from their actions. Time was provided for planning, implementing ideas, observing, questioning and critically reflecting. The action research framework required teachers to question their perspectives of teaching and learning

and the needs of the children in their classrooms. This questioning provided the focus necessary for a successful professional learning journey. In this project the teachers chose either a literacy or numeracy focus and this became the driver of changes to practice. The collegial nature of the action research approach enabled individuals to receive support from their colleagues in directing their own professional IWB learning.

Constructive collaboration

In order for the IWB to be used effectively, a collaborative approach has to be developed and supported throughout the learning process. Time must be set aside for collegial collaboration, brainstorming and developing skills with the technology. Colleagues or others who act as critical friends also provide a context for sharing dilemmas, valuing learning and celebrating progress. In the case of this project, the action research framework provided a sound structure for meetings, time to explore the IWB and most importantly time for critical professional reflection on the learning journey. One of the project teachers described this constructive collaboration:

The team I worked with in the project on campus were supportive and happy to share with each other. Many discussions were held around the school, over staff room tables, climbing staircases together or during other incidental meetings. Our project days on the Murdoch campus were invaluable as far as reflecting on our journeys and defining our next steps. Constructive collaborative time and support is imperative for the successful implementation of IWB into classrooms.

'Expert' input at point of need

The project demonstrates that professional development needs to be tailored to the needs of teachers at different stages of their development in the use of IWB technology. As teachers develop, their professional learning must have the capacity to work with their existing knowledge and established skills and extend those further. In the early stages of the project, the teachers attended a 2-hour session on site with a UK, internationally recognised expert in the area of IWB technology. He demonstrated some of the capabilities of the board and in particular introduced them to some simple techniques that were eagerly practiced and then modified by the teachers. This session was pitched to the teachers at their level of IWB development and individualised in that they could determine to some extent what was covered. One of the teachers describes this learning:

I was pretty familiar with what he was doing until the Sorting Box. He showed us how to use ordering and layering of objects to allow them or not allow them into the auto shape box. It was a simple idea and I was hooked.

Midway through the project, the Murdoch researchers arranged for a consultant to provide IWB skills development that specifically addressed teachers' individual learning needs. Later in the project, one of the teachers attended a school-based conference, which then motivated him to access online learning and attend network meetings with other active classroom based IWB users. The importance of professional learning at point of need cannot be overstated. Teachers need to retain control over their learning and have access to activities that match their individual learning needs.

BIOGRAPHY

DR SUSAN MCKENZIE is a Lecturer in Educational Psychology in the School of Education at Murdoch University. She has over 20 years experience as a primary school teacher and 15 years experience in teacher education and professional development concerning inclusive education, literacy and partnerships between families and schools. Her current research focuses on gifted and talented education. The project discussed in this paper, supported by funding from the Australian Government Innovative Literacy and Numeracy Projects Grant, is the second Susan has completed under this funding strategy. The first project *Making Connections to Promote Early Literacy* was an action research project investigating home-school connections that promoted literacy development for young children.

DR KAREN MURCIA is a Senior Lecturer in the School of Education at Edith Cowan University, working with science education students at both the undergraduate and post graduate levels. Karen's experience in education includes having had the opportunity to teach at the primary, secondary and tertiary levels. She has worked extensively in school based research partnerships, using action research principles to support teachers as classroom based researchers. Currently, Karen is the director of a collaborative research project involving the Western Australian Department of Education, Electroboard and Edith Cowan University. This research explores the impact of interactive whiteboard technology on classroom discourse and contributes more broadly to Karen's 2009 Research Fellowship (ECU) program.

A focus on manageable change and development

Teacher development in use of IWBs should be understood as an evolution rather than a revolution. The developmental signposts identified in this paper reflect the notion that teachers cannot move straight from learning how to set up the board to embedding the IWB in their practice. The teachers in this project were prepared to keep moving forward by breaking with familiar practices and moving out of their comfort zones. They focussed on manageable change and the expectations of their own development were realistic. This gradual development is key in the process of teacher professional learning in the use of IWBs.

CONCLUSION

The teachers involved in this project found that over the course of the year more and more teaching colleagues were taking an interest in what was happening with the IWB project group. Enquires were made about future courses or IWB options. Time frames were also being discussed as to when other classrooms would be fitted with an IWB. This interest was evidenced by reports of both teachers and children stopping to watch IWB activity through their classroom windows. Clearly there was a ripple effect which emanated from the project teachers' commitment to IWB learning.

This ripple effect is ongoing and also affects the project teachers as they continue to reflect and move forward with their IWB practice. Project teachers thinking about ways to move forward featured the notion of children as the creators of IWB activity. This is captured in the following quote.

Children could construct a model with a friend, photograph it, edit and present it to the class on the interactive whiteboard. They could even publish their interactive materials on line for other students to use. Imagination and creativity can explode with what is possible!

The teachers in this project moved from being IWB novices to critical practitioners. This required time, planning and collegial collaboration. These Teaching professionals understood the importance of innovation and creativity for evolving their practise. The IWB was a medium for exploring their teaching and allowed them to expand their effective practice. Although the project focussed on the IWB it was evident that the board was only a tool, which had the capacity to support effective teaching and learning. This is further supported by the following quote:

Good teaching remains good teaching with or without the technology; the technology might enhance the pedagogy only if the teachers and pupils engage with it and understood [understand] its potential. (Higgins, Beauchamp & Miller, 2007:217)

Acknowledgement

This project was conducted with support by funding from the Australian Government Department of Education Science and Training (known as Department of Education, Employment and Workplace Relations DEEWR) under the National Projects element of the Literacy, Numeracy and Special Learning Needs Program. Any views expressed do not necessarily represent of views of the Australian Government Department of Education Science and Training (DEEWR).

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