Enhancing Student Learning with Interactive Whiteboards: Perspective of Teachers and Students

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ABSTRACT

When used in a pedagogically sound manner, interactive whiteboards (IWBs) are a valuable resource for connecting students with their learning. IWBs have been utilised in remote NSW schools for almost ten years, with other regional schools having only recently installed them. Exemplary teacher practice that demonstrated good pedagogy in the use of IWBs was identified. The lessons of five teachers from three remote and rural NSW primary and secondary schools were videoed to determine how they used the whiteboards to support teaching and learning. Teachers were interviewed to document their perceptions of the use of IWBs and students were interviewed to determine their feelings about the use of IWBs to support classroom learning. These case studies found that there was overwhelming support for the use of IWBs by both teacher and students.

INTRODUCTION

Interactive Whiteboards (IWBs) have been used for over a decade with the United Kingdom at the forefront of research and implementation in schools. IWBs engage students in the lesson content as they are being used as a complimentary tool to enhance the learning process. Pre-service teachers require skills in using IWBs in their teaching; however the teaching staff also require these skills, which can be gained through Professional Development. The case studies identified exemplar teachers so that their lessons could be videoed and teachers and students interviewed to provide complementary resources for professional development.

All IWBs do the same thing. They transfer the computer's monitor onto a whiteboard where the touch screen can be manipulated via a pen or finger. Objects can be dragged around the screen, drawn, animated, movies watched, paused and written all over and screens captured. IWBs come with installed images, many of which are interactive. Educational games on the IWB can be more engaging than conventional boards (white or chalk) and are an excellent tool for collaborative work.

Background

According to Higgins, Beauchamp, & Miller (2007), IWBs were first introduced into the United Kingdom for office presentations, then for the higher education sector and, in the late 1990's, primary schools began using them. It was found that the early adopters used IWBs as they met the needs of a wider range of users. Kennewell & Morgan (2003) reported on their observation that future teachers recognised the potential value of using IWBs in their classroom teaching and sought training wherever possible. This feedback gave this institution the impetus to purchase two IWBs due to a small grant so that pre-service teachers could gain valuable skills for their future teaching. However, academics had not received training to be able to conduct these sessions to the pre-service teachers.

In 2007 IWBs were introduced into the curriculum at this institution. One Learning Outcome of Information Communication Technology (ICT) unit for the pre-service teachers is: "Demonstrate an understanding of the potential of ICT to enhance learning, including video conferencing and the connected classroom". When students have achieved this learning outcome, it provides them with a Professional Teaching Standard enabling them to teach in NSW primary schools.

As an educator of future teachers we are constantly encouraging beginning teachers to gain sound understandings of the technology that is available for them to use in the classroom. We saw the need for IWBs to be incorporated into the curriculum which would provide unlimited possibilities to enhance teaching and learning. Pre-service teachers are guided by the principles of effective teaching and are linked to the pedagogical practices of (Gregory & Connolly, 2009):

- Clearly indicating outcomes to be achieved
- Designing sequences of related steps towards those desired outcomes
- Relating learning to students' needs, pacing the learning to meet students' level and interests
- Giving students feedback on their progress

Beauchamp (2004) stated that the use of IWBs was growing in the United Kingdom (UK) primary schools and were presenting challenges and opportunities for the teachers. This can also be said of teachers from Australia and using an IWB in a pedagogical manner needed to be considered to enhance student learning. Even though the use of IWBs is relatively new in Australia, the UK had been making use of this technology for more than five years before IWBs were introduced into Australia. Therefore, much can be learnt from their research findings. In a study conducted by Glover & Miller (2001), staff and students were interviewed from a high school. They found that the major problems that occurred with the

IWBs were when the teachers failed to "appreciate that interactivity requires a new approach to pedagogy" (p. 257). Kent (2008, p. 10) claims that pedagogy is "those things in the classroom that can have an influence on learning". Good IWB pedagogy, as supported by teacher interviews outlined in this paper, includes the following six principals (Gregory & Connolly, 2009, p. 69):

- The greater the immersion with IWB through daily use, the greater the knowledge and skills with how they work and what is possible
- Simple activities are best to start within the classroom; building up to more complex ones
- Begin by using other people's resources
- Create relevant resources that fit learners' context and interests
- Embrace students' keenness to work with IWBs and harness this to gain their engagement in learning by facilitating classroom interaction
- Avoid the use of IWBs for simple projection of the same content used in presentation or on regular whiteboards

Initial research on IWBs began in the early 2000s in the United Kingdom. Australia is approximately five years behind the United Kingdom in its use of IWBs and hence its research. In Australia, research has occurred since 2005 (O'Neill & Carr, 2006). This is supported by Independent Schools Queensland (2008) who reported that there was little research on the impact of a student learning in Australia. Most teachers were aware of the potential of an IWB for learning but required techniques for enhanced teaching and learning. As Kent (2008, p. 11) points out, all good teaching involves:

- *Promoting intellectual quality within the classroom*. This can be achieved by using the IWB with the class to present concepts and place in various contexts, explore implications, link with existing knowledge and lead discussions to probe student understanding enabling students to take their learning in personally relevant directions (p. 19).
- *Ensuring that lessons are relevant and significant to students' lives*. The teacher should embrace the student's world and teaching within this context by drawing clear connections with prior knowledge, experiences and interests and this can be achieved easier through the digital tools that are available on an IWB (p. 43).
- *Creating a classroom environment that actively supports students with their learning*. Having an IWB provides the teacher with a variety of possibilities to create a supportive learning environment through the use of different tools and resources (p54).
- *Linking teaching, learning and assessment*. IWBs support whole-class teaching linking concepts, adapting to students as lessons are scaffolded including formative and summative assessment (pp65-66).

Betcher & Lee (2009) argue that when new technology is placed in schools, teachers inevitably "continue doing many of the same things that old technology could do". For this reason, experienced teachers were sought who were now starting to "think in completely new ways … and create things that were not possible with old technologies" (p. 2).

METHOD

Which schools were targeted and why?

The aim of the project was to video and interview exemplar IWB teachers, along with a sample of students, to gain their perceptions of using the IWB as a teaching and learning tool. These videos would demonstrate good pedagogy to be used as a resource by academics. They would use this resource with pre-service teachers in order to gain knowledge on how to use an IWB in their classroom teaching. The reactions and perceptions of the five teachers and their students who were interviewed are outlined here.

IWBs were installed in 2006 without the knowledge of how to use them, particularly in the classroom. This was due to gaining a small grant to purchase the IWBs and, even though the supplier provided limited training, the academics still did not know how to use the IWB in a classroom teaching and learning situation. This knowledge was required by the academics so that they could demonstrate good practice when teaching pre-service teachers. This project sought exemplar teachers who were using the IWB in an innovative manner, making use of the interactive features that it has to offer. Regional exemplar teachers close to the institution were sourced by asking various schools and the state Department of Education, however, at that stage, only two schools had installed IWBs.

With the assistance of the state department and teachers working in the region, one primary and four high school teachers in remote and rural NSW, Australia, were identified as having the most experience using IWBs and were thought of as exemplar teachers in their use of the IWB by their peers and employers. They had installed and were using IWBs for several years prior to other schools in the state. The teachers from three rural schools were chosen, interviewed, lessons videoed and observed and students interviewed to ascertain their perceptions of the IWB. This material provided backup resources to use for professional development to be able to train pre-service teachers.

RESULTS

Overview of Interviews with Teachers and Students

The overall views of the teachers and students were extremely positive about the use of IWBs in the classroom. All teachers and students stated they would be very disappointed to lose the ability to use one, with one teacher saying, "I would be devastated if I didn't have the use of an IWB in my classroom" and another stating that they were "reliant on them". All felt that the IWBs were a very positive addition to their classroom. There were four themes that came from the interviews with teachers and students: behaviour management, students with special needs, enhanced learning and Mathematics being a favourite subject to use on the IWB with the younger students. These themes are discussed below.

Behaviour management

All teachers interviewed stated that the IWBs were significant in behaviour management. One teacher felt that the IWB reduced behavioural problems and dissipated most other problems as well. He sums this up:

> *I will give you just one example that highlights this. I teach the bottom Year 8 class. Last year they were in the bottom Year 7 class. They were taught by traditional methods. They were an absolute handful for the teacher and had multiple exclusions from the lesson ... This year I have taken over the class. They have come into this classroom with the IWB. There is a vision-impaired kid. I have basically all the behaviour problems in that class, poor attendance record, the whole lot. Now, these kids come in every single lesson, they know they are going to use the IWB. They know that we are going to use it in every single lesson. They want to know what we are going to do. Straight away, their behaviour problems have gone ...*

Another teacher stated that by combining various teaching elements; touch, visual and audio, the IWB could also be used as a classroom management tool. He stated that "It helps them [students] (a) participate in it [the class] and (b) have some sort of visual cue to go along with the words and the writing that you are trying to get across to them".

> *"I am reliant on it to get the attention of the kids to get them in and hook … They are an excellent tool for recording what you are actually teaching".*

Students with special needs

During the visit to a Year 7 Mathematics class (aged 13), a student was interviewed that had only 5% vision who reported that the IWB made learning easier as it was easier to see the board (due to the projection light and black writing on white background) and that the interactivity required assisted her in learning more affectively. IWBs support students with disabilities who benefit from the large screen size and have "learned at a greater rate than those not using the whiteboard" (Becta ICT Research, 2003, p. 1). In a Year 1 class (aged 6), one student had a hearing impediment and when asked if the IWB helped her, the student stated that it was better learning with the IWB but she didn't know how or why.

Enhanced Learning

All teachers interviewed stated that the IWB enhanced learning. The following statements sum this up. A primary school teacher:

> *YES, they enhance children's learning! The children are very responsive to the IWB and it's that desire to know more and the fact that they can manipulate things. It just gives them that step further, especially for younger children, reluctant writers. Those that find it very difficult to actually sit down and write out what they want to say. If they can move the text to get that section of how it should look and they actually have just manipulated it, rather than go back and have to physically write it, they are not spending that time going "oh, I can't write", they are spending the time learning and enhancing their knowledge and taking those big steps forward.*

A high school science teacher:

> *I think that the students are more engaged in their learning … Even if you are just using it as a modified chalkboard, for example, they will become more engaged because it is more vivid, you can make it more colourful, you can put pictures up there as well, which is a lot better than having a blackboard with white chalk on it. So, yes, they do become more engaged and they will become more interested in their learning and their learning outcomes at the end of the day are going to be far more effective as well.*

Mathematics

During the visit to the primary school, all students (100% interviewed) stated mathematics was their favourite subject to use on the IWB. This was supported by Wall, Higgins, & Smith (2005) who gained the views of primary school students and the impact of the tools on their learning. Their research found the IWBs could be motivating, aid concentration and keep student's attention. They also found that Mathematics was the subject that students thought to be the most useful.

CONCLUSION

The teachers reported the IWB enabled students to "get their head around concepts" and has "the ability to help their learning". It can be concluded that the students in these lessons were highly engaged and motivated by the teacher's enthusiasm and the interactivity that the IWB provided. These teachers were exemplars as they had been at the forefront in Australia in their implementation and use. The teachers found the IWBs practical to use in the classroom as was stated by one teacher, "it's so easy to have the two things going and you can flip from page to page. You can jump from one part to the other really easily. If you have paper and book, flipping and turning paper, the kids lose focus a little bit. With IWBs, this is instant. And, it is very hands on." By observing these teachers and learning from their hindsight and the perceptions of the students, the author was able to implement effective professional development to academic staff so that they could seamlessly use the IWBs in their teaching and have pre-service teachers take these skills with them into the classroom. By videoing the teachers during their lessons and interviews, these resources provide valuable back up materials for professional development so that academics gain the necessary skills to teach using IWBs in a pedagogical manner.

BIOGRAPHY

***Sue Gregory** is a Lecturer in ICT Education in the School of Education and Research Fellow with the DEHub Research Institute at the University of New England. Since 2007 she has been researching the various learning opportunities and efficacy of virtual worlds. The author has provided Professional Development to school staff, mostly on Web 2.0 tools and IWBs, since 2006 and was successful in obtaining funds to install IWBs throughout all tutorial rooms in the School of Education in 2010.*

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