STUDENT VIEWS ON THE VALUE AND USE OF INTERACTIVE WHITEBOARDS IN A SECONDARY SCHOOL.

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Abstract

The use of Interactive Whiteboards (IWBs) in South Australian secondary schools has increased quite significantly in recent years. This paper reports on a study at a large suburban high school in South Australia that has recently installed a number of IWBs in classrooms. The students were asked in an online survey to indicate how useful they thought the IWBs were and to comment on how IWB use could be improved, over 900 responses to the survey were received. Overall the students were quite positive about the use of the IWBs with the majority of the students indicating that they made the lessons more interesting. The use of simulations and animations on the IWB was identified by most of the students as being most valuable. While the overall results were positive the students highlighted that there were many classrooms without the IWBs and that there was a need for further teacher development in their use.

Introduction and Literature

Interactive Whiteboards (IWBs) are being used increasingly in schools in a number of countries, initially in the United Kingdom where Mercer (2010) described the situation as almost total saturation, in the United States where in a recent report (Lemke, 2009) they were described as standard equipment in some areas, and in Australia where a large number have been installed in both Primary and Secondary classrooms (Lee, 2010; Serow, 2008). IWBs have been described as a technology readily adopted by teachers (BECTA, 2003), one that teachers find relatively easy to use and initially requires no pedagogical change (Kennewell, 2006). Lee (2010) recently described the adoption as virtually overnight in some schools and that the introduction of IWBs into schools transformed the overall use of ICT. More recently IWBs have been described as a technology hub (Miller & Glover, 2010; Thomas & Schmid, 2010) where the teacher has access to video, the web, animations etc through the one device, enabling the teacher to offer a rich learning experience to the students. When the IWB is set up as a technology hub it has been proposed (Miller & Glover, 2010) that it can act as a trigger for pedagogic change.

While still a relatively new technology, there has been ongoing research into its use (Hall & Higgins, 2005; Jang, 2010; M. Lee, 2010; Mercer et al., 2010; Miller & Glover, 2010; Northcote, Mildenhall, Marshall, & Swan, 2010; Quashe, 2009; Thomas & Schmid, 2010; Winzenried, Dalgarno, & Tinkler, 2010). Lemke (2009) identified that there was a distinction in the research between using it as a tool to enhance teaching and as a tool to support learning.

Multiple studies identify a distinction between the use of IWBs as a tool to enhance teaching (e.g., flexibility, versatility, efficiencies, interactivity, saving work, etc.) and its use as a tool to support learning (motivation and affect, multimodal stimuli, etc.). (pg 9)

As a tool to enhance teaching, research has shown that IWBs can be used to support whole class teaching (BECTA, 2003; Kennewell, 2006). While this can be seen as a negative (Higgins, 2005) where there is more teacher talk and less interactive teaching, there is evidence (Northcote et al., 2010) to suggest that this increase in teacher talk does not always occur and that teacher led discussion in the form of dialogic teaching supported by the use of IWBs can be a positive outcome (Mercer et al., 2010). Interactivity has been shown to be dependent on the teacher (Quashe, 2009) and to be
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implemented in varying forms (Northcote et al., 2010). There are a number of other benefits of the IWB that have been identified by researchers. Mildenhall (2008) noted a gain in flexibility, and the ease of saving of completed class work has been seen as a benefit (M. Lee, & Winzenried, A., 2009). Smith et al (Smith, Higgins, Wall, & Miller, 2005) summarised the potential beneficial effects on teaching and learning as

- flexibility and versatility
- multimedia/multimodal presentation
- efficiency
- supporting planning and the development of resources
- modelling ICT skills and
- interactivity and participation in lessons. (pp 92)

However such benefits are not guaranteed (Marzano, 2009; F. Smith, Hardman, F., & Higgins, S., 2006). While the whiteboard (WB) part of IWB is not new for teachers or students, the Interactive (I) part is new, and can be more challenging—probably more challenging for teachers (Lee, 2010) than for students. Generation of effective interaction using an IWB is also reasonably complex (Quashie, 2009) and poorly designed activities using the IWB can be associated with time lost, interruption to flow of a lesson or student disengagement.

Given the recent introduction of IWBs to the school involved in this study, the researchers and the school staff were interested to see how the students perceived the use of IWBs, what was seen to be the benefits to students, what things about IWB use were seen to be problematic and what needed to be done to improve their use.

Method

Students at a large secondary school in suburban Adelaide completed an online survey at the end of 2011. The survey was conducted as part of a three year longitudinal study of the impact of Learning Technologies within the school. The IWBs had been progressively installed in the school over the last three years and while the larger study had been in progress for three years this was the first survey that had incorporated questions on the use of IWBs. The students responded to a series of six statements relating to IWB use which required a Likert response on a five point scale (Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree). The six statements were drawn from the literature surrounding the use of IWBs as outlined above:

1. IWBs make learning more exciting and interesting.
2. I prefer lessons which are taught with an IWB
3. I find it useful when the teacher uses interactive elements like simulations and animations on the IWB.
4. I think IWBs make the teacher's drawings and diagrams easier to understand.
5. I think teachers' lessons are better prepared and organised when they use an IWB.
6. It is easier to understand the work when the teacher uses an IWB.

The students were also provided with an open text box to respond to the question, “How the use of IWBs could be improved?”

Over 900 students attempted the survey but complete responses from 890 students only, were available for analysis. Approximately 520 students entered a text response, with some commenting on more than one aspect and so a total of 583 responses were available. The text responses were categorised into common themes and the frequency of themes calculated. One of the other text response questions in the larger survey “How has the use of Learning Technologies impacted on your learning”, while not part of the section on IWBs did provide supporting information for this paper.

Results and Discussion

It can be seen from Figure 1 that there was substantial agreement by the students to the first statement “IWBs make learning more exciting and interesting”, with over half of the students either agreeing or
strongly agreeing to the statement and only 9% of the students disagreeing with the statement. There were a large number of student responses to each of the questions that were neutral, this was not considered to be problematic and was interpreted as neutral rather than as no opinion because the students were required to select a response with a null (missing value) response being the default and these were not included in the data. This positive view was further supported in the student comments where students indicated that they were more interested in lessons because of the visual aspects of IWB use.

*It is more interesting when the teacher uses new technologies such as the smartboards because we are seeing what we are learning rather than only listening.*

and this was also linked to the use of the IWB as a central hub for multimedia

*The use of smartboards in classrooms enhanced the level of interest and also aided teaching as it is often easier to explain some concepts using digital sources like videos or diagrams.*

![IWBs make learning more exciting and interesting.](Figure 1 IWBs make learning more exciting and interesting. (890 valid responses)

The level of agreement for the statement “I prefer lessons taught with an IWB”, while less than that for the previous question was still substantial. In Figure 2 it can be seen that only 10% of the students disagreed with the statement and 48% showed agreement. The level of overall satisfaction was also supported by the number of students who indicated that they were happy the way things were and wanted no changes made. For example;

*I don't believe the IWBs need to be improved, there just needs to be one in every class room.*

*Please use the IWB....*

This was also supported from the student’s text responses (see Error! Reference source not found.) where the most common text response indicated that they wanted teachers to use IWBs more often.
Figure 2 Student responses to statement “I prefer lessons which are taught with an IWB”

One of the reasons for this preference for lessons involving use of an IWB may be that the teacher explanations are better when they use the IWB. Evidence for this can be found in a number of students comments:

- Only some of my teachers use them and they explain things better with them.
- They have had a fairly big impact. Like maths when the teacher uses the smart board to explain problems.
- So far the only lesson in which a smartboard is frequently used is maths and I think it has a very positive effect on our learning.

Table 1
Consolidated List Of Student Text Responses To Question “What Advice Would You Give To Teachers”

<table>
<thead>
<tr>
<th>Comment</th>
<th>Percentage of total comments (583)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use the IWB more</td>
<td>25%</td>
</tr>
<tr>
<td>No changes, it is good as it is</td>
<td>21%</td>
</tr>
<tr>
<td>Let students use it</td>
<td>3%</td>
</tr>
<tr>
<td>More animations / Interactives / video</td>
<td>5%</td>
</tr>
<tr>
<td>Technical Issues</td>
<td>5%</td>
</tr>
<tr>
<td>Teachers need to learn how to use it</td>
<td>21%</td>
</tr>
<tr>
<td>Get the teachers to write on the board more clearly</td>
<td>4%</td>
</tr>
<tr>
<td>Not use all of the time</td>
<td>3%</td>
</tr>
<tr>
<td>Don’t use them at all</td>
<td>3%</td>
</tr>
<tr>
<td>Put work on board</td>
<td>1%</td>
</tr>
<tr>
<td>No idea what to change</td>
<td>7%</td>
</tr>
</tbody>
</table>
The use of the IWB as a hub for multimedia was supported by the high level of student agreement to the statement “I find it useful when the teacher uses interactive elements like simulations and animations on the IWB.” From Figure 3 it can be seen that 61% of the students agreed with the statement, with less than 10% disagreeing. This is the heart of the Interactive part of the IWB – use of the dynamic interactive features of the IWB provides teachers and students with features more difficult to present in lessons without an IWB.

Figure 3 I find it useful when the teacher uses interactive elements like simulations and animations on the IWB.

This broad agreement is supported by the student comments on how to improve where 27 requested the use of more animations / interactive / video.

I would find more animation and pictures to show in lessons so students could engage more.

IWBs are great with programs such as geometry programs, graphics calculator emulators, algodoo, physics sims etc. (Interactive content). It would be good to have more programs that are good to use on IWBs, as well.

IWB’s are only occasionally used in my classes. I find them useful in English when we are doing film study and videos also help me understand things better like in Science.

Smartboards are extremely useful in maths subjects, the ability to have the ‘whiteboard’, textbook and calculator emulator at the front of the class makes for good lesson structure.

A number of students also mention these elements when commenting on how Learning Technologies had improved their learning, for example

I find working with the smart board makes me more interested in the topic. Particularly when there are animations and the teacher talks over the topic.

It is more interesting when the teacher uses new technologies such as the smartboards because we are seeing what we are learning rather than only listening.

Smart Board was used by many of my teachers. The videos and animated diagrams shown helped me to visualise and understand various concepts.
The majority (54%) of the students indicated that they thought that IWBs make the teacher’s drawings and diagrams easier to understand. This was especially important in some classes where the teachers saved the IWB screens and made them available to students.

**Positive impact, specifically the smart board notes which are emailed out to me every week. Helps me catch up if I miss lessons, or go through lesson material again if I do not understand it the first time.**

However teachers need to be careful that they practice writing and drawing on the board as it can be seen that 15% of the students did not think that use the IWB made it easier to understand drawings and diagrams and related to this from Table 1 there were 25 students who specifically mentioned that the teachers need to be more careful when writing on the board.

**A change teachers could make when they use an IWB is making their writing neater because it’s extremely hard to understand when it is messy.**

Question 5 sought student views on the teachers’ lesson preparation and organisation. The IWBs in the school are only relatively new and so teachers are in the process of developing material for them and in most cases have not had the advantage or reusing material from the previous year. Despite this 43% of the students indicated that they thought that the teachers were better prepared and organised when they used the IWB. A number of students commented that they felt the teachers were more organised, a typical comment was:

**I suggest all classrooms should have the IWB because it is much better to use IWB than a normal whiteboard. It makes diagram look better and the writing is neater. I feel the lesson is organised with the IWB**
Figure 5 I think teachers’ lessons are better prepared and organised when they use an IWB.

The level of agreement with the final statement “It is easier to understand the work when the teacher uses an IWB” follows a similar pattern to the other questions (see figure 6), with very few students (<10%) disagreeing with the statement, just under half neutral and a similar number agreeing with the statement. This pattern of response suggests that a substantial group of the students saw a general benefit for their learning associated with IWB use. Again this can be supported by the number of students in their comments who requested that more teachers use the whiteboards more often.

Figure 6 It is easier to understand the work when the teacher uses an IWB.

In their comments a number of students explicitly mentioned that teacher explanations that incorporate the IWB are easier to understand.

I think teachers should start using IWBs more in class as they give us a better understanding of what we have to do.

While some also mentioned that part of the reason is that teachers were able to incorporate multimedia into their explanations.

The use of smartboards in classrooms enhanced the level of interest and also aided...
teaching as it is often easier to explain some concepts using digital sources like videos or diagrams.

The broad profile of student responses to the survey was consistent across year levels, as shown in Figure 7. The Year 8 students were the most positive in their agreement with all of the statements while the year 10s showed somewhat lower mean levels of agreement. The pattern of level of agreement is similar with all of the year levels having the highest level of agreement to the statement “I find it useful when the teacher uses interactive elements like simulations and animations on the IWB”. What must be noted is that when looking at the average levels of response they are all above 3 which is the neutral level for all of the statements, indicating an overall positive view of the use of the IWBs.

![Figure 7 Interactive Whiteboard question responses by year level](image)

While the majority of the students indicated that they at least did not feel disadvantaged by the use of the IWB their comments did highlight some areas of concern that need to be addressed by the school. These comments point to issues that might have relevance for schools at a similar point in use of IWBs.

Teacher professional learning in the area is essential. From Table 1 it can be seen that 21% of the students indicated that the teachers needed to learn how to better use the IWB and that the lack of
teacher facility slowed down the class. Typical responses of this nature were;

*I think the technology used by teachers e.g. smartboards slows down the lesson and students take it as an advantage of not working*

*I think some teachers need a better understanding of how to use IWBs, as it takes up lesson time.*

The IWB while it adds functionality and are generally quite reliable they do require the teacher to be familiar with them. As one student put it they are a fiddly;

*The smartboards were there but they are not used very often. I prefer the whiteboard as it is less fiddly*

and another a waste of time

*They tend to spend more time trying to get them to work than actually using them. They are in general just a waste of time.*

While only 5% of the students commented on technical issues, as the level of interactivity used in the class and teachers increase interaction with the board and use it as a hub, there is more danger of breakdowns and calibration issues impacting on the classroom.

As well as developing their knowledge of basic IWB operation, teachers also need support to look at how the IWB can change their pedagogy. The students requests for more animations and interactive elements, to be able to use the IWB more and to have teachers pre-prepare more of the work are examples of the change in pedagogy required. An example of student use of the IWB was described by the student below.

*The use of Smart Boards have helped when presenting oral presentations along with the use of Google Docs to share notes amongst the class*.

The previous comments all indicate that the students want the teachers to use the IWBs more but to also use them more effectively. The development of the IWB as the interactive multimedia hub would be one way in which this can be achieved.

**Conclusion**

It was clear from the student responses that the majority of the students thought that the use of Interactive Whiteboards was having a positive impact on their learning. Given that they are a new addition to the classroom and that for most teachers they have only been working with them for 12 – 18 months this is an encouraging outcome for this school. This result supports the previous research in the area (Lee, 2010) which indicates that teachers are quick to incorporate IWBs into their teaching and that they do not need to make big adjustments to their teaching practice. However the students in this school were also calling for increased and more effective use of this technology by their teachers. For many this was associated with the incorporation of more interaction and use of multimedia. The path forward may be the development of the IWB as the interactive multimedia hub, which brings together many of the technologies so that the teacher can operate them in a seamless manner and draw them together to improve the students’ learning experience.

**References**