Cite as: Jones, K. (2004), Using Interactive Whiteboards in the Teaching and Learning of Mathematics: a research bibliography, *MicroMath*, 20(2), 5-6.

Using Interactive Whiteboards in the Teaching and Learning of Mathematics: a research bibliography

Keith Jones

According to BECTa's 2003 survey of UK schools, around 85% of secondary schools and 37% of primary schools that responded to the survey said that they had interactive whiteboards (IWBs). Although this form of technology is relatively new, there is an emerging body of literature on their effective use in teaching and learning. According to BECTa's reading of this research, in general the key benefits of using IWBs are that such use:

- Encourages more varied, creative and seamless use of teaching materials;
- Engages pupils to a greater extent than conventional whole-class teaching, increasing their enjoyment and motivation;
- Facilitates pupil participation through the ability to interact with materials.

While to date only a few research studies have looked specifically at the use of IWBs in the teaching and learning of mathematics, the studies that have been reported have begun to look at the specificities of the nature of learning interactions possible with this form of technology and how this might differ from interactivity possible without digital technology. The central importance of the skill of the teacher continues to be a key aspect of classroom interactivity. Several research projects are currently underway and are only just beginning to report. There is much scope for further studies.

The publications listed below are in addition to those already published in *MicroMath* and show the range of work that has been published about the use of IWB technology in mathematics education (in alphabetic order by surname of first author).

Davison, I. (2002), Using an Interactive Whiteboard to Facilitate Pupil Understanding of Quadrilateral Definitions, *Proceedings of the British Society for Research into Learning Mathematics*, **23**(1), 13-18. and

Pratt, D. & Davison, I. (2003), Interactive Whiteboards and the Construction of Definitions for the Kite, *Proceedings of 27th Conference of the International Group for the Psychology of Mathematics Education* (PME 27, Hawaii, July 2003), volume 4, p31-38.
Complementary accounts illustrating that the complexities inherent in understanding definitions of quadrilaterals remain even when some of the visual and kinaesthetic affordances of the IWB are utilised.

Glover, D., & Miller, D. (2001), Running with Technology: the pedagogic impact of the large-scale introduction of interactive whiteboards in one secondary school, *Journal of Information Technology for Teacher Education*, **10**(3), 257-276.
Case study of one secondary school, showing that even with a fairly limited system in use in the mathematics department, teaching can change to include more interaction, together with associated group and class discussion.

Glover, D., Miller, D. & Averis, D. (2004), Panacea or Prop: The Role of the Interactive Whiteboard in Improving Teaching Effectiveness. Paper presented at the *Tenth International Congress of Mathematics Education*. Copenhagen, Denmark, July 2004.
Suggests that where IWBs are used in every lesson, the novelty effect can diminish and that much depends on the overall quality of teaching.

Godwin, S. and Sutherland, R. (2004), Whole-class Technology for Learning Mathematics: the case of functions and graphs. *Education, Communication and Information Journal (ECi)*, **4**(1), 131-152.
Suggests that new pedagogical practices with ICT need both to harness the potential of ICT to support individual pupil inquiry and *work within this inquiry-led practice to develop collective knowledge within the whole class. While providing evidence that the use of an IWB could become an important tool in this respect, the*

authors provide reminders that much interactive learning can take place with an ordinary (non-digital) whiteboard.

Greiffenhagen, C. (2000). Interactive Whiteboards in Mathematics Education: Possibilities and Dangers. Paper presented at the working group on *The Use of Technology in Mathematics Education* held at the *9th International Congress on Mathematical Education* (Tokyo, Japan, July 2000). Paper available from the author.
Suggest that the IWB should not only be seen as a presentational device for the teacher, but also as an interactive and communicative device to enhance the communication with and amongst pupils.

Perks, P. (2002), The Interactive Whiteboard: implications for software design and use, *Proceedings of the British Society for Research into Learning Mathematics*, **22**(2), 55-60. E*mphasises the need to design teaching scenarios that make full use of the interactivity available with an IWB.*

Steed, A. (2002), *Use of an interactive whiteboard*. Best Practice Research Scholarship (BPRS) report. Available at:
http://www.teachernet.gov.uk
Suggests that there are benefits to using an IWB when teaching particular mathematical topics, most noticeable in graph work (although the author cautions that the data was collected over a relatively short time period).

Other useful, but more general, publications on using Interactive Whiteboards include:

BECTa (2003), *What the Research Says about Interactive Whiteboards.*
Online at:
http://www.becta.org.uk/page_documents/research/wtrs_whiteboards.pdf

MirandaNet (2002), *Transforming Learning Using Interactive Whiteboards*
Online at:
http://www.mirandanet.dial.pipex.com/ftp/whiteboard.pdf

Below are links to some of the current ongoing projects, developments and networks that involve the use of IWB technology and from which further reports are likely to emerge (in alphabetic order by name of project):

InterActive Education: teaching and learning in the information age:
http://www.interactiveeducation.ac.uk/maths_designs.htm

Interactive Whiteboard Research Forum
http://www.ros.org.uk/iwb/index.htm

National Whiteboard Network
http://www.nwnet.org.uk

The REVIEW Project:
http://www.thereviewproject.org

University of Keele Interactive Whiteboard project
http://www.keele.ac.uk/depts/ed/iaw/

***MircoMath* Research Bibliographies**
Every year hundreds of teachers engage in classroom-based research for a variety of purposes. As more and more opportunities arise for teachers to get support for engaging with research, *MicroMath* is devoting a section to a series of *research bibliographies* designed to provide details of the most pertinent research on using particular ICT applications in the teaching and learning of mathematics.

Keith Jones is a member of the Collaborative Group for Research in Mathematics Education at the University of Southampton. From 2001-2003, he led the thematic group on *Tools and Technologies in Mathematical Didactics* for the European Society for Research in Mathematics Education. See:
http://www.crme.soton.ac.uk