Chapter 7

Using the Interactive Whiteboard to Stimulate Active Learning in School Science

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ABSTRACT

This case study is set in the context of an extraordinarily rapid influx of interactive whiteboards in schools in the UK. The focus is on pedagogical strategies used to harness the functionality of this powerful technology to support teaching and learning in science. The study offers a vivid example of how one expert secondary teacher used the IWB technology and other digital resources to support “active learning” about the process of photosynthesis by a class of students aged 14-15. Collaborative thematic analysis of digital video recordings, teacher diary, field notes and post-lesson interview data from a sequence of six lessons yielded detailed, theorized descriptions of the teacher’s own rationale. The chapter concludes by highlighting a multimedia resource produced as an outcome of this case study in order to support professional development of practitioners working in other contexts.

CONTEXT OF THE T-MEDIA PROJECT

This research took place in the UK educational context where there has been substantial government investment and policymakers’ interest in interactive whiteboards and a sixfold increase in their numbers in UK schools (sixfold between 2002-05: Kitchen, Mackenzie, Butt, & Finch, 2006). The UK is in fact the most prominent investor globally in IWBs in education; virtually all schools now possess a number of boards (primary schools have a mean of 9 each and secondaries have 24) and many have one in every classroom. In notable contrast with many other educational technologies, IWBs are not only present but actually used regularly. For example the Evaluation of Curriculum On-
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A line survey of schools found that 69% primary and 42% secondary teachers use them in at least half of all lessons, although only about a third of teachers use subject-specific software (Kitchen et al., 2006). A similar proportion of secondary teachers still feel that they need more whiteboards in order to “deliver the curriculum adequately” (Becta, 2008, p.20).

Despite their meteoric rise in popularity, penetration of IWBs took place before the implications for teaching and learning were properly understood or even investigated (e.g. Smith, Higgins, Wall, & Miller, 2005). Assumptions about “transforming pedagogy” were not empirically based although Government-commissioned evaluations (Moss et al., 2007; Somekh et al., 2007) and other recent research (see reviews by Glover, Miller, Averis, & Door, 2005; Smith et al., 2005, and Sept. 2007 issue of Learning, Media and Technology) are now providing insights. The research to date shows that teachers and students are enthusiastically adopting this powerful tool, which appears ideally suited to supporting interactive whole class teaching, where learners express, collectively evaluate and reformulate their ideas to build new knowledge. However it seems in practice to be associated with superficial collaboration, motivation and participation at the expense of uptake questioning (Higgins et al., 2005), student talk and reflection (Gillen, Kleine Staarman, Littleton, Mercer, & Twiner, 2007; Kennewell, Tanner, Jones, & Beauchamp, 2008; Smith, Hardman, & Higgins, 2006). This may be at least partly related to the implementation of a national curriculum in England and Wales in 1989 and increasingly centralized control of its delivery and assessment of achievement in recent years, at least in England. Research by Moss et al. (2007) shows that pressure to maintain lesson pace and “get through” curriculum content means that IWB use may decrease thinking time and opportunity for learner input, resulting in teacher-only operation, particularly in secondary schools where our study was likewise situated. In our own earlier studies of IWB use in secondary science, students’ physical manipulation of objects was desired by teachers but constrained by systemic school and subject cultures, and curricular and assessment frameworks (Hennessy, Deaney, Ruthven, & Winterbottom, 2007).

RATIONALE OF THE T-MEDIA PROJECT

The T-MEDIA project used digital video to analyse and document how secondary teachers exploit the use of IWBs, data projectors and other digital resources to support subject learning. The work investigated the evolving pedagogy underlying classroom practice. It focused on understanding how and why successful approaches work (not on developing them), and explored how other resources and activities are complementary. The research took a collaborative approach to the systematic analysis of video recordings of classroom activity in a small number of cases. The methodology built upon that of related studies employing video as a key tool in capturing the complexity of teaching and learning processes and revisualizing the practices captured (Armstrong & Curran, 2006; Powell, Francisco, & Maher, 2003; Sorensen, Newton, & Harrison, 2006). Video-stimulated recall is believed to provoke reflective, dispassionate and considered responses and to help overcome working memory limitations on introspective reasoning (Lyle, 2003). It is inevitably selective and thus ideal when provoking evaluation and rethinking of what teachers normally take for granted is desirable (as in our case) rather than pure recall. Our goals were to assist teachers in making explicit their pedagogical rationale and, uniquely, to engage them in collaborative theory building about strategic technology use. The purpose was to understand, question, describe and disseminate classroom practice – with researchers and teachers acting as “co-enquirers”. Teachers who took part were all experienced, reflective practitioners who used technology in their everyday practice.