Interactive whiteboards: are they or aren't they (interactive)?

Shane Sutherland
School of Education

This report charts the experiences gained from the University funded innovation project into Interactive Whiteboard Technology (IWT). A resumé of the project's rationale, aims and intended outcomes is provided, followed by a discussion of IWT functionality. An implicit reflection of experience gained is embedded into this discussion, though key points are also reiterated in the summary.

Background and rationale

The rationale for the project started from the premise that there is an increasing proliferation of IWT in schools and colleges within our core recruitment area. Many students beginning study with the University have already experienced learning with IWT and, perhaps more importantly, there will be an expectation amongst future employers (particularly of our teaching graduates) that students are confident and conversant with its use.

The purpose of the project then is to ensure that the learning and teaching applications of IWT, and Technology Supported Learning (TSL) in general, are developed in a coherent and effective way allowing tutors to utilise the technology confidently within their normal teaching sessions.

The stated aim of the project was:

> 'to develop the hyperlinks, picture library, drawing tools and video/audio links in the proprietary[i] software in order to facilitate a truly interactive use of this technology in support of "organic" learning sessions.'

The aim itself warrants some further explanation. Mastery of functionality is self-evidently a necessary requirement for a curriculum development based upon a technical resource. What is perhaps less evident is a common understanding of *interactive* and/or *organic* in the pedagogic sense. What is not intended here is a quantitative conception of interactive—of responding to flashing icons, unthinkingly following *next* commands or progressing through material as a result of correctly remembering lists of facts, figures or shapes. The intention here is to promote a qualitative conception of interactive where interactive is analogous with engagement, and engagement is fostered through interaction between the learner, the material and the tutor. This higher level of interactivity is symbiotic with *organic* in that the lesson, though bounded by a structure requisite for the attainment of the session's objectives, is fluid enough to respond to the dynamic needs of the learners.

The expectations of the project were detailed through its outcomes, namely:

- the development of students' and tutors' confidence and capability working with Information and Communications Technology (ICT), TSL and IWT
- the integration of IWT across a wide portfolio of modules
- the development of a core group of skilled IWT users who will then support other colleagues in the use of this technology

Interactive Whiteboard Technology

IWT has now existed for approximately six years. A development of Computer Aided Design (CAD) technology, the whiteboards allow the user to control desktop functions through the medium of a touch sensitive screen or a magnetic induction system using a special pen. The initial development of IWT was driven by the needs of commercial presenters and salespeople, though manufacturers are now moving to exploit the growing education market place. The system central to this discussion is designed exclusively for the education sector.

Generally, the whiteboard supporting software will offer a number of functions. The easiest, and perhaps most commonly used function, is the whiteboard driver software which allows the user to control desktop applications. This works by allowing the cursor to be controlled on the board by touch or by pen. When an icon or function is selected the signal is passed to the linked computer, in much the same way as with a mouse, the computer responds instantly to the selected command. The computer is linked to a data projector which continuously projects the computer image onto the screen—this image changes as movements or actions are recorded by the board. In effect, the user is controlling the whiteboard-sized equivalent of a touch sensitive computer screen. This level of functionality allows the user to open, display and control applications such as PowerPoint, to launch any windows-based application—perhaps to explain the functions of certain icons—and to explore web-based resources.

The next level of functionality is annotating. Normally a toolbox will allow the user to select a freehand pen tool, a selection of arrows, boxes, ellipses or lines, and also more complex annotations such as grids, maps, icons or symbols. These annotations can be 'dragged-out' onto the screen where they appear as a layer over the top of the current image. An example of this application in use would be to circle, underline or indicate by arrow certain features of a software program before questioning the group on that feature, or even inviting students to annotate the answer. This tool is valuable when exploring web-based resources and can be used isolate single items from complex pages. As a tool for exploring understanding, promoting discussion or focusing analysis, the annotation tool can be used to highlight passages, words or phrases within displayed text. This text could be taken from a prepared Word document or from text or papers appearing on the web. We have found that by displaying assessment criteria to students, and by using the highlighter tool to draw attention to words such as, *reflective, analytical, synopsis,* or *comparative*, a much clearer understanding of the task has been achieved than might normally be expected.

The functions discussed so far have been described in relation to controlling or 'adding to' existing programs or files. IWT software also provides a flipchart function which allows the user to create, annotate and edit digital flipchart pages. Pages can be turned, torn up, reviewed or revised in much the same way as with a paper flipchart except, as these are digital, they can be copied, pasted, rearranged and saved. The saved flipcharts can then be used in future lessons, printed out for students or distributed as PowerPoint or HTML files for the students' (or colleagues') use. The flipcharts allow the user to import complex images or graphics, support all the annotation tools, write on them in freehand or allow typed text entry and recognise handwriting for text conversion. Hyperlinks can be built in to allow delineated progression to other flipchart pages, to other programs or to web-based resources.

The function which perhaps adds greatest value to the system trialled in this project[i] is the 'link library'. This tool is essentially a user created directory of resources which may be called upon during taught sessions. The link library has ten folders, each with 5 sub folders. An example of library setup and use might look like this:

- the main folder named Curriculum after the subject taught
- sub-folders named PowerPoint, Activities, Handouts, Assessment and Links

During a taught session the students review a previous session on curriculum models; answers, questions or key points are annotated on the flipchart. By clicking a single link in the link library a PowerPoint presentation (PPT) 'curriculum models' is launched. Three slides are shown before a question is raised about 'outcomes'. A single click launches a second PPT 'aims and outcomes'. Some discussion ensues, leading to a question about the relationship between outcomes and assessment. Another click, another slide show. 'How does this relate to the assignment?' —switching between sub-folders and the selection of an assessment link

opens a Word document. The relevant section is highlighted using the annotation tool. As the session draws to a close, a final link is made to a paper available on the web, this week's directed activity.

Of course this kind of organic, ostensibly student lead session is not a result of IWT—the technology simply makes it easier. The tutor still needs to be confident with their material which needs to be arranged in suitably sized chunks that can stand alone or be arranged as part of a greater whole. A certain level of IT competence is needed as folder systems need to be planned and populated and the systems in use need to be robust and reliable. However, why devote hours to digital preparation if the system has fallen down or cannot be booked? The logistics of IWT implementation are now discussed.

Whiteboard logistics

Mobile IWT systems mean that costly installation can be avoided and investment in the technology can begin to pay dividends around campus, school or department without setting aside specialist rooms. The danger of specialist rooms is that they may become the favoured haunts of the few technology able, and impregnable, unbookable or off-limits to the aspiring many. Mobile systems however do have drawbacks. If taught sessions begin and end at the same time, which most invariably do, it may be difficult to find technical support. Equipment which is set up very early or dismantled very late, and so left unattended, is vulnerable to opportunist theft. Data projectors in particular are very desirable, expensive, portable and easy to dispose of. Most users will need support to link the computer to the whiteboard, to link the computer to the data projector and to make sure each piece of equipment is 'talking' to the next. The projector may then need synchronising with the computer and the projected image needs calibrating with the board. After this has been achieved the whiteboard must not be nudged lest the calibration be knocked 'out of sync'. Once the system has been set up the user is ready to teach but should be careful not to focus all of his/her attention on the students—one eye must be kept on the floor. Unless the classroom is modern and well-designed, with electrical sockets and data points set into the classroom floor, disaster may be close at hand from operating in, around and over the cabling—power cords to the board, to the computer and data projector, data cable to the projector and the whiteboard and, if it is necessary to link to the web, UTP cable to the computer. If the session passes safely without tripping over the cables and bringing all around crashing down, the tutor shouldn't be tempted to run off with the data projector to keep it safe. Projectors need a warm-down period to extend the life of the £300+ bulbs. Mobile IWT systems are better than no system but fixed installations, where feasible, are perhaps the safest bet.

Installed systems mean wall mounted whiteboards, ceiling mounted projectors and all the wiring running to a convenient point. If a PC is installed then the system simply needs turning on—a remote control will normally operate the projector which remains in standby mode. If laptops are used then all the user has to do is connect a serial cable from the whiteboard and a (S)VGA cable from the projector. Because the system is fixed, focusing is not an issue—the system can be up and running in a few short minutes. Where staff use identical laptops then the process can be made yet easier with the purchase of docking stations or port replicators. These gadgets allow for all of the cables to be permanently coupled to a base onto which the laptop is connected by means of a single click. Feedback from system users has confirmed an expected correlation between heightened pre-session anxiety and the complexity of the setting-up procedure. Clearly any intervention which makes IWB use easy and consistently successful moves a long way toward embedding its general use.

Student evaluation

A small-scale survey was conducted using a questionnaire. The questionnaire contained Likert scale items, selection items and qualitative responses. The respondents consisted of L1 (2 groups) and L4 students (1 group) who had been exposed to regular board use in taught sessions by two different lecturers—a sample questionnaire is enclosed at Annex A. Due to theft of a data projector, incapacitating one whiteboard, the survey results are taken from Semester 1.

The respondents from all three groups reported that the boards were used by both tutors and students and were used in at least 75% of taught sessions (items 1 & 3). All respondents, bar 1, indicated that the boards were either *easy* or *fairly straightforward* to use (item 4). Tutors were considered to be competent in their use (item 5). The L1 groups reported that IWT was used primarily to access Web/WOLF material and to present PowerPoint slides, whereas the L4 group also experienced use of flipcharts and annotation uses (item 2).

The L4 students, all trainee teachers in FAHE, reported:

'very positive introduction to a new teaching media'
'an enhancement of the teaching process'
'aids interaction with the group'
'is (visually) stimulating'

There were some concerns that it might distract attention from the content to the board, though one suspects this is a matter of delivery rather than of medium. The students also recognized the impact on preparation time, commented on the noise (of the data projector) and recognized the constraints of the supporting technology (web-access, WOLF, laptop/PC configuration). Overall a generally positive view was held of the technology and its application with students appreciative of their exposure to the technology during their training course.

The L1 students (combined awards) also reported positively. They felt that IWT had:

'enhanced the quality'
'made the module more informative and interesting. We found it more enjoyable'
'(it) made understanding easier'
'it makes you pay attention'
'students can easily catch up (because of visual images)'
'it improves the quality of the teaching'

Negative comments related to system issues (intranet/internet down, WOLF crashes), though some students also felt that concentrating on the board for long periods was tiring. Perhaps the most valuable experience of IWT for these students came about through the in-classroom demonstration of PowerPoint preparation, WOLF access and library databases. The clarity of explanation, understanding through visualisation and ability to 'go back' was all commented on by the students.

Summary

The introduction of whiteboards to the curriculum in the School of Education has been a generally positive experience. There have been issues to resolve such as access to equipped rooms, security of equipment and ease of use. Many lessons have been learnt which continue to improve the integration of this technology. Indeed, four more boards are being installed (fixed installation) ready for September 2001 and the Learning Centre at Walsall is purchasing two boards for use in the computer labs. Combined with the board owned by the School of Sport, Performing Arts and Leisure there will be nine boards available on site. Ease of access is likely to remove a further barrier to uptake by staff.

At this point the staff user position has improved drastically from a nil starting point 12 months ago. Within SEd there are now ten *incidental* users—tutors who use the boards primarily for PowerPoint presentations. There are six *intermediate* users—tutors who use some of the functions of the ACTIVstudio software and one user who users the full range of functions.

Staff remain enthusiastic about the potential of IWT—four workshops have been run to aid tutors' skill development. Undoubtedly the provision of four more boards, two into specialist rooms, will further strengthen the pool of experience and expertise within the School.

This project was managed as an innovation rather than a research case study though clearly some valuable findings emanate from our experience. That well-founded research is needed is clear. Indeed, in partnership with an IWT supplier, a full-time research student is being

recruited to help measure the impact of IWT across all education sectors. This innovation project, at the very least, has helped determine the kinds of questions that this research should seek to answer.

[i] ACTIVstudio software for the ACTIVboard, from Promethean