Conceptual Article

Interactive Whiteboards: New tools of learning

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ABSTRACT

The interactive whiteboard is a large, touch-sensitive display. Connected to a computer and projector, the interactive whiteboard is like a giant computer screen that students and teachers simply touch to operate. Using their finger or a pen as a mouse, teachers and students can access and control any computer application, file or multimedia platform including the internet, CD ROMs and DVDs. They can also write over applications in digital ink, then save their work for future study and review. They engage students with diverse learning styles by providing both immediate accesses to a wide range of digital materials and a common focus for the entire class-not something easily achieved with other technologies. The software interface captures the imagination of students of all backgrounds and abilities and helps them learn together, understand better and achieve more. This paper examines some of the features of the interactive whiteboards and the classroom applications.

Keywords: *Interactive Whiteboard, Educational Technology, Classroom Instruction, Digital Learning, Multimedia Teaching, Student Engagement, Touch-Sensitive Display, Computer-Assisted Learning, Collaborative Learning, Teaching Tools.*

What are interactive whiteboards? It is a large physical display panel that can function as an ordinary whiteboard, a projector screen, an electronic copy board or as a computer projector screen on which the computer image can be controlled by touching or writing on the surface of the panel instead of using a mouse or keyboard.

Typically, interactive whiteboards are used in lecture or classroom environments and the technology allows writing or drawing on the surface, printing off the image, save it to computer or distributing it over a network. We can also project a computer screen image onto the surface of the whiteboard and then either control the application by touching the board directly or by using a special pen. The computer image can be annotated or drawn over and the annotations saved to disc or sent by email to others.

Technology

A fully functioning interactive whiteboard usually comprises four components: a computer, a projector, appropriate software and the display panel. The computer is connected to the projector and whiteboard. The projector displays the computer screen image onto the board. Action on the surface of the display panel is communicated with the computer over a cable or wireless connection and interpreted via the installed software. Display panels can be either front or back projection. Additional components are available for some systems, including handled key pads for gathering individual responses and interactive white board tablets: in effect a small personal version of the larger board.

Types

There are three different kinds of interactive whiteboard technologies: Resistive Membrane, Electro-Magnetic, Laser Scanners. Resistive Membrane whiteboards have a soft flexible surface similar to vinyl consisting of two pieces of resistive material separated by a small gap which creates a touch-sensitive membrane. They can be drawn on using fingers or a special stylus that can represent pens of different colours via software selection. Movement is tracked by detecting the pressure of the syllabus object on the surface. Electro-magnetic whiteboards an similar to traditional whiteboards in that they have a hard surface and can be drawn on with norma pens. They Require special battery-driven pens that emit a small magnetic field detected either by they frame of the whiteboard or by a grid of fine wires embedded beneath the surface of the board. Lase: Scanners whiteboards have a hard writing surface with infrared laser scanners mounted in the top comers of the board that detect pen movement. To

work interactively they require special felt pens each of which has a uniquely encoded reflective collar that the lasers use to register its colour and position.

Functionality Most interactive whiteboards offer the following simple functions

- Draw or write on the board using different coloured pens or even fingers. Write ove1 the top of programmes to highlight and annotate points.
- View and navigate the internet from the whiteboard. Surf and display websites tha1 the entire room will be able to see in a teacher-directed manner.
- Print out or save the results to the computer.
- Use advanced letter recognition systems that convert handwriting to text that can be edited. Students can approach the whiteboard and add their contribution to the discussion by writing directly on the whiteboard.
- Support remote voting or feedback.
- Store sequences of screens for playback which can be re-used in later classes, given to absent students or saved onto the homepage.
- Control computer applications via the screen interface.
- Customize the screen appearances.

Complex functions

Instant visual display or sources such as pictures, newspaper cuttings, photographs, diagrams, table and worksheets, graphs, video clips and sound bits to give students a clear frame of reference.

Turning brainstorms into sorting exercises. For example, when teaching the education module the teacher may ask questions can write student answers onto the board. The whiteboard then translates this into computer text. Students could then be asked to come to the board, highlight the statement and move them into categories.

Instant preparation of graphs. The data can be written onto the board and using excel, it could instantly be tum the results from the class into a graph.

Promote group working. Students can approach the whiteboard and add their contribution to the discussion by writing directly on the whiteboard. Groups can view and solve interactive problems together.

Provide an electronic flipchart with all notes and diagrams saved as an HTML file for later use across an intranet, allowing an archive to be easily maintained and displayed.
Allow the tutor to monitor or see what each student has on their screen and choose which screen to display on the whiteboard in a networked environment.
Run on-line tests and opinion polls and display instant feedback to the group.

Pedagogical applications of interactive whiteboards

Visualization The use of graph plotting software on the interactive whiteboard enables far faster understanding of the concepts: students have a clear visual understanding of the topic, and are able to transfer this understanding to other topics. With an ACTIV Board installed in the Graphics room, all students in the class can see the screen. The board provides immediate information, visibility in all parts of the room, the opportunity for step-by-step methods when working on complex drawing tasks and the opportunity to display comparative designs. It has made the delivery of the curriculum efficient, interesting and enjoyable for both students and teacher. A less obvious advantage of the board is the way in which it reduces the need for so many pieces of paper material. This results in significant savings on reprographic costs. It results in faster knowledge retention.

Enhancing class discussion An electronic whiteboard is an ideal focus for class discussion, providing opportunities to raise questions and stimulate exploration. Various techniques may be used, including

- Using a picture as a stimulus for discussion
- Using written prompts
- Brain storming
- Sorting
- Text disclosure activities
- Asking the right questions
- Sharing expertise

Modelling, demonstrating, annotating Whilst modelling is essentially presentation show in how to do something-it can be made interactive by the inclusion of opportuniti9es for feedback. Students can also use the whiteboard to model activities to each other or as a toe for demonstrating work to their peers

- Drag-and-drop activities
- Annotations
- Shared reading
- Collaborative writing
- Collaborative problem solving
- Peer teaching

Collaborative learning and problem solving Cooperative experience is at its richest whe1 students have something interesting to cooperate on when they are engaged in a mind-stretching problem solving or investigative activity or when their task has a concrete outcome. Collaborative, problem solving involves understanding and representing the problem, classifying terms and understanding vocabulary, trying things out learning from mistakes, and evaluating the result and the process that achieved it. These types of activity are characteristics of much of the best compute based group work. All this can be modelled very effectively with the use of an electronic whiteboard

Peer teaching The group of students can collect images and information and compile these into a visual presentation. At the end of the unit of work each group can present their findings to the classic group on the electronic whiteboard. This model can be applied widely across the curriculum and can include presentations to other students.

Overall benefits Because interactive whiteboard are so like conventional whiteboards, they can help even technophobia teachers to sue this medium with ease for presentations from the front of the room. They help in broadening the use of e-leaming because they rapidly demonstrate the potential of alternative modes of delivery. They are easy to be integrated with other media resources. They allow teachers to create easily and rapidly customized learning objects from a range of existing content and to adapt it to the needs of the class in real time. They allow learners to absorb information more easily. When fully integrated into a VLE (Virtual Leaming Environment) and learning object repository there is potential for widespread sharing of resources this technology is a boon for the academia.

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