

# A Mobile Interactive Whiteboard System to Support Problem-Based Learning

## Introduction



Figure 1 Dr Coward and his MSc class

The [MSc in Clinical Embryology](#) is a taught postgraduate course in the Nuffield Department of Obstetrics & Gynaecology which aims to inspire future clinical and scientific leaders in the field of assisted reproductive technology. [Dr Kevin Coward](#), the Course Director, and his colleagues employ a repertoire of teaching methods including lectures, group tutorials, laboratory practical classes, self- and class-directed problem-based learning, and in-house demonstrations by visiting companies. The introduction of a mobile interactive whiteboard in the

department's 'wet' laboratory has significantly improved the student learning environment by facilitating swift and efficient dissemination of teaching materials, and permitting easier viewing of microscopic images. Furthermore, the whiteboard was deployed to pioneer a novel problem-based learning technique in which student groups run their own practical class for peer groups, including briefing and debriefing.

## The Challenge

The development of practical laboratory skills and a robust attitude to experimental design, execution, and analysis are imperative on a course such as Clinical Embryology. However, in a large laboratory class it is not always possible for all students to have a satisfactory view of a regular whiteboard or projector screen during a presentation. Moreover, it can also be difficult for the tutor to annotate, record and display data 'on the fly' during active teaching. As well as addressing these practical considerations, the course team wanted to move away from 'classical' teaching methods and a focus on pre-determined outcomes. They wanted to promote deep learning by encouraging students to think creatively about their subject, and also to stimulate discussion about how lecture-based material can be enhanced through linked laboratory sessions.

## The Innovation

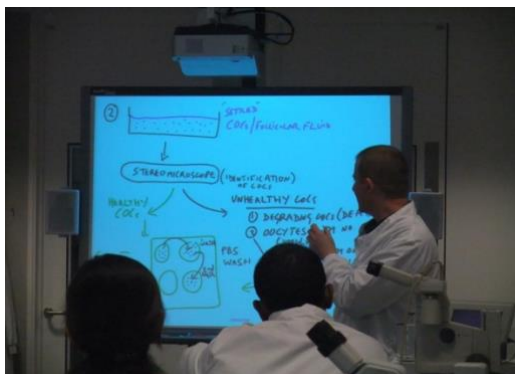


Figure 2 Dr Coward uses the interactive whiteboard to describe the experimental process in a laboratory practical

The solution to these problems was to incorporate electronic whiteboard technology into the Clinical Embryology 'wet' laboratory, featuring a large mobile interactive whiteboard, with hydraulic height adjustment, for the tutor at the front and two smaller 'slave' screens at each side of the lab.

In May 2012 the course team was awarded a Teaching Development Grant from the Higher Education Academy to fund the technology, which was installed and ready for use in the following Michaelmas Term.

The system has revolutionised the manner in which laboratory practical sessions can be prepared and demonstrated. All of the students now have a good view of at least one screen; data collected during practical sessions can be recorded and shared; and on-the-fly changes to experiment protocols can be communicated instantly.

An important aspect of this technology is its flexibility and mobility. The whiteboard can be linked to microscopes, enabling tutors to explain micro-manipulative techniques on a large screen. This has permitted tutors to explain key techniques in great depth and, crucially, has greatly enhanced staff-student interaction. The ease of accessing online resources such as video clips has proved particularly valuable for both internal and visiting lecturers.

The innovative PBL facilitated by the technology involved dividing the 15 students into two groups. Each group was tasked with designing its own practical in the 'wet' laboratory, based on a rudimentary laboratory technique that had previously been discussed in lectures. At the start of their practical, the group used the whiteboard to brief the remainder of the students on the design, goals, and potential scientific outcomes. The group then supervised their peers while the latter carried out the experimental work. Finally, the group facilitated a debriefing to discuss the data that had been collected during the experiments.

## Feedback



Figure 3 Students working at their lab bench, with one of the 'slave' screens visible

Students' feedback on the impact of teaching and learning in this way was unanimously positive; for example:

*I really like how we had the opportunity to teach and conduct the experiment. Both features together promoted thoughtful/reflective learning. It was also a lot of fun.*

*Completely different approach when you are 'on the other side' of the practical and need to answer questions to explain things from the very basics to more advanced.*

*I think it will be useful in terms of confidence i.e. standing in front of the other students and explaining procedures.*

## Top Tips for Success

1. Critically appraise the way in which learning objectives are normally achieved and identify areas in which information technology could enhance teaching and learning in pursuit of these learning objectives.
2. Consider how both the teacher and the students might use the technology.

3. Plan the whiteboard system so that it can be used in a flexible manner (e.g. moved to other locations, or be adjusted for height) and easily adapted to accommodate new forms of learning activity (e.g. linked to a remote camera).



*Winner, OxTALENT 2013 award for use of technology in the classroom  
The photographs in this case study have been used with permission from the Nuffield  
Department of Obstetrics & Gynaecology.*