

## Using a versatile audio visual system to change how students learn in the School of Pharmacy

Dr Colin Melia and Dr Matt Boyd from the School of Pharmacy discuss the impact of new AV equipment on their laboratory and seminar work



Dr Colin Melia

Dr Colin Melia is associate professor in the School of Pharmacy, whose teaching and research speciality is the design, formulation and manufacturing of pharmaceutical medicines. His research into novel controlled release dosage forms and their mechanisms of drug release, is aimed at the need to develop new therapeutic approaches through improved drug delivery systems. He works closely with the pharmaceutical industry and acts as a consultant worldwide.



Students using the new facilities in the School of Pharmacy

### What was the learning and teaching issue that this technology sought to address?

We wanted to maximize the impact of live demonstrations and ensure that each student in the lab enjoyed the same quality of experience. We also wanted to enhance our small-group teaching facilities.

### What did you do?

A 50 student capacity laboratory was fitted with a versatile AV system. This comprises a 77" Smartboard™, linked with a sound system, a ceiling camera, a bench camera and a number of high quality 40" LCD screens distributed around the laboratory. In addition 3 seminar rooms were fitted out with 77" Smartboards™ for small group teaching. We spent considerable time planning how to



configure these systems in order to ensure our AV elements worked well together. We wished to provide a system which was sufficiently versatile to encompass our current classes, future expansion, and different teaching styles. For the lab we wanted to ensure ease of use by staff, optimal student viewing and anticipated future uses of the lab. This proved a very worthwhile exercise, as it allowed us to anticipate problems and consider in depth, both the current and future use of the system, prior to its installation.

### Can you tell me how the laboratory system works and what you use it for?

The lab is used extensively for both first-year classes in Practical Dispensing and the Science of Medicines Manufacture and third-year Chemistry lab classes. The technology was used to demonstrate visually the practical techniques used in the manufacture of 8 major types of medicinal product. Students then had to prepare the medicines themselves from a prescription provided. We used it for small group tutorials too, to explain how to analyse experimental results,



### Dr Matthew Boyd

Matthew Boyd has been a Lecturer in Pharmacy Practice in the School of Pharmacy since August 2006. His research focuses on the use of Information Technology in healthcare and healthcare education. In the two and a half years in post, Matthew has been a keen advocate of the use of technology to enhance student learning and in 2009 was awarded the University of Nottingham Lord Dearing Award for teaching and learning, the highest award for teaching excellence in the institution.

“The equipment purchased through the VLL has been instrumental in triggering an extended programme of investment in teaching technology within the School”

## School-wide Visual Learning Initiatives

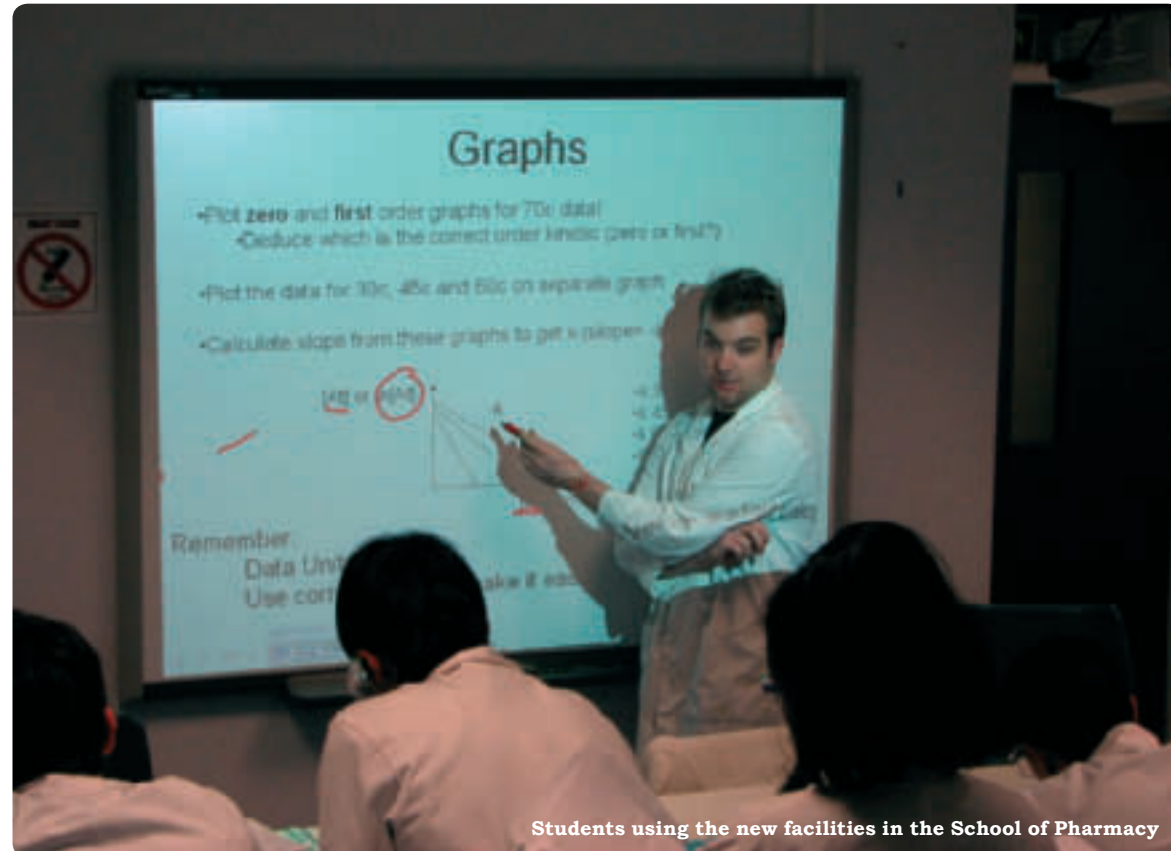
and we also used the LCD screens to display instructions to students.

The system has proved remarkably easy to use. It is controlled by simple push buttons mounted on a single panel on the bench. These allow the academic to switch views, bring in each camera or the web from either the installed PC, or any laptop an academic might bring into the lab.

### What were the learning and teaching outcomes of this installation?

There were improvements in all sorts of areas. Students were surprisingly focused and confident about the unfamiliar task they had to undertake - most clearly felt they knew what they were doing. The students seemed engaged with the demonstration on the screen and talked little - staff ascribed this to the effectiveness of the AV demonstrations in conjunction with changes in our system of marking. Interventions by the demonstrating staff reinforced rather than introduced learning. As a result of all of the above, students finished the exercises early and made few errors that would be dangerous to themselves, or to the patient.

Other changes that were clearly beneficial to the learning experience included the fact that for the first time, students were able to stay in their places during demonstrations. No-one fainted through having to stand and peer, as they had done in previous years. It has accelerated their training and given them more confidence, and it has provided a piece of jigsaw that has connected the theory that we give them in lectures, with the practical lab work.



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## School-wide Visual Learning Initiatives

A really good example of where the technology has clearly worked is in a demonstration of how to accurately weigh powder. The pharmacist is ultimately responsible for the quality, safety and efficacy of the medicine on the ward, so accuracy is a crucial skill. Quality (precision, cleanliness and reproducibility) and efficacy (if you don't make it right it doesn't work) are the key skills of the pharmacist. We have been able to use the equipment to demonstrate a little pharmaceutical trick of balancing powder on a spatula, and then tapping it. This system means that what goes into your medicine is very precise.

We can also use the system to demonstrate when something doesn't work too, which is equally important. For example, in the preparation of an ointment, the particle size of the powder that you add to the base is crucially important; if it is too large it can scratch the skin when applied. We can show good examples, and bad examples, and ways of remedying the latter. The technology allows you to more accurately demonstrate the visual characteristics of a medicine, to make an initial assessment of its quality.

### Can you tell me a little bit about how the seminar rooms worked?

The installations in the seminar rooms have been utilised by students in most year groups, for things like calculations and communication skills workshops. They have also been used for project group discussions and in the smaller final year optional module workshops.

The systems are used as an adjunct to teaching, and provide a rich method for recording group discussions that can be referred to beyond the end of the session whilst also providing a permanent record. These records have been used to shape future years' sessions when multiple sessions have been run concurrently, a phenomenon not previously possible with conventional whiteboards.



Students using the new facilities in the School of Pharmacy

### **What were the learning and teaching outcomes here?**

The students really value small group teaching and enjoy using technology as part of the learning process. Using the BridgeIt™ software, from Smart, we are able to link Smartboards™ in different rooms which allows much more interplay between seminar groups. We are in the process of trialing this, but it is a very different method of teaching and we are hoping that we may also be able to use it to run concurrent sessions with our students in Malaysia.

The system was incorporated into our teaching very easily and was used by all the principal teaching staff. We undertook more demonstrations than before and were able to stop the class at will and demonstrate any concept with which students were struggling with. Brilliant !

When running seminars, staff have felt much more comfortable dealing with issues that have arisen. It is very difficult to change a PowerPoint presentation half-way through, however a hand drawn slide using the Smartboard™ is quick, simple and intuitive and is therefore significantly better for adapting to student need.

### **You suggest that the technology has embedded well into your current programmes. What impact do you think it might have in the future?**

The Medicines Manufacture course will certainly evolve with the new lab system being central to its teaching style. We have yet to fully utilise so much of its versatility, especially the Smartboard™ element. It will, for example, allow us to show the equivalent processes of medicines manufacture being undertaken in the real life pharmacy or in pharmaceutical industry, and therefore contextualise the exercises being undertaken by students.

The use of the linked seminar rooms will allow easier facilitation of small group teaching, potentially reducing the physical number of staff required for session delivery. This will allow more sessions to run using small group teaching, which can often be more effective. By the very nature of the electronic recording possible, students will also be able to progress independently whilst retaining records, allowing academics to review discussions without the need to always be present.

### **What about the impact of technology like this in disciplines beyond Pharmacy?**

Anywhere where you have small-scale hands-on manipulation which requires dexterity - something like a surgical procedure or how to construct something - could make very good use of this equipment. It gives the students visually an idea of the skills that they need in order to successfully prepare things to a high quality or to accurately manipulate something.