

LabTutor Case Study



Client: University of Otago, New Zealand

Situation: The Department of Physiology wanted a reliable data acquisition system for human experiments in large group teaching situations (21 lab groups of 96 students) where some of the staff would be relatively inexperienced.

Solution: PowerLab LabTutor Systems

PowerLab LabTutor Systems Engage Students in Learning within Strict Time Limits

In 2007, Otago University began two new first year health science courses. The courses were part of the foundation year for five different Health Science degrees, including dentistry, medical laboratory science, medicine, pharmacy and physiotherapy. The courses needed teaching systems that were, “user friendly in a large group situation where some of the teaching staff would be relatively inexperienced” said Dr Bolter.

Choosing PowerLab was a straightforward decision. The department has used PowerLab systems in research and teaching for many years and, “we knew that if we had any problems, an ADInstruments staff member would help to resolve them” said Dr Bolter.

1800 students enrolled in the first semester course. They were divided into 21 lab groups of 96 students. During each laboratory session, student pairs alternated between anatomy components and completing physiology experiments using 24 PowerLab LabTutor Systems.

These numbers meant that the Otago physiology department had to administer hundreds of human physiology experiments within strict time limits every week. During this intense teaching period, the educators found that LabTutor “made physiological recordings very accessible to a first year audience. Students with a wide range of abilities were successfully recording and measuring their own data.”

Staff also quickly became confident with the hardware and software. Despite having no previous PowerLab experience, two technicians, “have readily acquired the necessary expertise for setting up our labs in a relatively short period of time,” said Dr Bolter. In class, staff “can be non-expert in LabTutor, and still do a good job as a physiology demonstrator,” said Ms Dallimore.

Background information

Course: First Year Health Science - Human Body Systems I and II

Educators: Dr Janice Bolter, Senior Teaching Fellow and Ms Justine Dallimore, Senior Teaching Fellow

Students using PowerLab LabTutor systems: Over 1800 students in Human Body Systems I, and around 1400 in Human Body Systems II. Students complete the units as part of Otago's Health Sciences First Year, the foundation year for all five Health Science degrees, including dentistry, medical laboratory science, medicine, pharmacy and physiotherapy.

Experiments performed: Human Physiology Suite

Lab time for each experiment: 60 minutes

Interview with Dr Janice Bolter and Ms Justine Dallimore

What are the laboratory requirements for the course you teach?

We require a reliable data acquisition system for human and animal experiments in a large group teaching situation. The first semester course had over 1800 students, and around 1400 are enrolled in the second semester. Laboratories run for three hours, but because they are shared with anatomy, there is generally one hour for physiology experiments.

When you were looking for data acquisition systems which ones did you evaluate?

PowerLab with LabTutor software was the first data acquisition system that we looked at and trialled. After trying this system, we decided to adopt it. We had the advantage of having used MacLab/PowerLab data acquisition systems in the department for both research and teaching for many years.

What features and/or benefits swayed you in the direction of PowerLab with LabTutor software?

We chose PowerLab with LabTutor software as we required something that would be user friendly in a large group teaching situation where some of the teaching staff would be relatively inexperienced.

We make extensive use of PowerLab with Chart software in second, third and fourth year laboratories as well as in our research laboratories, but we decided to go with LabTutor as it offered the experiment range we required for a first year physiology course, and the interface appears less technical and frightening for first year students.

Another attractive feature was the data acquisition channels with appropriate preselected sensitivity ranges and filter settings that reduce the amount of troubleshooting required to record a response. We want the first year students to focus on the physiology involved in the exercise rather than the technicalities of making a good recording. In contrast, when they begin using Chart in second year, we expect students to filter the signal appropriately and choose suitable sampling rates and ranges for the signal they are recording.

What LabTutor features have made a big difference to you?

The flexibility of LabTutor. We are able to customize the experiments to suit our situation. Further, we can easily modify a lab while the lab rotation is running – that is, if we encounter a problem during a two-week lab rotation, we can immediately alter the file.

Another attractive feature is the customer support we have been given. We appreciate having access to support staff who cater to our needs and help us with any questions.

For our demonstrators, using LabTutor has meant that they don't have to do as much troubleshooting, and don't have to be a LabTutor expert to do a good job as a physiology demonstrator.

What features do the students enjoy?

The students enjoy doing experiments on themselves and discovering how their body responds. They appreciate being able to do experiments that they have read about in textbooks, and actually doing the exercise improves their understanding of the physiological response being recorded.

They also enjoy the independence that this system allows. They can conduct their own experiments with minimal supervision, and they get good hands-on experience. LabTutor is intuitive to use, and we don't get many questions about how to work through the software.

How does LabTutor help students understand scientific principles?

LabTutor has made physiological recordings very accessible to a first year audience. Students with a wide range of abilities are successfully recording and measuring their own data. LabTutor uses progressive exercises, and this allows students to gradually build upon the physiological concepts behind the exercises. The background information and figures are valuable additions to the students' body of knowledge. Further, the use of embedded model results is an excellent idea, as often students don't know what they're trying to record. We hope that over time this transfers to the students becoming more independent and being able to make their own judgements about the data they collect – that is, think more scientifically. LabTutor's analysis and display features assist the students in learning data acquisition principles and add to their knowledge of the scientific method. The Report page is an excellent feature that will serve as a logical first step towards writing lab reports.

How does LabTutor save you time?

LabTutor saves our technical staff set-up time. Because all the signal conditioners and transducers are compatible, our technicians can quickly connect them. Neither of our two technicians had previous experience with PowerLab, but they've both readily acquired the necessary expertise for setting up our labs in a short period of time.

Do students finish practicals on time?

Yes, because we have been able to modify LabTutor experiments to suit our time requirements. We have 2 hours and 50 minutes allocated to each lab session, but we have to allow time for a check-in test, introduction to the lab, a wrap-up of the lab and a check-out test. That leaves 2 hours to do the practicals, and we share most of the labs with anatomy, so we have 60 minutes to complete the physiology components.

Would you recommend PowerLab systems with LabTutor software to other educators?

Yes, we have had a positive and productive experience with LabTutor software.

Any other comments?

I think what has made our experience so successful is the after purchase service we have had from ADInstruments. We have been given invaluable support in terms of both time and expertise.

Educator Information

Dr Janice Bolter is a Senior Teaching Fellow in the Physiology Department at Otago University. Her main responsibilities include: coordinating and teaching the laboratory component of second year science papers, developing and teaching the laboratory component of the first year health science papers (HUBS 191 and HUBS 192) and lecturing endocrinology in HUBS 191. Dr Bolter has also taught in the third year science laboratories.

Ms Justine Dallimore is a Senior Teaching Fellow at Otago University. She is the co-ordinator of HUBS 191 & 192 and DENT/MELS/PHTY/PHCY 215 Teaching Fellows and demonstrators. She gives lectures, teaches in laboratories, develops laboratory exercises and trains laboratory demonstrators.