LabTutor Case Study

Client: Stony Brook University (SBU)

Situation: SBU, one of the largest and most comprehensive universities in the US has been using PowerLab LabTutor Systems with LabTutor 3 successfully for three years. SBU wanted students to be able to access their lab data outside the lab in the Biology Learning Centre (computer lab).

Solution: Upgrade to LabTutor 4 Teaching Suite with LabTutor Server which allows students to log in to LabTutor and access their lab work outside the lab in the Biology Learning Center.

LabTutor 4 Teaching Suite is a robust teaching system that engages students and saves time

For the past three years, Stony Brook University (SBU) has been using PowerLab LabTutor Systems as the key teaching tool for Introductory Biology subjects. "The easy to use, robust hardware and flexible, quasi-open-source software has completely transformed the way we are able to give physiology labs," said Dr. Marvin O'Neal, Course Director.

The PowerLab LabTutor Systems have provided significant time savings. Lab classes of 24 students complete their physiology experiments with only one supervising academic. Outside the lab, students can meet in the Biology Learning Center to analyze data or discuss experiments. Dr. O'Neal said LabTutor Server had made this "a breeze."

PowerLab LabTutor Systems were chosen for SBU after comparison proved PowerLab LabTutor Systems were more efficient and easy to use than other data acquisition systems for teaching. Dr. O'Neal's experience using PowerLab Research Systems also favored this decision, "I've used your 'bulletproof' hardware in research, the technical support is fantastic, and the software could be modified for my specific application."

Approximately 900 students use 41 powerlabs, 36 human and physiology systems and 5 biochemistry sets with LabTutor 4 Teaching Suite to record and analyze data for physiology, reflex, cardiovascular and skeletal muscle experiments, as well as experiments that have been customized using LabAuthor software.

Student feedback has been positive. According to Dr. O'Neal students enjoy "experimenting on themselves and sometimes on lab partners."

Due to the success of PowerLab LabTutor Systems in the Introductory Biology courses, SBU are considering implementing LabTutor in SBU's upper division physiology labs.

Read the full interview with Dr. Marvin O'Neal

ADINSTRUMENTS.com

Background information

Course: Introductory Biology, Stony Brook University (SBU).

Educator: Dr. Marvin O'Neal.

Students using PowerLab LabTutor Systems: Approximately 900 students undertaking Introductory Biology subjects currently use PowerLab LabTutor Systems.

Experiments performed: Physiology, reflex, cardiovascular, skeletal muscle and experiments customized and created using LabAuthor.

Class structure: One instructor required for each class of 24 students.

Interview with Dr. Marvin O'Neal

Please describe your role(s) at your institution. How long have you been in this role?

Course Director for Introductory Biology laboratories for 3 years.

What courses use LabTutor and how many students are in the course(s)?

Bio 205; approximately 900 students.

How many PowerLabs do you have and what other ADInstruments equipment do you have?

41 PowerLabs, 36 human and physiology systems and 5 biochemistry sets.

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

2007 - National Instruments (or LabVIEW), Adept Scientific's DASYLab8, and DATAQ Instruments

What were the key factors that made you choose ADInstruments products?

I've used your 'bulletproof' hardware in research, the technical support is fantastic, and the software could be modified for my specific application.

Can you describe the implementation of the PowerLab data acquisition system in the lab? (Laboratory setup, number of staff running labs, how the labs are run.)

Introductory biology laboratory (sophomore undergraduates) in sections with 24 students and 1 instructor. Each lab group is 4 students (6 lab groups per section). Each room is equipped with 14 computers. 2 computers per lab group, 1 instructor computer and 1 classroom computer. The instructor computer is used for clickers, grades, Powerpoints, etc. The classroom computer is used to collect section data; it has a digital camera attached to compound and dissecting microscopes, a scanner, a gel doc, etc. In each lab group there are 2 computers for the 4 students. For an ADI lab, two students share the PowerLab and collect data while the other two students analyze data on the other computer. LabTutor Server makes this a breeze.

Outside the lab, students can meet in the Biology Learning Center (12 computers with LabTutor) to analyze data or discuss experiments.

How long have you and/or the university been using ADInstruments data acquisition systems?

3 years.

What difference has PowerLab made for you, your students, and the courses you run?

The easy to use, robust hardware and flexible, quasi-open-source software has completely transformed the way we are able to give physiology labs. I look forward to integrating undergraduates into curriculum development using LabAuthor.

What type of experiments are your students conducting with LabTutor systems?

Physiology, reflex, cardiovascular, skeletal muscle, design your own experiment.

Can you describe how the course was run before the use of LabTutor systems?

This is a relatively new course where students are learning how to conduct experiments. The old physiology labs were cookbook and simple. By making the hardware reliable and the software flexible, you open time for students to do more and create more.

What particular features of LabTutor 4 suite are improved over previous version of LabTutor or other data acquisition software (if applicable)?

Remote data analysis: students can focus on conducting experiments in the lab and analyzing data outside the lab. Makes time for more inquiry-based labs.

How have LabTutor suite and PowerLab systems saved you time?

This course is large. All of the organizational goodies such as preparation lists, detailed methodology, instructor answer keys, etc. are excellent. PowerLab systems are robust. If we don't have to spend time to fix the hardware/software, then we can spend time on something else.

How have LabTutor suite systems been cost effective?

Students are hard on equipment. They have the ability to misuse even the simplest tool. So far, so good with PowerLab... I'll let you know in 5 years how cost effective the purchase was.

Can you comment on the students' experience with LabTutor suite systems?

If the student has taken an old physiology course before taking our new course, then most of their comments are positive and LabTutor gets rave reviews. However, for the student that has never been forced to use the old equipment, then most of their comments are about reading. Students hate to read in order to figure out how something works. They want a movie with a voice over explaining as they go... this is one reason that I created Podcasts to accompany each of the ADI labs. Students would rather watch a video podcast on how to use LabTutor systems instead of reading the instructions. YouTube generation?

Which features do they seem to enjoy?

Experimenting on themselves and sometimes on lab partners.

How does LabTutor suite help students with understanding scientific principles or learning goals?

A laboratory environment centers around 'doing', as does LabTutor. Laboratory environments are the first places where students practice science. They are also the first places where many students are turned off from pursuing science as a career. The stakes are high for the citizenry of a nation if we (the US) continue to graduate fewer scientists and fewer informed citizens.

What are your future plans for LabTutor? Do you intend to increase the number of systems that you use, the way you use them etc.?

We are considering using them in upper division physiology labs.

LabAuthor: Have you modified existing experiments with LabAuthor? Have you created a new experiment?

Yes and yes.

Please comment on the use of LabAuthor: Was it easy to use? Had you used another HTML editor? How does LabAuthor compare?

Easy to use but also a little limited. I found myself doing the more complicated things with other software, like Adobe and pasting them into LabAuthor. This worked well.

Support: Do have any comments you would like to make about the service from ADInstruments

Nope. It's great.

Would you recommend LabTutor systems to other educators?

Yes.

Biography

Dr. Marvin O'Neal is the Director of Introductory Biology Laboratories at the Stony Brook University (SBU). He has published research papers in prestigious scientific journals as well as writing for biology education texts, and has spoken at a number of recent biology education conferences. Dr. O'Neal was appointed at SBU in 2007, and was pivotal in the implementation of physiological data acquisition systems in undergraduate biological laboratory subjects.