

## Does Technology Help Students Understand Biology in a Lab Setting?

**Sharon L. Gilman**

Department of Biology, College of Natural and Applied Sciences

This study sought to answer the question: does technology help students understand biology in a lab setting? Faculty members are asked to incorporate technology in their classrooms. Is this effort paying off in student learning? Addressing these questions in an undergraduate biology lab is the goal of this study. In our second semester Introductory Biology course for majors, we've adopted a series of inquiry-based lab exercises with an emphasis on communication. We worked in two traditional lab rooms, one entirely lacking any computer technology beyond occasionally borrowed laptops, and one with a full projection system and weekly use of laptops. She compared student learning and attitude changes in these two settings.

A total of 195 students in 14 sections of Biology 122 Lab during the fall semester of 2004 and spring semester of 2005 at Coastal Carolina University were given anonymous pre- and post-course surveys asking them questions related to the following areas: attitude toward science, technology in science class, the nature of science, experimental design/statistics, basic biological content, and writing scientific papers.

There were just a few differences observed between the groups. Both the high tech and low-tech groups started out with positive attitudes toward science and this did not change, and both showed an increase in positive attitude toward small group activity. Both groups said they enjoyed using technology in the lab and the high tech group showed an increase in their view that it was advantageous to use technology to learn science.

Overall, both groups seemed to have a good understanding of the nature of science with the glaring exception that neither thought that the various sciences were inter-related. The low-tech groups became slightly more convinced that the right answer wasn't as important as the right method, and the high-tech groups became slightly more convinced that a good decision is a scientific process and that an unexpected result isn't a failure. They were also slightly more likely to think that biology requires special abilities. Both agreed they should have to think in lab and class, that in science theories are replaced, that science is a constantly expanding field, and that good communication is a key to science.

There were no clear differences between the groups in the survey results concerning course content, understanding of experimental design, statistics, or paper writing. How sections answered these categories of questions seemed to depend much more on the instructor they had.

In conclusion, we did not find any clear differences in learning between lab groups using less classroom technology *versus* those using more, however the two groups had different instructors and I did find that the content they learned did vary considerably depending on the instructor. Thus I think one would have to compare low- and high-tech with the same instructor. I had tried to do that, but the students in my two sections were very different to start with. The students do seem to enjoy using technology, so it's perhaps a worthwhile investment for that reason alone.

We were encouraged to find that our students do seem to have a solid grasp of the nature of science, and their second semester (for most) of college science courses did not seem to be turning them off of science. Since most are probably taking more than one science course, it is

discouraging to find that they see little relationship between different sciences. We're going to have to work on our interdisciplinary approaches.