

Case Studies

Students at the University of Northern Colorado learn statistics with interactive, real-world projects experience; virtual reality at Haywood Community College from engineering to English; Stanford University's Electrical Engineering degrees online; and a computer hacking game at Texas A&M.

University of Northern Colorado

Statistics Get Interactive

Introductory statistics students

at University of Northern Colorado are just as likely to research information on the Web or conduct surveys to collect their own data as they are to read case studies in a textbook. It's all a part of a plan to give students a more active learning environment and better their use of technology.

Professor Larry Lesser, who holds a Ph.D. in Mathematics Education and did his dissertation on teaching introductory statistics, jumped at the chance to revamp the school's traditional intro statistics course when the Department of Mathematical Sciences began reexamining its program.

To tackle the problem, Lesser started by setting up Excel spreadsheets in a computer lab to give students firsthand experience at data analysis. Because there weren't enough computers to go around, students worked in teams. Ultimately this added to the educational experience as students needed to hone their communications skills for team work.

And because the computer was doing the number crunching, students were freed to work on the more interesting problems of real world statistics. "Being on the computer, they can also toggle back and forth between Excel and a word processing package as well as the Internet," says Lesser. He adds that some of his assignments forced students to pull data off the Internet or from print media articles. Lesser also



created a Web site for the course with links to various resources.

All of this is aimed at getting students involved at all levels and in their subject of interest. Because Lesser's class is introductory, his students come from many backgrounds ranging from the social to the hard sciences. He makes sure they can work on statistical problems that involve their own major or area of interest. He also makes sure the technology works to serve their ends.

For example, one sociology student conducted a survey on campus of students feelings about gun control, and used a random number generator to generate numbers for students out of the phone book with which she conducted her interviews. "They really get a sense of ownership over the end result because they've collected the data and produced the results themselves," Lesser says.

Lesser's statistics Web site is another way for students to gain a sense of ownership. The site is interactive in that students make a choice to collect data in a certain way and then see what happens. Because they can do the experiment repeatedly, this helps them to see trends or make predictions.

Students are evaluated on a standards system, so Lesser placed the rubric on the Web site with specific feedback for students to see what they need to work on and where their strengths and weaknesses are. This increases students' clarity about their objectives and provides meaningful feedback.

Currently, Lesser is on his second round of teaching the course and the feedback continues to be positive. Although some students start the course with math or computer anxiety, he says, once they get the orientation to the course it isn't a week

or two before they are ready to dive in. For more information, contact Larry Lesser, (970) 351-2455 or lmlesse@bentley.UnivNorthCo.edu or access <http://etip.univnorthco.edu/lesser/facbio.htm>



Haywood Community College

Virtual Reality on Campus

When students in Juanita Stock's American Literature class said they really got into Flannery O'Connor's short story "A Good Man is Hard to Find," they meant it. Not literally, but virtually. That's when Tony Gaddis, engineering technology instructor, and English instructor Stock built the first immersion virtual reality environment that took students inside the last scene from the story.

Students put on head-mounted displays and entered a virtual world replete with scenery and artifacts from the final scene in the story. Inside that world were the woods, the ill-fated car, the Misfit's glasses, and the grandmother's basket in which she hid Pitty-Sing, the cat that caused the accident. But right alongside those elements were things strewn about the scene that didn't appear in the story at all. The mission: Walk around this virtual world and identify those elements that were not a part of the final scene.

Students liked it. That's why Gaddis and Stock followed up with an entire class dedicated to blending virtual reality with literature. In the course, called Exploring Literature Through Virtual Reality, students create virtual reality-based fictional recreations of short stories they have selected. One of the goals is to get students thinking about critical elements of a short story and getting inside the work from the author's point of view.

Gaddis and Stock expect that students working so closely with the literary texts will gain a new appreciation of how writers use images and settings to set a