

Out of the Lecture Hall: The Pennsylvania State University



The Joab Thomas building for Statistics on the Penn State University Park Campus.

KEY FACTS

ORGANIZATION

The Pennsylvania State University

OVERVIEW

- Public university serving 85,000 students throughout Pennsylvania
- Thousands of students take introductory statistics courses each semester

CHALLENGE

- Improve introductory statistics courses
- Increase opportunities for student-instructor interaction

PRODUCTS USED

Minitab® Statistical Software

RESULTS

- Students spend more time investigating concepts than memorizing formulas
- Fewer teaching assistants needed for each course saving \$75,000 a year

Penn State and Minitab Inc. share a long history of innovation. In 1972, three Penn State statistics professors developed Minitab Statistical Software to help their introductory students devote more time to directly exploring statistical concepts and less time doing tedious calculations. Minitab software revolutionized the teaching of introductory statistics and, today, it is used at more than 4,000 colleges and universities worldwide. Today, a team of Penn State statistics faculty once again transformed their students' learning experience and they've done it with the help of Minitab software.

Challenge

Each semester, nearly one thousand Penn State students take Stat 200, an elementary statistics course required by more than 60 majors. The statistics department would divide the students into four sections each participating in three weekly lectures. Smaller groups would then meet twice per week for review sessions with teaching assistants. This left little opportunity for interaction with instructors and no in-class time for students to apply the concepts they were learning.

With support from Penn State's Center for Education Technology Services (CETS) and the Schreyer Institute for Innovation in Learning along with funding from the Pew Foundation's Center for Academic Transformation, the Stat 200 team developed a new course that has changed the face of introductory statistics instruction at Penn State forever.

How Minitab Helped

The team had two goals: first, to more actively engage students in learning statistics using hands-on experience doing data collection and analysis; second, to shift the role of instructors and teaching assistants from information presenters to learning facilitators by implementing technology that would reduce the time needed to teach and administer the course.

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The new technology included a Stat 200 website that allows students to log on at anytime and is a repository of exercises, activities and data sets. It allows students to take greater responsibility for their own progress and it helps instructors save administrative time by supporting group communication. They also use the site to survey students and collect data online for later analysis.

The largest change for the Stat 200 class was to take it out of the lecture hall and put it in the hands-on lab. Reducing lectures to one day per week and turning the remaining two sessions into computer workshops using Minitab Statistical Software allows the students to apply what they are learning immediately. And since many of the lab activities are based on the online survey data, the students are even more interested in analyzing the data with Minitab and interpreting the results. This also allows the instructors to interact directly with the students, facilitating the discussions that inevitably emerge.

According to Penn State professor Bob Harkness, Minitab has been critical to the program's success. It's simple, user-friendly menus allow students to pick it up quickly and are prepared to use it with little help. With all the time they're spending in the lab, students are talking more about p-values and how to use Minitab to perform two-sample t-tests. In short, they're investigating concepts much more extensively, which is far more important than memorizing formulas.

It also helps that Penn State students have easy access to Minitab Statistical Software. As part of the redesign, the University purchased a 200-user license and made it available in all of their public labs, many of which are open around the clock.

Results

The new Stat 200 course has not only transformed how statistics is taught at Penn State, it has helped the university's bottom line. Stat 200 now requires half the number of teaching assistants that were needed when the course was lecture-based, which translates into a savings of \$75,000 a year. This leaves more teaching assistants available for research projects.

The program's success is inspiring further innovations. The University is extending the Stat 200 course to its branch campuses and the National Science Foundation awarded a grant to the Stat department to implement the new design in two other statistics classes. With 19 branch campuses and many more statistics courses, there's no doubt the Stat 200 team will continue to positively impact the educational life of its students and the future of statistics education.

And Minitab will be with them every step of the way.