

Oral pre-tests equals more students passing calculus at CU

National Science Foundation awards CU \$450,000 to spread the concept

By Brittany Anas (Contact
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Here's a formula that math teachers like to see: The number of students flunking calculus at the University of Colorado dropped when undergraduates were required to talk about class concepts before big tests.

Five years ago, CU introduced these oral pre-tests to students who were struggling in a Calculus I class, and it trimmed the failure rate from 30 percent to 22 percent. The national failure rate for the subject is about 40 percent, according to the university.

The National Science Foundation is warm to the concept, and has awarded CU a \$450,000 grant to spread the oral assessments to other classes, including those on CU campuses and to Boulder's Fairview High School.

Before each written exam, groups of five students meet for an hour with a proctor, who helps the students talk about the basic concepts of the course.

"The process includes asking students to explain how and why specific mathematical procedures

can be used and to draw graphs that clarify the meaning of important concepts of the course," said Mary Nelson, an applied math instructor who is the principal investigator for the grant.

Nelson -- who earned her doctorate from CU's School of Education on research and evaluation methods and math education -- said she is hopeful the grant will mean continued improvement among students. She has been teaching at the college level for 35 years.

In 2003, CU's applied math department introduced the oral assessments into a two-semester Calculus I course. Analysis showed that students in the course earned higher grades, and they passed Calculus II at a higher rate, said Anne Dougherty, the associate chairwoman of the department.

The study is important, the researchers say, because calculus is a gateway course for science, technology, engineering and math majors.

The grant will allow researchers to collect and analyze data and to introduce oral assessments into a wider range of courses. The oral tests are now practiced in calculus classes at CU's Boulder and Colorado Springs campuses, and will be launched in two algebra classes at Fairview high.

Next fall, the oral assessments will be offered in the Boulder campus's introductory mechanical engineering and aerospace engineering classes, said Dougherty.

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