

USE TECHNOLOGY TO IMPROVE THE QUALITY OF STUDENT LEARNING AND REDUCE THE COSTS OF INSTRUCTION

DESCRIPTION

At most public community colleges and universities, 25 courses generate approximately 45% of the annual full-time equivalent (FTE) undergraduate student enrollments. Focusing on these large-enrollment, introductory courses, institutions can implement course-redesign efforts to utilize the capacities of information technology, to improve the quality of student learning and reduce the costs of instruction.

CURRENT EXAMPLES

Supported by an \$8.8 million grant from the Pew Charitable Trusts, and managed by the Center for Academic Transformation at Rensselaer Polytechnic Institute, the Program in Course Redesign was created in April 1999, to assist colleges and universities in their efforts to redesign large-enrollment, introductory courses in multiple disciplines. The participating institutions included:

- University of Massachusetts-Amherst (introductory biology),
- University of Colorado-Boulder (introductory astronomy),
- University of New Mexico (introductory psychology),
- University of Wisconsin at Madison (general chemistry),
- Tallahassee Community College (college composition); and
- Rio Salado College (pre-calculus mathematics).

The results show that all thirty participating institutions reduced costs by about 40% on average, with a range of 20% to 84%. Other outcomes include increased course completion rates, improved retention, better student attitudes toward the subject matter, and increased student satisfaction. The 30 redesigned courses impact more than 50,000 students and produce an annual savings of \$3.6 million each year.

Virginia Tech is recognized as a national leader in the use of technology to improve student achievement and reduce per-student costs. This leadership role was developed in the past decade in response to a directive from the Virginia Legislature that each public university prepare a restructuring plan to serve more students at the same funding level. The mathematics emporium model implemented at Virginia Tech eliminates all class meetings and replaces them with a learning resource center featuring on-line materials and on-demand personalized assistance.

STATE POLICY PRIORITIES TRADE-OFF

The major cost item in higher education is personnel. Reducing the time that faculty and other instructional personnel spend, and transferring some tasks to technology-assisted activities, is the key to cost savings in instruction. However, if technology is seen as an "add-on" to the existing mode of instruction, the per-student costs will increase.

Cost savings have resulted from projects that share the following characteristics:

- Whole course redesign by a faculty team, rather than the redesign of a single class or section.
- Make the teaching-learning process more active and learner-centered, with "lectures replaced with a variety of learning resources that move the student from a passive, note taking role to an active, learning orientation." (Carol Twigg)
- Computer-based learning resources, including tutorials, exercises, and low stakes quizzes.
- Mastery learning, with students expected to master specific learning objectives.
- On-demand help, with students able to receive assistance from a variety of sources.
- Alternative staffing, using undergraduate peer mentors and course assistants to increase the person-hours devoted to the course and free faculty to concentrate on academic rather than logistical tasks.

GENERAL FUND IMPACT

New resources may be required to initiate the course redesign efforts. However, when the program began in Virginia, the Virginia Legislature issued a directive that each public university shall prepare a restructuring plan to serve more students at the same funding level. The institutional restructuring plans led to the highly successful program at Virginia Tech.

TECHNICAL FEASIBILITY

The following policy questions must be resolved before progress can be made in implementing this option:

- How can the state best encourage institutions to use technology to reduce institutional costs, beyond their current efforts?
- How prescriptive should the state be in setting procedures, identifying strategies, and pressuring outcomes?
- Should the California Legislature request that California's public universities and colleges prepare restructuring plans to serve more students at the same funding level?