The financial management of American higher education is under intense scrutiny. Significant pressure to reduce costs stems from students, parents, legislators and others, even though in the vast majority of cases the price charged students for their education is less than the cost to the university for providing it. Meanwhile, revenue sources are increasingly strained as universities strive to enhance quality, improve access through financial aid, and serve the many related functions that society believes to be part of their obligations.

Gil Whitaker, Dean and Professor of Business Economics at the Jones Graduate School of Administration at Rice University, also oversees a Mellon Foundation grant program concerning the cost effective use of technology in teaching. Rather than encourage wholesale adoption of technology-based education, the program’s aim is to accomplish change in effective but less dramatic ways. Its basic premise is that the thoughtful application of technology will alleviate some of the cost pressures facing institutions today, while retaining the best aspects of quality higher education.
Recent developments in technology have the potential to significantly improve faculty instructional productivity while maintaining quality.

The Unfulfilled Potential of Technology

To continue to serve their many roles, universities not only must increase their revenues—although the potential to do so through tuition is severely limited—but also must reduce costs. As in many other service organizations, personnel costs dominate higher education expenditures. Yet, low faculty productivity often is cited as a key cause of the rapidly rising costs of quality higher education.

Recent developments in technology have the potential to significantly improve faculty instructional productivity while maintaining quality. Technology already has made possible many new research opportunities, but it has increased costs while doing so. The important issue in considering the use of technology in instruction is not so much whether quality can be improved while increasing costs—that is, doing more with more—but rather, can more be done with less; or, can the same be achieved with less?

Higher education no longer can afford a mind-set that doing “good things” is all that counts. In a period of revenue constraints, applications of technology in teaching that consider cost effectiveness as well as educational outcomes are essential for higher education to continue to improve its service to society. New approaches are required to avoid the real possibility of a slow decline in quality across the board.

Mellon Projects

New instructional paradigms are being implemented through Mellon projects at the University of Cape Town (UCT) in South Africa, George Mason University (GMU), and the University of Pennsylvania (Penn). Each maintains the high value that faculty place on human interaction in the learning process by using learning technologies in traditional campus settings.
At UCT, a CD-Rom based remedial academic skills course, titled *Deep Foundations*, has been developed, illustrating how the use of even low-level technology can be extremely productive. The use of self-paced teaching materials has freed up the academic support staff and relieved mounting pressure to hire additional staff. Further, students are able to complete their degrees in a more timely fashion since, in the past, many of them—legacies of an apartheid-based education system—had to continually repeat courses. This use of teaching resources not only was inefficient, but also was deeply demoralizing to students. Finally, the content of the course respects African themes, as it focuses on South African history through the use of that country’s unusually rich set of archeological sites.

At GMU, introductory astronomy and management information systems (MIS) courses have been designed based on the theoretical work of computer scientist Peter Denning, a GMU faculty member. In Denning’s model, professors assume the new role of course manager, capable of working with more students than before, but only on crucial course activities. The astronomy course is completely Web-based; preliminary evidence suggests that superior content is being delivered to several hundred students per semester. The MIS course uses a great variety of technology, all currently available at the university. It treats students as discoverers rather than receivers of imparted wisdom in a classroom. The course has been successful in reducing unit teaching costs considerably.

At Penn, the focus is on engineering and science programs, which are extremely expensive given their many specialized classroom and laboratory courses. The goal is to develop Web-based instruction concerning the safe and correct use of laboratory equipment. Currently, a great deal of instructor time is devoted during class time to such activities. The introduction of online materials will allow students to spend less time in class learning how to use equipment and more time actually performing experiments. It also will result in major savings of instructors’ time, an increase in the number of students a given laboratory can serve, and less damage to equipment.

**Conclusion**

The Mellon project is designed to discover and refine means by which to leverage the capacity of faculty, not to replace them with technological solutions. By reducing the rate of growth in the cost of teaching, such approaches have the potential to conserve much needed institutional resources.