NSU NOVA SOUTHEASTERN UNIVERSITY Abraham S. Fischler School of Education

Innovate: Journal of Online Education

Volume 2
Issue 3 *February/March 2006*

Article 1

3-1-2006

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by William H. Graves and Carol A. Twigg

Carol A. Twigg, founder, president, and chief executive officer of the National Center for Academic Transformation (NCAT), is an internationally recognized expert in using information technology to transform teaching and learning in higher education. NCAT's groundbreaking project, the Program in Course Redesign, demonstrated the possibility for institutions of higher education to use technology to improve learning while simultaneously reducing instructional costs.

Bill Graves [BG]: Carol, for those who are not familiar with the National Center for Academic Transformation and the Program in Course Redesign, could you briefly explain the program and the results that were achieved?

Carol Twigg [CT]: The Program in Course Redesign (PCR) was an effort funded by the Pew Charitable Trusts in 1999 to demonstrate that technology can be used both to increase quality and to reduce costs in higher education. NCAT worked with 30 very diverse universities, four-year colleges, and community colleges to focus on improving large-enrollment introductory courses that have the potential of impacting significant student numbers and generating substantial cost savings.

The results were dramatic. Of the 30 schools, 25 were able to improve learning in the redesigned course over the traditional (usually lecture-based) course. The other five showed learning equivalent to the traditional format. Of the 24 schools that measured retention, 18 showed measurable increases. All institutions, however, demonstrated cost savings, and the average savings was 37%. From the PCR, five distinct course redesign models and a replicable methodology for the course redesign process emerged.

BG: How did you measure increases in student learning?
CT: The PCR's basic assessment concern was the degree to which improved learning occurred at reduced cost. Answering this question required comparisons between the learning outcomes of a given course delivered in its traditional and in its redesigned format. Student mastery of course content was the bottom line. Techniques for assessing student learning included comparisons of common final examinations, embedded common questions or items in examinations, or individual assignments and samples of student work (papers, lab assignments, and/or problems). Outcomes were assessed according to agreed upon common faculty standards for scoring or grading. Assessment also included tracking student records after they completed the redesigned courses.

BG: NCAT pioneered the use of the term "course redesign," and now we hear it everywhere. What does NCAT mean by course redesign?

CT: Good question, Bill. Some people confuse course redesign using technology with putting courses online. That is not what it is about. It is about using technology, where technology makes sense, to reorganize instruction to better achieve goals for student learning in a more cost-effective manner. Most institutions already know how to put courses online. We try to help them leverage their technology investments to show measurable increases in learning at a reduced cost to the institution.

Of course, many of our course redesign strategies can be applied to improve learning in any course. However, the high-enrollment, multi-section course can be treated as one course for redesign purposes. Such treatment presents an opportunity to rethink the use of all the instructional resources and personnel

involved in the course, which, in turn, allows institutions to reduce total instructional expenses and pursue a unified strategy for improving learning. These high-enrollment common courses are taught at most institutions, further expanding the opportunities for sharing resources and achieving scaling effects beyond the individual campus.

BG: How big a role did technology play in the course redesign process? Was student learning increased because of the use of technology or because a conscious design approach was used?
CT: Good pedagogy in itself has nothing to do with technology, and higher education has known about good pedagogy for years. Proven pedagogies like encouraging active learning, giving prompt feedback, encouraging cooperation among students, and emphasizing time on task—all techniques that are used in the course redesigns—have been implemented without using technology. The significance of the redesigned courses is that faculty members incorporated good pedagogical practice into courses with very large numbers of students—a task that would have been impossible without technology.

BG: What's next for NCAT?

CT: NCAT, formerly affiliated with Rensselaer Polytechnic Institute, is now an independent nonprofit focused on improving and scaling the successful proof-of-concept produced by the PCR. Right now we are in the middle of an initiative financed by the Fund for the Improvement of Postsecondary Education, the Roadmap to Redesign, to streamline the course redesign methodology that was developed in the PCR and, in turn, expose more institutions to the principles of course redesign. This effort includes another 20 plus institutions that are redesigning common courses in precalculus, statistics, psychology, and Spanish. In Spring 2005, these institutions finished their course redesign pilots using the updated methodology, and most will have fully implemented the new courses in Fall 2005 or Spring 2006. The key here is that all of these schools were able to build upon the work of the PCR institutions by adapting the models that were created in the PCR to their own particular situations while not having to start from scratch. And they are doing so without an external grant!

NCAT also received funding from Lumina Foundation for Education to analyze the impact of the course redesign techniques used in the PCR on underserved students: low-income students, students of color, and adult learners. We focused on a subset of 15 of the 30 institutions with high percentages of underserved students. We found that our course redesign methodology had a positive impact on these students: 14 of the 15 institutions showed improvements in student learning; 11 of the 15 projects showed improvement in course completion/retention rates. Despite the widespread assumption within the higher education community that underserved students and technology use do not mix, we were able to demonstrate conclusively that the opposite is true. And we are not the only ones to have shown that good pedagogical practice leads to increased student learning; we are just the first to use technology consistently to support that practice. The really good news is that unlike typical approaches to addressing low success rates among underserved students, which are typically "add-ons" to existing programs, these course redesign ideas are also affordable (Twigg 2005).

In addition to these research and development efforts, NCAT puts its primary emphasis on working with states and higher education systems to implement state-based course redesign programs.

BG: Why work with states and systems?

CT: As I mentioned previously, NCAT aims not only to establish a proof-of-concept—how technology can be used to increase quality and reduce cost—but also to scale the successes. So far, we have worked with individual institutions in developing a sound course redesign methodology, but by working with states and systems to implement similar programs on a larger scale, we can have a greater impact.

The reality today is that more students than ever need a high quality postsecondary education, yet funding sources are stretched to the breaking point. We know that course redesign can assist states and systems

with critical operational issues such as enrollment growth, accountability, quality consistency, and efficient use of existing resources. By using a train-the-trainer approach, NCAT works in partnership with state/system staff and local administrators and faculty to implement a course redesign program tailored to their needs while building capacity within the state to run subsequent programs.

BG: Which states or systems are you currently working with?

CT: This initiative is relatively new, but there are already two very positive state-based programs in progress. Our partnership with the University of Hawaii system (UH) grew out of its interest in repurposing an existing faculty development grant program. UH wanted to move away from supporting only individual faculty development grants toward projects that would have a greater impact on the system as a whole. They also wanted to increase their focus on producing measurable learning increases and reductions in instructional costs so that resources could be freed to meet other campus and system needs. UH launched its first statewide competition for course redesign grants in May 2004 and issued an invitation to participate to all 10 member institutions. Interested teams of faculty and administrators participated in three sequential workshops led by NCAT and then worked with NCAT, as needed, to develop course redesign proposals. A review committee of representatives from UH and NCAT ranked proposals and selected three projects to be funded. Pilots of these course redesigns occurred in Fall 2005, and full implementation of these courses have since begun in Spring 2006. Meanwhile, in Fall 2005 UH went on to launch a second round of course redesign grants.

A second partnership with the Ohio Learning Network (OLN) extends their longstanding Emerging Needs Grant Program. This program awarded faculty development grants aimed at increasing the use of technology in teaching. In 2004 the OLN, like UH, decided to add an emphasis on containing instructional costs in addition to improving student learning. NCAT worked with OLN to develop the call for proposals, educate faculty and administrators from institutions throughout the state on the course redesign methodology, and work with the chosen institutions to develop and implement their course redesigns. Nine successful proposals were chosen from among the 28 public and private institutions that sent teams to the first course redesign workshop. Those nine institutions began implementing their redesigns in Fall 2005. Since then we have continued to work with OLN; we are currently evaluating this first round of projects and planning for a subsequent round as well.

We are currently in discussions with a number of other states to develop course redesign projects. Interestingly, leadership for the redesign effort comes from vastly different places, depending on the state. In some states, it logically comes from the statewide coordinating body for technology initiatives like the Ohio Learning Network. In others, the system office or board of trustees drives the project. In still others, the legislature, the state budget authority, and even the governor's office promotes course redesign.

BG: What challenges have you experienced thus far working on the state and system level?

CT: As I mentioned, no single, obvious entity should or could take leadership of a state- or system-wide course redesign effort. This is both a positive and a negative. Since there are many points of entry for NCAT to introduce the concept of course redesign, we have many opportunities to make an impact. But not having a clearly defined "driver" for the process presents other challenges. We do know that implementing a course redesign program that produces measurable results in both quality improvement and cost savings requires strong leadership. Without it, the cost savings element usually becomes lost in the process. Fortunately, we have very strong and supportive leadership in our current projects, and such leadership is essential to developing successful programs.

Making sure the principles of NCAT's course redesign methodology are communicated very clearly on all levels presents another challenge. Most states/systems are used to running grant programs. When they perceive NCAT's program as yet another grant program, their first reaction is "Why do we need to hire people from the outside to run a grant program? We already know how to run a grant program." That is not what

NCAT does. NCAT teaches a proven methodology for course redesign that improves learning, reduces costs, provides a replicable process, and guarantees results through constant interaction with and monitoring of projects. NCAT intends to change the way that faculty and administrators think about the relationship of quality and cost and to do so in a sustainable way.

We confront additional challenges when cost savings are mentioned as a goal; the first response of the faculty is to get nervous and sometimes justifiably so. Cost reduction in the past has meant loss of jobs, but that is not something we advocate. We urge the leadership to have a frank discussion of what will happen to the savings that are generated, and we recommend that the savings remain in the department that generates them. If this message is not communicated well by the leadership and does not occur early, roadblocks will arise that can diminish the effectiveness of the program. We urge the leadership to think of cost savings as a reallocation of resources that allows institutions to achieve their wish lists, such as serving more students on the same resource base, offering additional courses at upper levels, breaking up academic bottlenecks, and so on.

Talking about cost savings in higher education can be difficult and can lead to the derailment—or the watering down—of the project if not done properly. Most internal departments are reluctant to deal with the issue of cost directly, particularly when the faculty initially reacts negatively. In contrast, NCAT's experience with and knowledge of how to address this issue with all stakeholders constructively will ensure that productive discussions will occur and that the central goal of improving quality and reducing costs will not be compromised.

BG: What role does the commercial sector play in NCAT course redesign?

CT: A significant one. One of the major tenets of NCAT's course redesign methodology is that institutions should avail themselves of the plethora of content, software, and tools that have already been created and tested rather than create everything themselves. In addition, the commercial sector needs to be in tune with what content resources faculty need in order to redesign courses to produce better learning outcomes. NCAT recently created its Corporate Associates program to tighten the link between commercial providers of content and software and faculty members who are developing cutting-edge course redesigns so that both can be better informed about what is available and what is needed. At this time, Bedford, Freeman, and Worth Publishing; Thomson Learning; Pearson Education; and Houghton Mifflin Publishing are members of our program.

BG: How can interested parties learn more about what is going on with the projects and what other states and institutions are doing?

CT: The best source is our new Web site (NCAT), which provides a wealth of information on course redesign, including detailed descriptions of all of our projects, tools that NCAT has developed to aid in the redesign process, and suggested reading. The most useful feature of the site is the detailed descriptions of actual course redesign projects, including outcomes information and contact information for project leaders. Again, one of the core principles of NCAT's program is to avoid reinventing the wheel. We highly encourage institutions considering course redesign to read about what others have done and to contact those people to learn the lessons that they have learned along the way.

Contact information for NCAT staff is also on the Web site. We welcome inquiries and will work with the state/system to craft NCAT's course redesign methodology to help solve problems specific to the state/system. If meeting increasing enrollment demands without additional funding is the main issue, for example, we can help design a program to meet that goal. If reducing the time to graduation for students is a major problem, we can adapt a program to that particular focus. While the NCAT methodology offers an organized approach to course redesign, it is not a one-size-fits-all approach.

BG: Anything else?

CT: I appreciate the opportunity to update the *Innovate* audience about where NCAT is going. We think of our work as a continuous circle from producing a proof-of-concept, to analyzing what worked well and what did not, to communicating those results and the lessons learned, to scaling those successes, and then back again to producing another proof-of-concept. We welcome input and feedback from our colleagues along the way.

BG: Thanks for your time, Carol, and keep up the good work!

References:

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