

Redesigning the Basics

Tennessee's community colleges use technology to change their approach to developmental reading and math

By Kay Mills

CLEVELAND, TENNESSEE

TIFFANY WHITE, out of high school for 15 years, confesses that she was “really nervous” about taking algebra at Cleveland State Community College in southeastern Tennessee. “But I’ve surprised myself by doing better than I thought I would,” she said. She’s motivated because she was laid off from a manufacturing job last May and wants to become a legal assistant.

And she is helped along by a redesigned math program that uses technology to focus attention on the skills students need for college-level courses and lets them move at their own pace instead of in lockstep with classmates. White also likes the idea that, while she is at the computer in the math lab, “all day long somebody is here if I need help.”

White said that, while she had passed the writing placement test in about 13 minutes, after almost an hour she failed the math test. But halfway through the spring semester, she had already finished elementary algebra and had decided to move on to intermediate algebra.

Cleveland State, which is about 30 miles from Chattanooga, enrolled 3,471 students (2,329 full-time equivalent) this spring. Seven hundred students must take developmental math each semester because of gaps in their background. But in the past only 54 percent of them moved on.

“We’ve got 20 years of data to show that the lecture method of teaching doesn’t work,” said Karen Wyrick, math department chair. “We had too many kids failing. We had too

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many kids dropping out before they got through. This approach is quicker and saves money.” It also helps students complete the courses at higher rates. For example, the completion rate (that is, achieving a C or better) for elementary algebra was 50 percent before the redesign, 68 percent afterward.

The intermediate algebra completion rate increased from 57 percent to 74 percent.

In addition, the overall college retention rate increased by seven percent in spring 2009. “That’s due to the math department,” Wyrick said.

Cleveland State’s redesign and several others in Tennessee occurred with the support of the National Center for Academic Transformation (NCAT), headed by Carol Twigg,

its president and CEO. Starting in fall 2007, the Tennessee Board of Regents (TBR) staff convened meetings to familiarize its schools with the NCAT approach to delivering instruction by taking advantage of technology and measuring student learning, all with the aim of serving more students better and at less cost. Supported by an \$8.8 million grant from the Pew Charitable Trusts, NCAT had previously awarded grants to 30 colleges and universities to reorganize large classes, such as the Psychology 201 course at Cal Poly Pomona.

Representatives from all the community colleges and universities—the University of Tennessee system does not come under the Tennessee Board of Regents—had to attend the first sessions. After that, participation was voluntary; 17 of the 19 TBR schools submitted 28 applications for redesigns. NCAT awarded six grants of \$40,000 each to Tennessee schools, using money from the Fund for Improvement of Postsecondary Education (FIPSE). Five were community colleges; the sixth was Austin Peay State University. Two redesigns covered remedial reading or writing courses, and four involved math.

NCAT reported that the redesigns at four of the schools improved course completion rates and school retention rates while reducing costs. Financial savings at the community colleges ranged from 19 percent to 51 percent.

Nationwide in this round of grants, NCAT has also worked with campuses in four other states: Arizona, Mississippi, New York and Maryland. Most of the schools involved are four-year institutions, but Niagara County Community College in Sanborn, New York, received a grant to redesign its introductory statistics course.

Much of the action concerning developmental education is occurring at the community college level, as states work to shift these courses out of four-year institutions. The Education Commission of the States (ECS), based in Denver, Colorado, which worked with Tennessee in preparing its FIPSE grant application, sponsors the “Getting Past Go” project through which it helps states develop policy and



Wade Payne, Black Star, for CrossTalk

Karen Wyrick, math department chairman at Cleveland State College in Tennessee, made the instructional videos that accompany the college’s redesigned developmental math courses.



"I've surprised myself by doing better than I thought I would," says Tiffany White, who took algebra at Cleveland State Community College in Tennessee 15 years after finishing high school.

model practices to improve developmental education, thus increasing college retention and graduation rates.

Among the states working in this area is California, which has a Basic Skills Initiative, begun in 2006 through the community college chancellor's office. It helps colleges to improve their developmental courses and faculty training to teach them. High schools are also getting more directly involved. In Florida, for example, the state is working with high schools to assess students' abilities and provide any remedial help needed before they get to college.

Bruce Vandal of the ECS says that across the country there is "greater recognition that there needs to be a more

customized approach in our delivery of developmental material." One size does not fit all. "What's exciting about Tennessee's work is that it is focused systemwide," Vandal said. "Tennessee is far and away ahead in that approach."

At Northeast State Community College, in Blountville near the Tri-Cities area of Tennessee, the redesign effort centered on the developmental reading course, considered the gatekeeper for other classes. "If you can't read for information, you don't do well in other classes," said Xiaoping Wang, dean of Northeast's behavioral and social sciences division and lead staff member on the redesign. "Once students fail this reading course, they disappear."

Work in the redesigned reading course is divided into 20 modules. All students take sections on note taking and highlighting as well as test taking. The next eight units are considered priority: vocabulary, reading for the main idea, supporting details, patterns of organization, purpose and tone, inference and critical thinking. There are ten extra units that can help students not only to read better but also to increase their grades if they complete them satisfactorily. These include active reading strategies, outlining and summarizing, and time management.

Northeast's program uses a lab and web-based learning materials. MyReadingLab, a product of Pearson

Education, Inc., gives students diagnostic tests, various reading assignments, tips on areas such as identifying slanted language or supportive details, and tests to determine whether the student is ready to move on. Readings include such topics as planning a trip to the Getty Center in Los Angeles, or the emergence of jazz; practice tests might involve readings about

a presidential advisor meeting the press, or about human cloning.

"We made quite a few changes as we went along," Wang said. "There has been a learning curve for the faculty." Wang explained that it was understood from the outset that the lab work must build into the course because "community college students aren't going to stay to use the lab" as some at four-year schools might do. The planners added a reading group meeting after the first semester of the pilot project because many students felt lost, with no connection with each other or the faculty. In that reading group, the instructor covers the concepts involved. Then students work independently.

In one of the labs, instructor Jimmy Henson was providing individual help, and checking students' course notebooks—another addition after the pilot project began. "We were struggling with the whole monitoring process," Henson said. "Students didn't know how to keep course materials organized." Henson added that faculty were "just relying on verbal assurances but often found the students hadn't really mastered the material." The notebooks include sheets recording whether students have worked on various concepts, and their scores on practice tests.

Almost ten percent of Northeast's 5,841 students (3,975 full-time equivalent) take this course, and they cannot advance unless they finish it. "Math is only a prerequisite for math and science courses, but reading is needed for virtually all college courses," Wang said. The student success rate for traditional reading courses at Northeast was 58 percent, while the success rate for redesigned courses averaged 60 percent over three semesters, and significantly more students had A's and B's in the redesigned course than in the traditional one. When the redesign was fully implemented, students averaged 86 percent on the final exam, compared with 81 percent in traditional classes.

The redesigned course also saved \$41,119, a 51 percent reduction, by enlarging class sizes and using fewer adjunct faculty. Using the lab approach allowed one faculty member to provide more attention to more students, Wang said. "Success is the main thing," she added. "If we save money but don't do well, then we don't do this. The savings are icing on the cake."

At Henson's Friday morning lab session, students of varied backgrounds were working on practice tests, moving at their own pace. Chelsea Anderson, who graduated from high school in 2007, is a first-year student who wants to become an x-ray technologist. "I goofed off" in high school, she admits, but says now she is learning how to apply herself. Bo Bellamy, 38, was laid off from construction work in December, so he enrolled at Northeast State to study electrical technology in order to get the certificate he needs for better jobs. "It's a whole different world now," he said.

C.H. Charlton, the other full-time developmental reading instructor, was in favor of the redesign from the beginning. He had been concerned that when students were at different places in their learning in traditional classes, some were slowed down.

However, Henson was skeptical at first. "I didn't think technology could be as effective as me, with a degree in teaching reading," he said. He became a convert once he had hands-on experience with the program. "I said, 'Wow, this is

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great.” He saw students grasping material where previously he would not have known whether they got it or not. “They may do well on a quiz or on a test, but I don’t know whether they really have mastered it,” Henson explained. “Once I see them interacting with the modules, I see whether they are comfortable with the material. I saw their ‘aha’ moment more often than I saw it in the traditional setting.”

Likewise, Karen Wyrick said that she “just wanted to lecture. I thought that if I was not standing up there in front of them, teaching them, they weren’t going to get it.” So John Squires, the department chair at the time and lead person on the Cleveland State math redesign, asked her if she wanted to make the videos that accompany the course. Students can watch those CDs and use the modularized material on computers. Last year, Wyrick said, one of her colleagues had a student who completed elementary algebra, intermediate algebra, college algebra and statistics in one year. “That student would have been bored out of his brain if he’d had to sit there in a lecture class.”

After revising its three developmental courses, Cleveland State’s math faculty found that the number of students in college-level classes increased. “Prior to redesign, we had about 400 students per semester in college-level math courses,” Wyrick said. “We now have 500 to 600 in these courses per semester.” As a result, the faculty redesigned eight college-level courses. “We had seven full-time faculty, and otherwise it would have been hard to field the load.”

Betty Frost, associate professor of math at Jackson State Community College in west Tennessee, was initially a naysayer as well. Now she has been named as one of six NCAT scholars who will help teams from 50 schools prepare redesigns under the organization’s new program called “Changing the Equation.” Some of those schools will receive \$40,000 grants for math redesigns, with funds from the Bill & Melinda Gates Foundation.

“This is my 35th year of teaching at Jackson State,” Frost said. “I’m kind of old-school. I thought the students needed some classroom instruction. Some others were that way, too,

but I was probably the worst one.” The faculty decided to have focus groups where they could go over some of the material, then students could talk about it and ask questions. One day Frost took her students across the hall from the lab to a classroom and was talking about something—equations perhaps—and asked if there were any questions. “A young man put up his hand and asked, ‘Can we go back across the hall?’ And I’ve never had a focus group since.”

The Jackson State program is called SMART Math, an acronym for Survive, Master, Achieve, Review and Transfer. When the college began its redesign, Frost said, they surveyed the math faculty to see what competencies, or skills, were involved in their courses. That helped them decide how many modules to include in the redesigned course. Then they took the list of the competencies to be developed to all the departments and asked them which of those skills students absolutely needed to complete their classes.

“Previously, students whose goals were to be a registered nurse, an elementary school teacher or a rocket scientist had to pass, or test out of, the same developmental math courses before enrolling in the courses and programs they came to college to take in the first place,” according to the college’s description of its math program. “Traditionally, developmental math courses required students to learn competencies not necessary to be successful in their chosen career.” That is no longer the case at Jackson State.

Overall, redesign students increased their average post-test scores in all courses by 15 points, according to the math department. The percentage of students passing developmental math courses has increased by 45 percent. The SMART Math program reduced the cost per student by 20 percent, by increasing the maximum class size from 24 to 30, providing the chance for students to complete the developmental work more quickly, reducing the number of sections taught by full-time faculty from 78 percent to 58 percent, and by using tutors at lower cost per hour than faculty.

The Community College Futures Assembly, based at the University of Florida, gave its Bellwether Award to both the Cleveland State and Jackson State redesigned math programs,



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Wade Payne, Black Star, for CrossTalk



“Reading is needed for virtually all college courses,” says Xiaoping Wang, who was the lead staff member on the redesign of Northeast State Community College’s developmental reading course.

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the former in 2009 and the latter this year. These awards “recognize outstanding and innovative programs and practices that are successfully leading community colleges into the future.”

Two of the Tennessee programs—a reading and writing redesign at Columbia State Community College in the center of the state, and a math redesign at Chattanooga State Community College—were considered less successful. Nonetheless, said Treva Berryman, TBR’s associate vice chancellor for academic affairs, “what we learned from them may have made a huge difference systemwide. It’s not that they failed if they saved other campuses from similar problems. A pilot’s a pilot. Give it a try.”

Communication is often a problem in redesigning courses. If a leader in a pilot program thinks it isn’t going to work, “you can forget about the rest of the people,” Berryman said. “You have to be willing to fail. And presidents have to give support so that people aren’t

punished if they do fail.”

NCAT’s Carol Twigg has her own assessment. The Columbia State redesign failed to incorporate a lab where students could work, she said, and did not offer them enough support in the technology they did have, which can be a big problem in a rural area. As for the math redesign at Chattanooga State, “the math faculty didn’t want to do it,” Twigg said bluntly. But the academic vice president did, she added, and has hired John Squires, who led Cleveland State’s redesign, to chair the Chattanooga State math department. He and the math faculty there are now creating mini-lectures

students can attend, bridging the gap until they can prepare CDs with the course material similar to the ones Wyrick and others made at Cleveland State.

“You can’t just stick a student at a computer,” Squires said. Chattanooga’s earlier attempt “just didn’t work,” he added, pointing out that Cleveland State “had a semester of planning and a semester to create the program. Chattanooga is in the midst of it. We’re having to push the reset button and build it as we go. We have ten faculty working on course materials, and ten doing the mini-lectures. They will be developing the videos over the summer.



Harrison McClary, Black Star, for CrossTalk

“Redesign may appear piecemeal because we’re not finished. It will be systemwide,” says Paula Short, vice chancellor for academic affairs for the Tennessee Board of Regents.

We have much more flexibility at Chattanooga.” Demand at Chattanooga State is greater as well. Of 9,427 students (5,988 full-time equivalent) last fall, about 2,000 had to take developmental math.

The Tennessee Board of Regents is expanding its redesigns for developmental courses, and by 2013 all its community colleges must have in place programs that have technology as an integral part and must focus on helping students master the subjects at their own pace. Developmental work was already a major focus in TBR’s strategic plan for 2005–2010 after the state legislature told the system it needed to do more with less, said Paula Short, vice chancellor for academic affairs.

Tennessee worked with NCAT because it had “a proven record in creating change,” Short said. NCAT provided training for applicants and helped follow the pilot programs to see what worked and what didn’t. “We saw this as systemwide. We offered training to everyone. We wanted them all to have the benefit of that training,” she added. “Redesign may appear piecemeal because we’re not finished. It will be systemwide.”

As the colleges prepare their redesigns, Berryman said, “we’re asking them to start with a blank slate. Take what you know about how students have changed, how careers have changed, how technology has changed. If developmental studies didn’t exist, what would you need to carry our students over the next 25 years?”

“We are not trying to fix what was broken in the past,” Berryman added. “We are trying to teach whatever competencies they need for careers they are going to choose. That really is a different philosophy.”

Betty Frost knows that from her own experience. She recalls a student years ago who wanted to enter the nursing program but was struggling with intermediate algebra. “She just never got it, and she disappeared. Today we see she didn’t need intermediate algebra for nursing.” ♦

Kay Mills is the author of “This Little Light of Mine: The Life of Fannie Lou Hamer” and four other books.

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