16 Proven Ways to Help Your Course Redesign Succeed

Best practices from developmental math redesigns using MyMathLab in a lab-based setting at community colleges

"Learning support redesign does not replace instruction. It's a paradigm shift that moves the focus from instructor-centered to student-centered. Student needs drive the instruction, regardless of the delivery model."

—Maria Johnson
Georgia Piedmont Technical College Faculty and Pearson Learning Support Redesign Specialist

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INTRODUCTION

What is course redesign?

Course redesign is a data-driven innovation intended to increase quality and improve efficiency in large-enrollment introductory courses. When combined with high-quality teaching and learning courseware like MyMathLab and other MyLab products, institutions that redesign their courses achieve more-effective use of instructor time, increase student time on task and engagement in course material, and reduce institutional—and, frequently, student—costs.

Why redesign?

In 2007, the typical community college had a 38% success rate in Introductory Algebra. (Other developmental math courses didn't do much better.) Statistics showed that within three years of first taking the course, only 28% of students went on to a college-level math course. Of those 28%, only 20% passed the course on the first try. Faculty, administration, and even students agree: those numbers are not acceptable.

The National Center for Academic Transformation (NCAT), a pioneer in driving positive change in higher education, is helping do something about it.

NCAT is an independent, nonprofit organization whose research-based methodology has produced remarkable results in learning gains, retention, and cost savings since 1999. To support its mission, NCAT established the Changing the Equation (CTE) program and conducted it from September 2009 to September 2012. Supported by the Bill & Melinda Gates Foundation, the program was designed specifically to engage U.S. community colleges in successful redesigns of their remedial and developmental math sequences. Each college participant redesigned its developmental math sequence by using NCAT's Emporium Model plus either MyMathLab or another commercially available instructional software. This report deals solely with the institutions that were successful and that used Pearson's MyMathLab or MyLabPlus.

The results achieved by the colleges that used MyMathLab or MyLabPlus are particularly worthy of note, especially considering CTE's accelerated time frame. But are we surprised? Not at all. CTE program requirements, including the following, mirrored many of the best practices listed herein:

- Required lab attendance
- Participation points awarded to students
- Deadlines and clear expectations
- Monitoring of student progress
- Intervention for students who lagged behind or underperformed

Since Pearson began collecting data on higher education redesigns, we've noticed that specific redesign characteristics and proven best practices result in repeatable, above-average learning gains as well as gains that continue to improve over time and throughout the course sequence.

Continued on next page

YOU CAN SUCCEED!

Three simple guidelines form the cornerstone of your redesign's success:

1. First, pilot a few sections.
2. Then implement more broadly.
3. Always perform the above two items with coaches at your side.

The most successful schools in the CTE program took advantage of mentoring opportunities such as those available to Pearson customers via the Pearson Faculty Advisor Network.

http://community.pearson.com/fan/

Pearson has been an active member of NCAT's Corporate Associates Program since the fall of 2004. Pearson offers a number of course redesign workshops led by both NCAT staff and NCAT Redesign Scholars. And Pearson recommends and supports the free dissemination of NCAT's research, tools, and downloadable resources that highlight the principles of course redesign and improved student outcomes.

http://www.pearsoncourseredesign.com

This report is for you, whether you are a teaching-faculty member, an administrator supportive of redesign, a lab director, or other redesign stakeholder. It is both a basic introduction to course redesign and an accessible reference to some of the field's most proven-effective—and easy-to-implement—best practices.

Applying NCAT's CTE program as a framework, we organized the report into 16 core best practices divided among three main redesign phases (page 3). You'll find examples of each of the best practices in gray boxes, and there are important tips, lessons, and Web pointers in orange text in the margins throughout. We hope you'll find the report useful as you embark on your redesign journey. Please contact us at pearsoncourseredesign@pearson.com with any questions.

Much of the information was drawn directly from each school's experience as posted online in CTE program case studies and from the full report on the project: "Improving Learning and Reducing Costs: Project Outcomes from Changing the Equation." For more case studies using MyMathLab products, visit http://www.mymathlab.com/case-studies-all.

Find Changing the Equation case studies—including learning outcome, course completion, and cost reduction data for each successfully completed redesign—at http://www.thencat.org/Mathematics/CTE/CTEInstitutions (rev).html.

Find the NCAT's full report on the project, "Improving Learning and Reducing Costs: Project Outcomes from Changing the Equation," at http://www.theNCAT.org/Mathematics/CTE/CTE_Lessons.html.

BEST PRACTICES

After cross-referencing the successful aspects of the Changing the Equation redesigns that used MyMathLab or MyLabPlus, we divided 16 core best practices among the following three redesign phases: (1) Needs Analysis, (2) Planning, and (3) Implementation. Each best practice was used by the majority of schools and was a significant contributor to the successful implementation and sustainability of the schools' redesigns.

1 Needs Analysis Phase • Identifying the problems you want to solve

1 Know why you and your department want to undertake a redesign.

Most schools want to see the following improvements:

- Accelerated student completion of the developmental sequence
- Creation of online or blended course options
- Increased student success rates
- Enhanced ability to serve more students with fewer resources
- Reduction in cost-per-student expenses

Heartland Community College

Benchmarking showed that HCC ranked very low in developmental math completion and retention rates: in the 42nd percentile for retention and 32nd percentile for completion. The purpose of HCC's redesign was to help the college break this cycle of failure. The college's goal was to offer developmental mathematics courses in a format conducive to improving student success and persistence on to college-level courses.

http://www.thencat.org/Mathematics/CTE/Abstracts/HCC_Abstract.html

2 Gauge your course readiness.

Assess your readiness for course redesign by your answers to the following questions as outlined on the NCAT Web site:

- Will changes in the course have a high impact on the curriculum?
- Are decisions about curriculum in the department, program, or school made collectively—in other words, beyond the individual faculty member level?
- Do the faculty members have an understanding of and some experience with integrating elements of computer-based instruction into existing courses?
- Have the course's expected learning outcomes and a system for measuring their achievement been identified?
- Have institutional leaders demonstrated commitment to use technology to achieve strategic academic goals—a commitment that moves beyond using technology and intends to provide general support for all faculty and for all courses?
- Is the campus committed to a partnership between faculty, information technology (IT) staff, and administrators in both the planning and the execution of the redesign?

TIP FROM THE FIELD

If I'm a department chair, how can I get others excited about redesign?

- Ensure that your decisions are data driven. If you don't have data, ask faculty if current outcomes are acceptable.
- Identify one or two receptive faculty members and then have them become the champions with other faculty members and spread the word.
- Recruit a respected, prestigious faculty member to start a dialogue in the community and encourage dissenting views.
- Convey to faculty that although the current design is broken, it is not their fault.

Choose your team wisely! Include people who are well respected and who will support you.

2 Planning Phase • Creating a blueprint for your redesign

To a school, each of the CTE institutions formulated a plan by means of a committee of interested faculty members. Many schools began the process by examining redesign models and programs in place at other institutions. They then analyzed their own students, needs, and resources.

Make your course redesign decisions with great care and consideration—and after consulting with others on such topics as modularizing content, student pacing, how to give course credit for shell courses, Making Progress (MP) or In Progress (IP) grades, and working with your bursar and registrar offices.

http://www.pearsonhighered.com/courseredesign/gettingstarted.html

3 Build a strong team.

Be sure your team includes a person from your institution's finance office, an educator, an administrator, and a person from the technical or IT group on campus. Then broaden your thinking to also include certain other key stakeholders on campus like the registrar or bookstore manager. With those administrators on your side, your way will be smoother and your implementation—and your students—will more likely succeed. Once the team is in place, support from the top and teamwork within the department become integral.

An assessment of lessons learned by successful CTE institutions starts with the importance of both institutional commitment and strong leadership. In the project's full report, NCAT president and CEO Carol Twigg says, "Participants frequently cited leadership and administrative support as factors in sustaining and expanding interest in redesign. In some cases, redesign is being encouraged by system-level leadership; another project noted support by trustees as a factor. Some redesigns were managed collegially, others depended upon a core group of tenacious faculty, and still others were implemented in a top-down fashion by administration. Important functions of top leadership were willingness to stand up publicly to talk about the project and its benefits and backup of the project team—when it ran into trouble—by providing resources or fixing administrative problems."

Somerset Community College: What Worked Best

- *Administration support to provide additional resources beyond the NCAT award*
- *IT support to keep our equipment and software working for our students; we have administrative permission in our labs to restrict Web sites*

4 Choose a redesign model and method of content delivery that best fits your goals. Will your course content be divided into modules? If so, how many? Big or small? What about shell courses? Across all of NCAT's redesign programs, one thing has remained constant: schools that achieved success had established clear goals at the onset and then specifically designed their implementations to reach them. The Emporium Model offers the most flexibility for student learning because it individualizes the learning process. Even though every CTE school applied the Emporium Model, you may find that a different model works best for you. The NCAT Web site offers a list of possible models at http://www.thencat.org/PlanRes/R2R_ModCrsRed.htm.

Laramie County Community College

The traditional three-course developmental math sequence was reorganized into 17 modules, which in turn were split among three modular courses. The goal was to allow students to move rapidly and successfully through the math courses required for their specific discipline. The college offered students the opportunity to proceed at their own pace and to test out of modules they already had mastered. This eliminated duplication of topics from one course to the next, and allowed students to progress to the next course in the sequence upon completion of the previous course at any time during the semester.

http://www.thencat.org/Mathematics/CTE/Abstracts/LCCC_Abstract.html

Of 50 courses that awarded an MP grade,

74% had higher completion rates.

That result is extremely encouraging, especially when taking into account the differences between grading policies in the traditional and the redesigned formats of the courses.

—From "Improving Learning and Reducing Costs: Project Outcomes from Changing the Equation"

Northern Virginia Community College

Concurrent to NOVA's redesign, the Virginia Community College System redesigned developmental mathematics at all of its 23 member colleges. The content of the three prior developmental math courses was allocated into ten modules. Colleges were given the option of offering each unit as a stand-alone one-credit course with a recommended duration of four weeks, or offering the units using a shell course model to simplify course registration. In the shell course model, students registered for a four-credit course if they needed to complete at least four units to qualify for their desired credit-level math course. Students who needed to complete just one, two, or three units to reach their exit point registered for a one, two, or three credit shell course. The one-credit courses were scheduled for a four-week session; the two-credit courses for an eight-week session; and the three-credit courses for a 12-week session.

http://www.thencat.org/Mathematics/CTE/Abstracts/NVCC_Abstract.html

STUDENT SAVINGS

Although the NCAT's primary cost savings goal is to reduce institutional costs, successful CTE redesigns produced substantial time and money savings for students as well.

- Saving tuition dollars. Modularization of the developmental math course sequence let students move from one course to the next within the same semester.
- Accommodating life events. Students in developmental math—and in community colleges in general—frequently juggle multiple responsibilities, including jobs and families. Modularization offered them the flexibility to address both their academic and their life goals.

85% Percentage of successful CTE schools that used MyMathLab*

Questions to answer before choosing a software product or text:

- Will it be used in face-to-face classes? in blended (hybrid) classes? in a lab setting? or in classes that are completely online?
- Does it assess student learning based on performance of assigned objectives?
- Does it assist students in remediation of areas in which an objective is not met?
- Does the software provider offer technical support for instructors, students, and campus IT administrators? Is there *dedicated* technical support for each of those user groups?
- For the supervision of sections taught by part-time or adjunct instructors, will the software ensure consistency of instruction?

http://www.pearsonhighered.com/courseredesign/get-started/choose-a-product/index.html

*Seventeen of the 20 schools that successfully finished the CTE redesign project used MyMathLab or MyLabPlus.

Creating modules of individual learning concepts offers struggling students a less intimidating way to establish track records of success and reinforces the connection between time on task and achievement. Simultaneously, those students who can will progress faster through the course material. Students have due dates, but they needn't start the course over if they aren't able to complete all of the content by the end of the semester. They pick up in the next semester just where they left off—without incurring any financial, time, or learning penalties. That best practice is often paired with mastery learning. (See page 14, Require mastery learning.)

The CTE institutions that used modules were in coordination with their registrars to implement Making Progress grades. Note that on an individual-semester basis, the pass rates in a modularized course using MP grades can appear low. But when MP grades are accounted for, what look like unsatisfactory pass rates at the onset can be seen for the long-term *increases* in student learning they really are. (See page 18, Redesign Data.)

Some schools included one or more shell courses. Shell courses have no topics and no credits associated with them. They are devices that enable students to enroll from one term to another without paying twice for continuing the same course in a course sequence.

5 Select software and text that will help you achieve your redesign goals.

Faculty from both the CTE and NCAT's previous redesign programs say that at the heart of their successful course redesigns are high-quality, interactive learning materials. Such materials help promote greater student engagement with course content, with each other, and with the instructor, thereby helping improve student learning.

6 Build an assessment plan.

This means both enforcing common assessments and deciding who will be responsible for tracking of data, measurement, and documentation of observations regarding learning gains. The majority of CTE institutions first had baseline data for the courses in their traditional formats, which was compared with student learning outcomes after redesign.

One of the benefits of the Emporium Model is its emphasis on course consistency. CTE students were assessed on common outcomes by using common assessment methods. Those in traditional courses may be assessed in any number of ways—even within the

Volunteer State Community College

VSCC faculty and IT together have determined how to extract grades from MLP/MML, format, and input into BANNER so TBR's (Tennessee Board of Regents) Learning Support competencies can be marked on the appropriate student BANNER record. This collaboration makes VSCC less dependent on an outside vender for BANNER interface.

http://www.thencat.org/Mathematics/CTE/Abstracts/VSCC_Abstract.html

Cochise College

The redesign team included members with substantial expertise in developmental mathematics, and they were given the authority to closely examine outcomes. The department as a whole had been involved in assessing developmental math outcomes for over 10 years. A significant element of that assessment was the exit exam; Cochise had four semesters of data on this exam, which allowed the department to perform both parallel and baseline comparisons against the redesigned courses. All students (those taking traditional or redesigned courses) were tested in comparable settings.

http://www.thencat.org/Mathematics/CTE/Abstracts/CC_Abstract.html

same department—which leads to potential content and grading differences, grade inflation, and overall lack of data integrity.

Twigg took her analyses of the CTE redesigns and the program as a whole even further by identifying exactly which outcomes data best defines success. "NCAT has learned that one cannot evaluate the success of Changing the Equation by simply comparing individual course completion rates," she says in the CTE program's final report. "Completion of the developmental math sequence and success in subsequent college-level math courses are the two most important data points to use to compare student success rates between the traditional and redesigned formats."

BUILDING SUCCESS

COMMON ASSESSMENTS

Data culled from NCAT's full report on the CTE project indicates that the enforcement of common assessments results in substantial increases in learning outcomes.

At Pearl River Community College, a comparison of common final exam scores between the traditional developmental math courses and the redesigned courses indicated that mean final exam scores **increased** in all three of the redesigned courses by:

+87% in Fundamentals of Math

+45% in Beginning Algebra

+20% in Intermediate Algebra

At Robeson Community College, mean scores on common final exams **increased** by:

+23% in Essential Mathematics

+14% in Introductory Algebra

At Somerset Community College, mean scores on common final exams **increased** by:

+16% in Prealgebra

+14% in Basic Algebra with Measurement

Northern Virginia Community College compared performance on 30 exam questions given to both groups of students. Means **increased** by:

+27% in Arithmetic

+40% in Algebra I

+53% in Algebra II

At Northwest-Shoals Community College, means on correctly answered common exam items **increased** by:

+12% in Basic Mathematics

+13% in Elementary Algebra

+23% in Intermediate Algebra

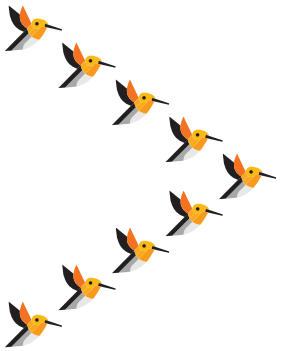
At Oakton Community College, means on correctly answered common exam items **increased** by:

+57% in Prealgebra

+62% in Elementary Algebra

+37% in Elementary Plane Geometry

+94% in Intermediate Algebra



"A collective commitment is a key factor in the success and the sustainability of redesign projects."

—Carol Twigg
National Center for Academic Transformation

7 Get everyone—and keep everyone—on the same page.

Collaboration

Many departments find that the most difficult thing about redesign is having to work in a group. The fact is that if every faculty member is not handing in grades and actively participating, the integrity of the pilot will be compromised.

CTE institutions were no exception. According to the final report, the majority of schools reported that in order to move forward, "faculty had to adjust to the concept that they could not make a decision based on their individual interpretations; rather all had to follow the same rules and guidelines."

Many schools found that required weekly staff meetings represented a big step toward retaining team harmony and ensuring that all faculty and staff were implementing redesign decisions consistently.

Consensus

About two-thirds of participants reported challenges in the area of achieving departmental faculty consensus about the redesign. Some of the schools reported the importance of strong leadership and administrative support to keep departments and redesign teams united.

Pearson faculty advisors recommend these additional strategies:

- *Recruit a mentor.* Consultations with administrators and the gathering of successful data from other schools can help a lot. Stay focused on the problem that prompted your redesign, and either suggest visiting a nearby institution that combated the same problem with a successful redesign or contact others on your own campus who have done redesigns in their own departments.

Bowling Green Technical College

BGTC is fortunate to have 100 percent commitment to the redesign from all math faculty and administrators. The math department will continue to improve the redesign each semester and anticipates seeing higher gains in learning outcomes, completion and retention.

http://www.thencat.org/Mathematics/CTE/Abstracts/BGTC_Abstract.html

- *Start small, with a trial or minipilot.* Many schools use summer sessions to explore redesign concepts. Share your data and progress in terms of redesign benchmarks.
- *Be supportive and communicative.* Be your redesign's cheerleader and actively work to develop a sense of team enthusiasm around the initiative.

"No matter how much success you're having, you can't continue working together if you can't communicate."

—Matt Cameron
Drummer, Pearl Jam/Soundgarden

Communication

Outside your department. A number of CTE participants reported challenges associated with preparing others on campus for the redesigned format. Their experiences point toward actively marketing the redesign to key campus constituencies. For instance, students are influenced by a wide range of personnel, so think about

spending time preparing the entire college community for the changes. Campuswide support will encourage students to accept change.

Inside your department. Data that supports the redesign will help when you're trying to encourage resistant faculty to make the leap. Get the majority of the faculty engaged, and the rest will eventually follow.

- *Show chairpeople, administrators, and faculty all of the data that supports the redesign, and include the school's current failure and dropout rates.* Discuss the long-term effects of the present situation as a way to get all to agree that something needs to change, and then brainstorm what you can do to fix it.
- *Let departmental faculty know that other schools have similar problems.* Consider conducting a forum to explore the models other schools have used and the kinds of successes that resulted.

The NCAT Redesign Alliance has a group of people who help schools tailor and implement redesign programs. Learn more at http://www.thencat.org/RedesignAlliance/Membership.htm.

Northwest-Shoals Community College

NWSCC has greatly appreciated the input and support from the College's NCAT Scholar, John Squires. He served as a mentor, solutions expert, and friend. The NCAT workshops allowed the College to interact with other institutions that faced the same challenges. This gave a sense of community among the colleges so that no one felt the sting of isolation throughout the process.

http://www.thencat.org/Mathematics/CTE/Abstracts/NWSCC_Abstract.html

8 Train faculty, adjuncts, tutors—and keep training them.

Consistency is vital to the integrity and sustainability of a redesign. Pearson provides product and implementation training to ensure all faculty are in harmony regarding goals, execution, and working in a group.

Most redesign teams experience bumps along the road. For many, working in a group is challenging. Be patient and help faculty adjust to the idea that they are not allowed to make decisions unilaterally; rather, everyone must follow the same rules and guidelines.

Once the redesign is up and running, weekly meetings and the mentoring of part-time faculty, adjuncts, and tutors by full-time faculty can help keep faculty connected and on board.

Volunteer State Community College

VSCC has moved from a culture of traditional face-to-face lecture to a culture of student-centered, faculty-supported, technologically-based learning. The departmental professional development calendar includes specific ongoing training for emporium faculty and staff.

http://www.thencat.org/Mathematics/CTE/Abstracts/VSCC_Abstract.html

TIP FROM THE FIELD

What if my department doesn't own—or is unable to reconfigure—space for a redesigned course?

- Look at online models rather than reconfigured classrooms if you have facilities issues.
- Be prepared to make judgment calls about how to best serve students versus being true to the redesign model. Sometimes there are exceptions.
- One college had students purchase laptops as part of a course fee. When all students have laptops, any classroom can be a lab.

ONE-ROOM-SCHOOLHOUSE APPROACH

Robeson Community College used the one-room-schoolhouse approach to deal with low-enrollment sections, which produced both institutional cost savings and clear benefits to students.

Previously, when small sections did not fill up (particularly at smaller campuses and sites or during certain class times), the sections either had to be canceled (interrupting student progression through the sequence and incurring lost revenue to the college) or had to be offered at relatively high costs. The one-room schoolhouse meant that the college offered multiple developmental math courses in the same computer classroom or lab at the same time.

Students worked with instructional software, and instructors provided help when needed. Even though different students were at different points in the developmental sequence, all of them could still be in the same classroom. This strategy enabled the institution to increase its course offerings and avoid canceling classes, which in turn reduced schedule problems for students and enabled them to complete their degree requirements sooner.

http://www.thencat.org/Mathematics/CTE/Abstracts/RCC_Abstract.html

3 Implementation Phase • Launching your redesign pilot

Redesign isn't a magic bullet. There may be struggle, and sometimes turnaround is not immediate. (See page 15, Grade Inflation.) But by adopting the best practices described here, your institution will see results—results that continue through the course sequence and that are sustainable over time.

9 Conduct a pilot implementation before embarking on a full-scale rollout.

Without exception, every successful project had conducted a redesign pilot in a small number of course sections before conducting a full-scale implementation of its course redesign. After one or two semesters, initial problems got worked out, and the institution was able to smoothly scale its redesign to all course sections.

Robeson Community College

During the pilot phase, parallel sections were used to assess student learning. Data obtained from the pilot phase compared student success rates and retention rates between the traditional and the redesigned model. Indirect measures of student success were obtained through student surveys.

http://www.thencat.org/Mathematics/CTE/Abstracts/RCC_Abstract.html

10 Position your students for success.

When it comes to positioning students for success, no one has more experience than Pearson Faculty Advisors. At the latest Pearson Course Redesign Workshop, they talked about their own experiences and those of faculty at schools they've helped. Two methods rang out loud and clear:

- *The first-day-of-class orientation*—including getting-started materials, presentations, customized handouts, and email templates—helps students understand the value of course materials and the connection between learning the course objectives and successful completion of the course.

  http://www.firstdayofclass.com

Northwest-Shoals Community College

[T]he first-day orientation class served as one of the most important days for student understanding of the program.

http://www.thencat.org/Mathematics/CTE/Abstracts/NWSCC_Abstract.html

- *Structure and lots of it.* The more structure you provide, the more success students will have. This includes the presentation of clear expectations and the setting of firm and consistent deadlines.

> **"Students don't do optional."**
>
> *—Carol Twigg*
> *National Center for Academic Transformation*

11 Require attendance.

What most faculty have already observed, the CTE project confirmed: required attendance is critical to the success of both your redesign and your students.

Twigg underscores the point in the project's full report. "It was absolutely necessary to have an incentive for attending class and/or a penalty for not attending. Math faculty and tutorial staff quickly realized that students don't do optional."

Oakton Community College

Required attendance in class provides a common grade component throughout the department and helps students identify milestones in course progress that indicate success.

http://www.thencat.org/Mathematics/CTE/Abstracts/OCC_Abstract.html

Mountwest Community & Technical College

Students met in a computer lab three hours a week with their instructor and one hour a week in small groups. Attendance was mandatory and accounted for 10 percent of their grade.

http://www.thencat.org/Mathematics/CTE/Abstracts/MCTC_Abstract.html

12 Connect and engage with students.

Faculty involved in a CTE program and other redesign initiatives are unanimous about the importance of individually connecting with students both in class and outside class. In class, faculty recommend not waiting for students to ask questions. Rather, they suggest circulating in the classroom or lab space and employing a system of signals via plastic cups to avoid student embarrassment. Outside class, some faculty send weekly emails containing kudos for those doing well and offering support and intervention to those who are having trouble or not completing their work.

Lurleen B. Wallace Community College

Instructors did not lecture during the scheduled lab time but rather offered individualized help and reviewed student progress. MyMathLab software provided interactive tutorials and monitoring of student performance. Students received immediate one-on-one assistance from instructors and tutors.

http://www.thencat.org/Mathematics/CTE/Abstracts/LBWCC_Abstract.html

TIP FROM THE FIELD

There are lots of ways to establish student engagement. Here are some suggestions from Pearson's Faculty Advisors.

- Offer points for everything! They won't do the work if it doesn't count!
- Offer self-acceleration options.
- Have students respond to one another by offering them points for responding and sharing ideas.
- Get information to students as early as possible.
- Remind students that *they* are the ones accountable for their grades. Add the following to your signature line: "Remember: YOU determine your grade."

SEVEN PRINCIPLES FOR GOOD PRACTICE IN UNDERGRADUATE EDUCATION

Following are the Seven Principles for Good Practice in Undergraduate Education as compiled in a study supported by the American Association of Higher Education, the Education Commission of the States, and the Johnson Foundation. They are timeless, seminal, and as relevant today as they were in 1991—before online courseware and the ubiquity of the Internet appeared in the higher education landscape.

Good practice in undergraduate education:

1. Encourages student–faculty contact
2. Encourages cooperation among students
3. Encourages active learning
4. Gives prompt feedback
5. Emphasizes time on task
6. Communicates high expectations
7. Respects diverse talents and ways of learning

Arthur W. Chickering and Zelda F. Gamson. Applying the Seven Principles for Good Practice in Undergraduate Education. New Directions for Teaching and Learning *no. 47, Fall 1991. San Francisco: Jossey-Bass.*

13 Employ personalized learning.

As instructors seek new solutions to lack of college preparedness, it has become clear that the most successful solutions include personalization and immediate feedback that engage students in active learning and that enhance and inform assessment.

At the core of such personalization strategies is adaptive learning technology—instructional software that contains individualized learning plans and enables work to be completed at the student's pace. (See page 6, Select software and text that will help you achieve your redesign goals.)

Students who used MyMathLab (1) completed assessments at their own speed and—via diagnostics performed along the way—(2) followed a personalized learning path that targeted the exact skills they needed to work on and that delivered the right material (e.g., hints on how to solve problems, videos, animations, worked problems similar to the one missed, and links to the e-text) they needed to master those skills. Students became engaged, and instructors could tell immediately which students were struggling with exactly which concepts.

Personalized learning is frequently applied with other best practices. Many of the CTE schools found it was a natural fit with modularization (see page 5, Choose a redesign model and method of content delivery that best fits your goals), mastery learning (see page 14, Require mastery learning), and frequent assessments (see page 13, Conduct frequent assessments). This kind of intelligent integration of practices can quickly make your good redesign even better.

Nashville State Community College

Math faculty modeled the NSCC redesign on SMART Math at Jackson State Community College. Developmental math content was adjusted to include only those skills needed for success in college math or in a particular career rather than to remediate what was not learned in high school. ... Integrating these changes with NCAT course redesign principles created a modularized, technology-driven course that allowed students to focus on concepts relevant to their career goals, to have access to one-on-one assistance when needed, and to potentially complete their math requirements in one semester.

http://www.thencat.org/Mathematics/CTE/Abstracts/NSCC_Abstract.html

Guilford Technical Community College

The guided module design allowed students to be more active and engaged learners, receive immediate feedback about their work, focus on what they did not know and move quickly through what they did know. A combination of guided content learning, acceleration and remediation as needed meant that more students could successfully complete the course and that the cumulative learning effect from module to module would be greater because the mastery approach was reinforced with regular testing.

http://www.thencat.org/Mathematics/CTE/Abstracts/GTCC_Abstract.html

14 Conduct frequent assessments.

Instructors have long recognized the necessity of assessment as both a measurement of how well students are learning and a tool for critical feedback.

- **"Assessment and feedback are crucial for helping people learn.** Assessment should mirror good instruction; happen continuously as part of instruction; and provide information about the levels of understanding that students are reaching. In order for learners to gain insight into their learning and their understanding, frequent feedback is critical: students need to monitor their learning and actively evaluate their strategies and their current levels of understanding." (*How People Learn;* Bransford, Brown, and Cocking, 1999)
- **"Individuals acquire a skill much more rapidly if they receive feedback about the correctness of what they have done.** One of the most important roles for assessment is the provision of timely and informative feedback to students during instruction and learning so that their practice of a skill and its subsequent acquisition will be effective and efficient." (*Knowing What Students Know: The Science and Design of Educational Assessment;* Pellegrino, Chudowsky, and Glaser, 2001)

Course redesign exponentially increases the power of assessment by increasing the *number* of assessments, thereby offering students a firsthand account of what they know and what they do not know and by providing instructors more opportunities to intervene before a student falls too far behind. When frequent assessments combine with the best practices of personalized and mastering learning, a course redesign's capacity to result in (1) student comprehension of course material and (2) student learning gains throughout the course sequence is nothing short of catapulted—and there are no limits.

Lurleen B. Wallace Community College

The students became more active in the learning process by engaging in frequent practice of quizzes and tutorials and receiving immediate feedback. Students were encouraged since they received help when it was needed and progressed with more confidence through the modules. The amount of one-on-one time that instructors spent with students answering questions also increased.

http://www.thencat.org/Mathematics/CTE/Abstracts/LBW-CC_Abstract.html

Pearl River Community College

The redesigned courses 1) had more assignments, more quizzes and more tests than the traditional courses and consequently took longer to finish, 2) included more content than the traditional courses and consequently took longer to finish, and 3) required an 80% mastery level that essentially raised the cut score for a student to earn a C in the redesigned courses. Overall, the course content for all of the courses was more rigorous for the redesign students than for the traditional courses to better prepare the students for the college-level math courses. The math department chair and several instructors have noticed that students who have completed the redesigned developmental math sequence are better prepared and their knowledge base is more consistent.

http://www.thencat.org/Mathematics/CTE/Abstracts/PRCC_Abstract.html

CLOSING THE GAP

According to a 2013 presentation by Pearson Faculty Advisor and NCAT Redesign Scholar John Squires, three key elements close the educational gap for traditionally low-achieving students:

- Engagement in course material
- Early intervention
- Mastery learning

IT WORKS!

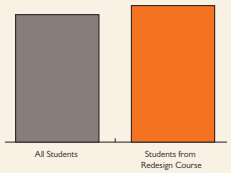
Cleveland State Community College Redesign: Tennessee Board of Regents and University of Florida studies found that gender and race were no longer factors in predicting course success—because achievement gaps had been closed.

Chattanooga State Community College Redesign: Low-income students were tracked and compared with all students in terms of course success, accelerated learning, and fall-to-spring retention. No gaps were found: low-income students performed as well as other students across the board and in all areas.

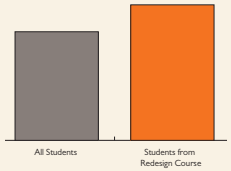
BUILDING SUCCESS

SUBSEQUENT SUCCESS RATES

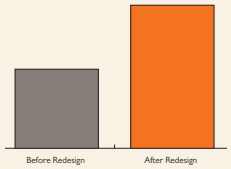
Some of the CTE institutions have sufficient longitudinal data to compare how well students who complete the redesigned sequences perform in subsequent college-level courses with those who entered via the traditional format. "The results are positive," writes Twigg in the full report. "And we believe [they] will be replicated in the other projects as more time goes by."



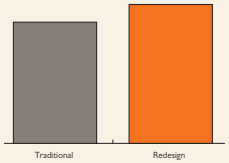
At **Northern Virginia Community College,** the success rate in Math for Liberal Arts for all students was 67.7%; for students who had completed the redesigned developmental math course, **the success rate was 72.5%.**



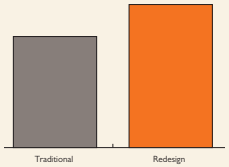
The success rate in Precalculus for all students was 57.7%; for students who had completed the redesigned developmental math course, **the success rate was 72.0%.**



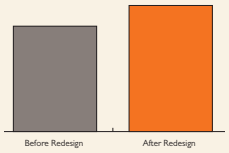
At **Northwest-Shoals Community College,** the percentage of developmental math students successfully completing a college-level math course increased from 42% before the redesign **to 76% after the redesign.**



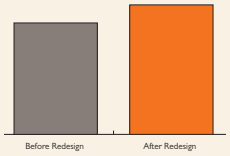
At **Pearl River Community College,** final exam rates in college-level College Algebra increased from a mean of 64.4% in the traditional format **to 73.8% after the redesign.**



Completion rates in College Algebra went from 59% prior to the redesign **to 76% after the redesign.**



At **Somerset Community College,** the percentage of developmental math students successfully completing Applied Mathematics increased from 56% before the redesign **to 67% after the redesign.**



The percentage of students successfully completing Intermediate Algebra increased from 37% before the redesign **to 43% after the redesign.**

15 Require mastery learning.

Students who advance without full competence in skills are doomed to struggle—if not fail. A successful strategy that addresses preparedness for college-level math and mastery learning ensures that skills are solidly understood and that they build one upon another, thereby reinforcing previous knowledge and increasing confidence.

Without exception, every CTE program school employed mastery learning as a major aspect of its redesign. Within each module, mastery was assessed in homework assignments, practice tests, and module exams and was required before progression to the next module. Depending on the school, a passing score ranged from 75% to 90%.

Schools that employ mastering learning invariably find (1) that students both complete more work and learn more than do students in traditional formats and (2) that

Somerset Community College

SCC's redesign involved adopting a modularized curriculum that followed the approved Kentucky Community and Technical College System curriculum. Two class periods (2.5 lab hours) were required per week. Students in the redesigned sections completed a pretest on each module. Students who completed the pretest with a score of 90% or higher were assigned a grade for the module and moved on to the next module. If a student did not score 90% or higher, s/he was required to complete the homework assignments lesson until mastery level of 80% was reached.

http://www.thencat.org/Mathematics/CTE/Abstracts/SCC_Abstract.html

Nashville State Community College

[A]t Nashville State Community College, the redesigned course was created by combining topics from the three traditional courses into one course with the expectation that students could master the material in one semester. This resulted in all students, regardless of initial placement scores and level, being required to master the same material in the same timeframe.

http://www.thencat.org/Mathematics/CTE/CTE_Lessons.html

Guilford Technical Community College

GTCC is deeply committed to research-based decision-making. GTCC evaluated the effects of the redesign by comparing performance on a common final exam in the traditional and redesign sections. GTCC also looked at comparative success rates as well as persistence and retention rates in the developmental courses.

http://www.thencat.org/Mathematics/CTE/Abstracts/GTCC_Abstract.html

the process to achieve mastery often takes longer. Although students might not complete a particular course by the end of the term, they *are* able to start in the subsequent term where they left off and are ultimately more prepared to successfully complete college-level work. (See page 14, Subsequent Success Rates.)

16 Track learning gains.

What you don't track, you can't measure. And what you haven't measured, you can't prove has happened. School faculty who consistently track and measure learning gains become able to make informed decisions about programmatic shifts and can increase their abilities to prove institutional effectiveness, meet accreditation standards, track quality-enhancement plans, and fulfill federal grant requirements.

Metrics to employ include comparisons of homework grades, exam scores, and final grades to those of past semesters; correlation between time spent and final grades; subsequent success rates; retention rates; and the effectiveness of using the text in tandem with the online product.

Stark State College

To measure the success of the redesign, the team looked at student learning outcomes and course completion rates. Student learning was measured using common assessment items. The team compared questions and problems on the traditional midterm and final with the same or similar items on the redesign's module posttests. Success rates in Intro and Intermediate Algebra were compared as A/B rates since the redesign allowed only As and Bs to be passing grades.

http://www.thencat.org/Mathematics/CTE/Abstracts/SSC_Abstract.html

GRADE INFLATION

According to an NCAT analysis of the program, the majority of CTE teams discovered that pass rates in the traditional format had been inflated by prior inconsistencies in grading practices.

"In conducting an extended analysis of the discrepancy between increased learning outcomes and decreased course completion rates in Changing the Equation, NCAT has discovered a variety of reasons that course-by-course completion comparisons are not true measures of the program's success or lack of success.

"Contributors to prior grade inflation in the traditional course included (1) having no clear guidelines regarding the award of partial credit, (2) allowing students to fail the final exam yet still pass the course, (3) failing to establish common standards for topic coverage, and (4) failing to provide training and oversight of part-time instructors. Thus, the C-or-better grades in the traditional courses were almost universally inflated.

"Further, the redesigned courses were more difficult than the traditional courses. The redesigned courses (1) had more assignments, more quizzes, and more tests than the traditional courses had and consequently took longer to finish and (2) contained more content than the traditional courses and consequently took longer to finish."

http://www.thencat.org/Mathematics/CTE/CTE_Lessons.html

CONCLUSION

> **"It just takes hard work and time."**
>
> *—CTE Program Participant*

More than simply successful redesigns, the projects described on the previous pages are victories. Behind the increased final exam grades, subsequent success rates, and institutional cost savings are innumerable and unnamed people who have become better equipped to pursue their academic goals, support themselves and their families, and achieve their life dreams.

An Ongoing Process

We applaud the institutions included herein for their efforts and determination. But make no mistake: those efforts are not over. A successful redesign never truly ends. It is an ongoing process, ever evolving with the emergence of new and improved technology, the entry of each unique cohort of students, and the increased amount of information gleaned via the long-term tracking and measuring of student data.

By employing these 16 best practices, CTE redesigns have the tools they need to sustain and even improve over time; and according to the final NCAT report on the program, they all intend to do just that. (See page 17, Models of Sustainability.)

Pearson's Faculty Advisor Network (FAN) is available to help you improve the teaching and learning experience at your institution. Visit the FAN site to meet and engage with a community of educators who are eager to share advice, tips, and best practices related to MyLab products. Join the network at http://community.pearson.com/fan.

The Pearson Family of Solutions

Pearson offers solutions for all kinds of educational needs, for all of the types of courses instructors teach, and for all of the ways instructors teach those courses. Combined with one of the many proven-successful best practices, the possible configurations of effective implementations are limitless. Let us help you:

- **Increase achievement.** Instant access to reliable data can help in developing personalized learning, assessment, and instruction and can provide a blueprint for faculty and institutional effectiveness.
- **Expand access.** From digital course materials and real-time assessments to fully online courses, Pearson's learning solutions are more flexible, powerful, and accessible than ever before.
- **Enable affordability.** Innovative technology offers the best opportunity to deliver personalized, scalable, and engaging solutions that drive results up and drive costs down.

For additional models of sustainable learning strategies, see Pearson's Making the Grade series of white papers. Compendiums of successful case studies from two- and four-year institutions in North America and around the globe, *Making the Grade, Versions 1–5,* can be downloaded at http://www.mymathlab.com.

We look forward to hearing about your achievements and to including your school's adoption in the next *Making the Grade* report. To tell us about your success, contact us at pearsoncourseredesign@pearson.com or take our online survey at http://www.surveymonkey.com/s/MyMathLab_Experience_Questionnaire.

MODELS OF SUSTAINABILITY

Guilford Technical Community College
Robeson Community College

At both Guilford Technical Community College and Robeson Community College, the sustainability of the redesign is not in question. Administrations at both institutions have supported redesigns from the beginning and continue to support them. North Carolina has recently redesigned the statewide developmental math curriculum into eight 1-credit modules.

http://www.thencat.org/Mathematics/CTE/CTE_Lessons.html

Nashville State Community College

There is little doubt that the changes to Nashville State Community College's developmental math program will be sustained and most likely will extend into other college-level math courses. The program has been changing for the past three years with the full support of the college in an effort to best address the needs of students. The improved retention and success rates indicate that the changes are having a positive impact. Additionally, instructors who had been initially hesitant about the program now fully support the changes, and some have begun playing active roles in the decision-making processes related to running the program.

http://www.thencat.org/Mathematics/CTE/Abstracts/NSCC_Abstract.html

Northwest-Shoals Community College

Due to the success of the project, Northwest-Shoals Community College's math department is considering redesigns of Precalculus with Algebra, Introduction to Technical Mathematics, and Mathematical Applications. The continued success of the Emporium Model strengthened administrator commitment to the redesign project. That commitment now extends throughout the transitional studies division to include redesigns of English and reading courses.

http://www.thencat.org/Mathematics/CTE/Abstracts/NWSCC_Abstract.html

West Virginia University at Parkersburg

The math department at West Virginia University at Parkersburg is totally committed to offering courses using the Emporium Model. The team feels strongly that this is the best solution for them, and their commitment is unwavering. The team intends to keep working toward improving completion rates and has enjoyed total support from the administration.

http://www.thencat.org/Mathematics/CTE/Abstracts/WVUP_Abstract.html

REDESIGN DATA

Excerpted from http://www.thencat.org/Mathematics/CTE/CTE_LearningOutcomes.html

** Difference is significant at the 95% confidence level or beyond.*
NA Completion cannot be calculated due to collapse of multiple courses into one.

	Learning Outcomes	Completion C or Better + Making Progress Grade	Cost-per-Student Savings	Will Be Sustained
Bowling Green Technical College			27%	
Prealgebra	Higher*	Higher		Yes
Basic Algebra	Higher	Higher		Yes
Cochise College			13%	
Fundamentals of Math	Higher	Higher*		Yes
Elementary Algebra	Higher	Higher*		Yes
Intermediate Algebra	Lower	Higher		Yes
Guilford Technical Community College			20%	
Essential Mathematics	Higher*	Higher*		Yes
Introductory Algebra	Higher*	No Significant Difference		Yes
Intermediate Algebra	Higher*	Higher		Yes
Heartland Community College			7%	
Fundamentals of Math	Higher*	NA		Yes
Beginning Algebra	Higher*	NA		Yes
Intermediate Algebra for Business & Social Science	Higher*	NA		Yes
Intermediate Algebra for Math & Science	Higher*	NA		Yes
Laramie County Community College			5%	
Prealgebra	Higher*	No MP		Yes
Elementary Algebra	Higher*	No MP		Yes
Intermediate Algebra	Higher*	No MP		Yes

	Learning Outcomes	Completion C or Better + Making Progress Grade	Cost-per-Student Savings	Will Be Sustained
Lurleen B. Wallace Community College			54%	
Basic Mathematics	Higher*	No Significant Difference		Yes
Elementary Algebra	Higher*	Higher*		Yes
Intermediate Algebra	Higher*	No MP		Yes
Mountwest Community & Technical College			19%	
Basic Math	Higher*	NA		Yes
Algebra I	Higher*	NA		Yes
Nashville State Community College			16%	
Basic Math	Higher*	NA		Yes
Elementary Algebra	Higher*	NA		Yes
Intermediate Algebra	Higher*	NA		Yes
Northern Virginia Community College			8%	
Arithmetic	Higher*	NA		Yes
Algebra I	Higher*	NA		Yes
Algebra II	Higher*	NA		Yes
Northwest-Shoals Community College			7%	
Basic Mathematics	Higher*	Higher		Yes
Elementary Algebra	Higher*	Higher*		Yes
Intermediate Algebra	Higher*	Higher*		Yes
Oakton Community College			9%	
Prealgebra	Higher*	Lower*		Yes
Elementary Algebra	Higher*	No Significant Difference		Yes
Elementary Plane Geometry	Higher*	No Significant Difference		Yes
Intermediate Algebra	Higher*	Higher*		Yes

	Learning Outcomes	Completion C or Better + Making Progress Grade	Cost-per-Student Savings	Will Be Sustained
Pearl River Community College			33%	
Fundamentals of Mathematics	Higher*	Higher		Yes
Beginning Algebra	Higher*	Higher*		Yes
Intermediate Algebra	Higher*	Higher*		Yes
Robeson Community College			28%	
Essential Mathematics	Higher*	Higher		Yes
Introductory Algebra	Higher*	Higher*		Yes
Intermediate Algebra	Insufficient Data	Insufficient Data		Yes
Somerset Community College			6%	
Prealgebra	Higher*	Higher		Yes
Basic Algebra	Higher*	Higher*		Yes
Stark State College			25%	
College Math	Higher*	No MP		Yes
Introduction to Algebra	Higher*	No MP		Yes
Intermediate Algebra	Higher*	No MP		Yes
Volunteer State Community College			28%	
Basic Mathematics	Higher*	NA		Yes
Elementary Algebra	Higher*	NA		Yes
Intermediate Algebra	No Significant Difference	NA		Yes
West Virginia University at Parkersburg			11%	
Basic Arithmetic	Higher*	Higher		Yes
Elementary Algebra	Higher*	Higher		Yes

COURSE REDESIGN WORK SHEET: Planning your redesign

Faculty Name

Course Name

Date

1. What are the main problems you are trying to solve through a course redesign?

2. What are the quantifiable goals you want the redesign to achieve?
   Example: Increase student retention rates by 20% over the course of a semester, see an effect size of 0.5 or better on learning gains.

3. When do you want to start the course redesign? Will it be for just one pilot course? How long do you envision adjusting the redesign before full implementation?

4. What course materials are you using? Do they align with your intended outcome?

5. Have you pursued grants or initiatives for the course redesign? If yes, what are they?
   Note: Check with your Pearson partner or visit Pearson's Grant Help Center at http://www.pearsonhighered.com/granthelp/ to learn more about grants that may subsidize your redesign.

6. How often will you hold organizational and professional development meetings for the faculty, lab staff, IT administrators, and others involved in the redesign?

7. List three ways to educate the culture of your faculty involved in the redesign.
   Example: Invite guests from institutions that have successfully implemented redesigns.

8. Who are the members of your course redesign team (faculty, IT people, lab directors, senior administrators)? Who will be responsible for managing the course redesign?

9. How will you evaluate redesign success?
   Example: Retention rates, final exam scores, final course grades, and subsequent success

10. Will you use historical data to support the efficacy of your redesign? Or will you administer common exams and assessments?

11. MyMathLab/MyLabPlus assignments will contribute what percentage to a student's final course grade?

12. Do you have—or have to seek—approval from your Institutional Review Board to run this redesign?

13. What is your main concern about this course redesign?

14. At the end of the course, would you like assistance in analyzing your data?
    If so, contact your local Pearson representative.

Supplement for Instructors Considering the Emporium Model

A. How many lab hours per week do you plan to require?

B. How are you planning to enforce this?
   Example: Swipe card, sign-in sheets, class attendance

C. How do you plan to accommodate all students if your lab cannot seat everyone at once?
   Example: Staggered due dates for assignments

D. How will you monitor the lab? Will an instructor be present? What role will the instructor serve? What student-to-instructor ratio will you establish?

E. What do you want to accomplish during weekly class meetings?

F. How will you schedule student testing?
   Example: Students schedule tests online and are accountable to deadlines.

NOTES

INSTITUTIONS IN THIS REPORT

MATH INSTRUCTOR EXCHANGE

Join us online at the Math Instructor Exchange, where educators connect in order to exchange ideas and advice on math courses, content, best practices, and the use of MathXL, MyFoundationsLab, MyMathLab, MyLabPlus, MyMathTest, MyStatLab, StatCrunch, and more!

http://www.instructorexchange.com

**Cited as participants in the NCAT State and System Course Redesign Tennessee Board of Regents: Developmental Studies Redesign Initiative (http://www.thencat.org/States/TBR.htm). These institutions did not participate in the CTE program.*

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