

## **DEVELOPMENTAL COURSES: AN OXYMORON?**

by  
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The Tennessee Board of Regents (TBR) has launched a Developmental Studies Redesign Initiative to reform its remedial and developmental math and English curriculum. The goal is to develop and implement a more effective and efficient assessment and delivery system that will increase completion rates for students, reduce the amount of time that students spend in remedial and developmental courses, and decrease the amount of fiscal resources that students dedicate to remedial and developmental education.

A 2005 TBR study revealed that level of academic preparation continues to be a major barrier to successful matriculation among first-time freshmen, regardless of age at time of entry, in Tennessee's public universities and community colleges. A large percentage of recent high school graduates fail to meet college readiness assessments. In fall 2005, 74% of recent high school graduates enrolled at TBR two-year institutions were required to take a remedial or developmental studies course. At TBR four-year universities, the level of remedial and developmental requirement was over 40%. In addition, 50% of non-traditional aged students returning to education after long periods away from the classroom are required to take remedial or developmental courses.

In the TBR system, approximately \$25 million is spent on remedial and developmental instruction annually, the cost of which is split 50/50 between state appropriations and student tuition revenues. Those tuition costs can add quickly to students' overall debt. In addition, none of the tuition payments and classroom effort results in credit toward a degree.

Students lacking the skills required to enroll in college-level courses face significant challenges persisting to a degree. Completing a series of non-credit courses to overcome deficiencies involves significant time and money for students, slowing academic progress, and sometimes derailing the momentum that comes with initial enrollment in postsecondary education. Reductions of overall costs and time to completion is a primary goal of the initiative, which will represent future permanent cost savings to students and to institutions.

During the course of this three-year project, the TBR will partner with NCAT to aggressively redesign the remedial and developmental curriculum, teaching and learning methods, and assessment strategies. Building on the successful models and lessons learned from NCAT's Program in Course Redesign, this project will develop new delivery structures that streamline course delivery, leverage new learning technologies, increase the quality of learning and reduce the cost of developmental education.

### **The Need to Redesign**

Currently, the TBR operates a remedial and developmental studies program that dates back to the early 1980's, comprised of seven courses taught primarily in traditional classroom settings in a 16-week format. The TBR program exhibits many positive qualities that other states could emulate. It uses a uniform placement testing system and offers the same seven courses (remedial and developmental) at all of its 13 community colleges and the same four of those courses (developmental only) at its six universities, helping to ensure a consistent experience for all TBR students regardless of location.

That being said, the TBR's program is not meeting the needs of its students who are quite diverse in levels of preparation, learning styles, and specific educational goals.

The current delivery strategy for courses offers a gradation of "basic remedial," "basic developmental," and "intermediate developmental" and does not afford an opportunity for students to quickly get up to performance level in one stage so that they can move to the next stage sooner. Students are required to take an entire course even though they may only be deficient in a portion of the topics. Restated, even if someone is marginally below the standard for freshman-level College Algebra, they are still placed into a 16-week course in Intermediate Developmental Algebra that requires them to sit through the full course to satisfy one or two limited or missing competencies.

The developmental course structure can present a significant obstacle to students' ability to realize their educational goals. Many students who begin a developmental course withdraw due to work, family or health issues. Students who withdraw and return the following semester must begin the same course from the beginning, even though they may have demonstrated mastery of some portion of the material prior to their withdrawal. Weaker students may be required to complete up to three full semesters of coursework prior to advancing into regular college-level courses. Many students are delayed in applying for admission to specific academic and professional programs. Others give up and drop out completely. Typical drop-failure-withdrawal rates in these courses of 40% to 50% further compound the problem.

In addition, TBR students are placed into remedial and developmental courses based on ACT or COMPASS test scores. Frequently, students are placed in a course that is beyond their skill level, and consequently, they are unable to complete the course successfully. Instructors often intervene early in the term and recommend moving to a lower level course. Since students are not required to move back once they are placed, however, they rarely choose to do so. Clearly, one important goal of redesign is to offer a more accurate placement system and thereby reduce the problems that arise with improper placement.

Finally, the current course structure standardizes the student learning experience as if all students' learning needs, interests, and abilities were the same. All students are required to learn at the same pace and with the same instructional strategies as the entire class. Because learning occurs in specific increments--especially in these skills-based courses-- and the time required to master each increment varies from person to person, the current system lacks the flexibility that could lead to greater student success.

Tennessee is not alone in dealing with these issues. Every state in the country faces similar problems in the ways in which remedial and developmental education is organized. By thinking more creatively about how to respond to a variety of learning abilities and preferences, it is possible to design structures and activities that work well with diverse types of students and lead to better, more cost-effective learning for all.

### **Modularization: A Key Strategy**

In order to address the problems identified by the TBR and its member institutions, it became clear early on that modularizing the curriculum would be a key strategy. The development of better placement systems combined with shorter, more tailored remedial and developmental modules would enable students to save time and money by only enrolling in the modules that address their deficiencies.

In December 2006, the TBR issued a Call to Participate in the Developmental Studies Redesign Initiative to its six universities and thirteen community colleges. Specifically, campuses were invited to redesign a remedial and/or developmental course sequence in mathematics, reading,

writing or English (combined reading and writing.) With support from the Fund for the Improvement of Postsecondary Education (FIPSE), the initiative was able to award a total of \$240,000 in grants to participating institutions to support their redesign efforts. Twenty-seven proposals were submitted in July 2007, and six projects were ultimately funded. NCAT collaborated with the TBR throughout the planning and selection process.

What were we looking for in a successful redesign proposal? In addition to describing a solid plan to improve learning and reduce costs by implementing NCAT's Five Principles for Successful Course Redesign, the TBR proposals needed to include a plan to modularize the remedial and developmental course sequences. Specifically, we wanted each institution to develop a plan to:

- Customize the learning environment for each student based on background, skill level, learning preference and academic/professional goals;
- Create a learning environment that allows students and faculty to focus on the skills that students are lacking, to study only topics in which they are unprepared, and to receive remediation assistance only in the areas where they have deficiencies;
- Remove skills overlap that may be present among courses in the current structure to streamline the curriculum;
- Create diagnostic assessments that evaluate specific skills linked to content modules to ensure that students only take the modules in which they have skill deficiencies;
- Allow students to start anywhere in the course sequence based on their learning needs and progress through the content modules at their own pace, spending the amount of time needed to master the module content, proceeding at a faster pace if possible or at a slower pace if necessary; and,
- Permit students to earn variable credit based on how many modules they successfully complete during a term.

Most of the proposals we received struggled with the concept of modularization. No one had trouble dividing the course content into modules—after all, that's like chapters in a textbook. Almost all recognized that today's high-quality instructional software is itself modularized. But most planned to have students continue to meet in small groups in traditional classroom settings, and most planned to have "teacher-led" activities dominate the redesign. They could conceptualize how to modularize course content but not how to modularize the student experience.

There is a contradiction between individualizing the student experience (i.e., diagnosing individual students' strengths and weaknesses and creating individual paths for them to correct their deficiencies) and meeting in traditional classes in which students are grouped together primarily for scheduling reasons. Student progress through the course materials will vary considerably. One-third may be in the middle of the material in any given class, one-third may have already accomplished the goals of today's class, and one-third may be lagging behind. Some students may be bored because other students' questions result in repetition of conceptual material they have already mastered, while other students feel overwhelmed by the amount of material covered in one class. It's not that meeting in groups is a bad thing to do. But a successful TBR redesign proposal needed to reconcile modularization and group meetings in new and innovative ways.

In contrast, six of the TBR institutions have developed innovative plans to individualize the student experience (i.e., diagnosing individual students' strengths and weaknesses and creating individual paths for them to correct their deficiencies) and allow them to progress through the course content at variable rates: **Austin Peay State University, Chattanooga State Technical Community College, Cleveland State Community College, Columbia State Community College, Jackson State Community College** and **Northeast State Technical Community College**. Each represents a unique approach to redesigning remedial and developmental courses.

Since NCAT is working closely with the TBR to ensure that improvements in student learning outcomes and reductions in instructional costs are carefully measured and documented, this project should go a long way in discovering the most effective and efficient ways to make a real difference in this critical area of educational need and to provide models that the rest of the country can emulate.

Let's take a look at the role of modularization in each of the six project plans.

Not surprisingly, the Emporium Model pioneered at Virginia Tech and replicated at many additional institutions is ideally suited to the goals of the TBR initiative, and **Cleveland State Community College** plans to redesign three math courses (Basic Math, Elementary Algebra and Intermediate Algebra) using that model. Drop-failure-withdrawal (DFW) rates in these courses currently average 45%. Cleveland State will use either *MyMathLab* or *MathZone* instructional software. Students will meet one hour in class and two hours in a large computer lab. The one-hour class meetings will be held in small labs (20 computers). Instructors will not lecture; students will work online and instructors will help students individually. Instructors will also review student progress and help students with their action plans for the coming week. The large computer lab will be available 54 hours per week to allow students to work at their convenience. The lab will be staffed by instructors and peer tutors to provide assistance to the students. Course material will be organized into 10 to 12 modules, which students will complete at the rate of one or more each week. All homework and testing will be done online. Quizzes on each module can be re-taken multiple times until students display mastery. Students will have the option of completing more than one module each week—i.e., they can move through each course at an accelerated pace. Students who complete a developmental math course before the end of the term will be allowed to begin the next developmental course immediately.

We were not surprised to see Cleveland State choose the Emporium Model for a math redesign, but we were very pleased to see the same model chosen for a reading redesign! **Northeast State Technical Community College** will move away from the traditional course delivery of small sections to a learner-centered, active learning mode supported by interactive, modularized learning software in its redesign of Basic and Developmental Reading. One large section of all enrolled students will replace traditional small sections (~17 students), which typically experience DFW rates ranging from 34% to 45%. Students will be required to spend three hours weekly in a reading center open 35 - 45 hours per week where they will have access to high-quality web-based interactive learning materials and resources and individualized face-to-face assistance. Students will also have access to web-based online learning materials 24/7 from anywhere they choose. *Tegrity* software will be utilized to provide students with pre-recorded lectures and discussions of key course concepts. Students will also be required to carry out collaborative learning activities by joining an online learning community and completing weekly online discussion and reflection on the course content.

Northeast will reorganize the two reading courses into 16 modules using *MyReadingLab*. Each module will have clearly defined learning objectives, tutorials, practice exercises, assessments for mastery and built-in deadline. Students will initially take a diagnostic test on their reading skills and their reading levels to ascertain their reading capability. Based on the diagnostic results, students will receive a personalized study plan that contains the modules necessary to gain the reading skills they lack and to improve their reading levels. Students may exit a course at any time when they pass the module tests and a comprehensive course post-test. Early exit will allow students to spend additional time on other courses they are taking and also increase their confidence as successful learners. Remediation will be provided to those who fall behind the learning schedule, and corrective actions will be taken by instructors to keep students on track so that they can finish course within the semester.

The team at **Austin Peay State University (APSU)** has developed a very innovative idea to redesign two developmental math courses where approximately one-half of the students either

fail or withdraw. Their redesign will eliminate developmental courses entirely! Students whose placement tests indicate developmental needs will enroll in the core math course required for their major—either Foundations of Mathematics or Elements of Statistics—and will receive supplemental academic support on a just-in-time basis to remove the deficiencies in mathematical competencies required for success in the core course. The redesign model selected by APSU is based on the Structured Learning Assistance (SLA) model developed by Ferris State University in Michigan. The core courses will not change in content but will be linked to SLA workshops consisting of computer-based instruction (*MyMathLab*), small-group activities and test reviews to provide additional instruction on key mathematical concepts within the courses. The statistics workshops will also use *Fathom* and *Minitab* in addition to *MyMathLab*. SLA workshops will be facilitated by students who have excelled in math and have been recommended by math faculty.

During the initial meeting of the workshop, students will be assessed to determine their specific math deficiencies. APSU's math faculty have collectively determined the prerequisite competencies that are required in order for students to successfully complete each of the two core math courses involved in the course redesign. Only the deficiencies which are deemed necessary for success in the core mathematics course will be addressed during the workshops. Students will be individually assigned modules within *MyMathLab* based on the results of the assessment. Students will complete the modules on a just-in-time basis so that they are prepared to use the associated mathematics skills as the core course requires. In addition, the workshop leader will review the more difficult concepts that were covered during class instruction. Just-in-time instruction on prerequisite competencies is designed so that students will use the concepts during the following class session, which in turn will help them see the value of the workshops and motivate them to do the exercises.

**Jackson State Community College** plans to combine parts of the approaches used by Cleveland State and APSU. The course redesign will use the Emporium Model, creating a learning center where students will work with *MyMathLab* and receive immediate assistance from instructors and tutors. Jackson State will re-organize the three developmental math courses, which currently face a failure rate of ~44%, into a single course organized in nine modules. But somewhat like APSU's just-in-time approach, students will be required to master only those concepts needed for their career goals which have been identified as deficiencies. Jackson State will survey all career programs on campus to determine which modules their students will be required to complete prior to admission. Pre-requisite competencies for general-education mathematics courses will be reviewed to determine pre-requisite modules.

A pre-test on an established set of competencies will determine what concepts students will be required to master for their majors. Following this assessment, each student will receive an individualized learning contract detailing a list of those modules that need to be mastered. The contract will also include a schedule for completion of each module which will provide a path to achieving the desired learning outcomes. Student learning will be accommodated by online tutorials, video lectures, instructor-led lecture/discussion groups, organized group study, one-on-one tutoring, and other activities housed in a learning center. The center will offer remediation for students who fall behind in scheduled work and acceleration for students who are capable of moving through the modules more quickly. The redesign will create an enhanced developmental math program that will prepare students for their own educational goals whether they involve beginning a program of study in a field that requires advanced mathematics, completing a general education mathematics course, or applying for admission to Jackson State's nursing or allied health programs.

**Chattanooga State Technical Community College (CSTCC)** plans to redesign its three developmental math courses which serve ~3600 students annually. These courses experience low student success rates (excluding withdrawals) ranging from 51% to 64%. Most students are currently taught in a traditional lecture format with one instructor teaching up to 28 students in a

class supplemented with computer-based homework using *MyMathLab*. Students also have the option of working in a lab setting to complete all homework. Recognizing from past experience that using *MyMathLab* as a supplement rather than as the focus of the course and having learned that “freshmen don’t do optional,” CSTCC will standardize content and assessment across all sections and require students to work in the lab. Students will spend two hours in class and two hours in a computer lab each week. The computer lab will be open ~65 hours per week, staffed by professional tutors, faculty and student tutors. Students in this active learning environment will be able to progress at their own rate, receiving immediate feedback from the software and one-on-one assistance. They will also be encouraged to work collaboratively on the homework.

The college's redesign plan will modularize the course. On the first day of class, a challenge test will be administered to each student in order to determine module placement. If a student successfully completes a challenge test (80% or higher), he or she will be given credit for that module and will proceed to the next module in the sequence. Students will move from one module to the next (called “module promotion”) by achieving a 75% or higher score on that module post-test. If a module post-test is not passed on the first attempt, the student will repeat the module. Students may continue on in the modules from the subsequent course. When students begin the next semester, they will either continue in the module that was not completed or take the next challenge test for module placement. The module approach will support various learning styles and eliminate the conflict of mastering multiple topics simultaneously.

At CSTCC's main Amnicola campus, students will be placed into large sections of ~90, up to a maximum of 110 students. The sections will be team-taught by three instructors. Two will hold large class lectures for students who are progressing in a standard sequence. The third instructor will teach two module sections, one for students who are ahead of the standard sequence and one for students who are falling behind. At CSTCC's satellite campuses, a similar two-plus-two arrangement will be used, but one instructor will teach up to two modules.

Finally, **Columbia State Community College (CSCC)** will use a phased approach in its plan to redesign its developmental writing and reading programs, which comprise four three-hour courses, all of which suffer from poor retention with DFW rates of more than 50% in some semesters. During the initial phase of the CSCC redesign plan in spring 2008, two reading courses will be compressed into a single three-credit course, and two writing courses will also be compressed into a single three-credit course. Instructional software (*MyWritingLab* and *MyReadingLab*) will provide students with skills-based learning tools, allowing for a more standard use of class time across sections that focuses on hands-on reading and writing practice. This pilot period will provide instructors the essential opportunity to analyze the strengths and weaknesses of the new software and allow them to work with students operating at a variety of proficiency levels in a single classroom setting.

During the second phase in fall 2008 semester, the reading course will be divided into three one-hour modules (Vocabulary, Comprehension and Advanced Comprehension). The writing course will be divided into four one-hour modules (Punctuation and Mechanics, Grammar and Usage, Paragraph Writing, and Introduction to Essay Writing). Each one-hour module will be taught in five weeks. Students will only assemble as a group for one 80-minute class period per week for lecture and practice of areas identified by the instructors during the first phase. The hybrid modules will be managed through Online Campus (Desire to Learn), where students will have links into their required software materials, assignments, grades, calendar and communication tools. Since the Paragraph and Essay modules will require significant grading time for instructors, they will be facilitated in smaller groups of 20. The Punctuation and Mechanics and Grammar and Usage modules will be driven primarily by the software and graded likewise, allowing for a class size of 40.

All students who enroll at CSCC with a reading or writing requirement will take a COMPASS test for the discipline in which they have placed, which will determine the modules required for each

student. Students will be required to demonstrate a 75% proficiency to earn credit for completion of a module. Flexible scheduling will provide students an opportunity to complete all their reading and writing requirements within one semester and will also provide them with an opportunity to repeat unsuccessful modules.

### **Learning from Experience**

Just about all of these institutions have had some kind of prior experience in using instructional software in remedial and developmental courses in an effort to improve success rates, but they have not experienced a significant increase in student success. They have learned some valuable lessons from those experiences that correlate with the experiences of successful NCAT projects, which include the importance of

- Coordinating faculty efforts

Rather than leaving it up to individual instructors to decide whether or not to use instructional software and how to use it, these new redesigns will coordinate the efforts of all course instructors so that all students receive a uniform, high-quality learning experience.

- Redesigning the whole course

In the past, TBR institutions have offered paired courses, combined courses, fast-track courses and online courses in remedial and developmental programs with negligible success. In many cases, these were primarily pilot projects that received limited advertising and often very small sections that provided an option, at the last minute, to those students who had registered too late for any other section. The new redesign plans will take on the whole course and make sure that the campus is well-prepared to publicize and explain the new opportunities to students.

- Using software as the focus of the course rather than as a supplement

Many past efforts used a textbook supplemented with some online tutorial software with limited usefulness. These new redesigns make software a centerpiece of their redesigns.

- Recognizing that freshmen don't do optional

Some TBR institutions have tried to alter their course delivery systems from a traditional lecture class without a technology component to a "self-paced," fully computerized course. The result was that, in some cases, success rates dropped by 20 percentage points. The new redesign efforts make student participation mandatory within a well-structured course that includes milestones for completion.

- Providing students with individualized assistance

Historically, some TBR institutions have offered these courses in a computerized classroom but with a traditional instructor-centered and lecture-based format, which unfortunately allowed very little or no individual assistance in class to accommodate the wide range of student learning needs. All of the new redesign plans include many different ways of providing students with *individualized* assistance and, in many cases, at times convenient to them on-demand as needed.

## **What about Cost?**

Remember that in addition to increasing student learning, one of the goals of the TBR initiative is to reduce the amount of time students spend in remedial and developmental courses, thereby reducing the cost to students, as well as to decrease the amount of fiscal resources that are dedicated to remedial and developmental education by the TBR. All of these redesign plans will reduce the institution's cost of providing remedial and developmental education; projections range from a 21% to a 51% reduction. Modularizing the courses allows the institutions to decrease the number of sections offered. Relying on high-quality instructional software to offload time-consuming faculty tasks like grading allows the institutions to increase section size. Fewer instructors will be required to teach remedial and developmental courses. In most cases, that means reducing the number of adjunct faculty, who are often difficult to find, and relying more heavily on full-time faculty.

## **Implications for Others**

A November 2003 NCES study revealed that nationwide, 28% of freshmen entering college in 2000 were enrolled in one or more remedial reading, writing, or mathematics courses. At public two-year institutions, 42% of freshmen enrolled in these courses and at public four-year institutions, 20% of freshmen were enrolled. That same study showed an increase in the average length of time that students spent in remedial education courses. For example, between 1995 and 2000, the proportion of institutions that reported an average of one year of remediation for students increased from 28% to 35%, while the proportion indicating an average of less than one year of remediation for students decreased from 67% to 60%. Public two-year colleges were more likely than public four-year institutions to report that students spent an average of one year or more on remedial courses.

Clearly the implications for colleges and universities around the country of the outcomes produced by the TBR initiative are substantial. By putting students first and organizing their redesigns around the individual needs of students rather than the convenience of institutions, these pioneering institutions may well make a major contribution to improving the ways in which all of us help students prepare for college success and move more rapidly to degree completion. We'll keep you posted on the results!