

HOW TO REDESIGN A COLLEGE-LEVEL OR DEVELOPMENTAL MATH COURSE USING THE EMPORIUM MODEL

II. Improving on the Essentials

Chapter I delineates the essential elements of the Emporium Model. We call these “essential” because including each element in the redesign is absolutely necessary in order to ensure success.

We do, however, recommend that you consider two ideas as you develop your redesign plan. They are not essential to success, but if NCAT were directly responsible for a redesign, we would certainly include them in our redesign plan.

Institute mastery learning

In the traditional format, students can exit math courses by simply attaining a total cumulative score of at least 70 percent or 75 percent. Based on averaging grades, students can earn a C or better by passing enough tests and learning enough competencies but not necessarily all. In traditional sections, students often continue on to the next topic without having demonstrated mastery of the previous one. The consequence of this practice is that they are unprepared for later concepts in the course, for the next course in the sequence and for other courses requiring specific math content.

Mastery learning means requiring each student to complete homework assignments, quizzes and tests—typically organized into modules—at a designated mastery level before moving ahead to the next unit, a learning approach that guarantees that students will be successful as they move forward.

A typical module sequence would be for students to begin by taking a quiz to demonstrate mastery and thus bypass the module—or move directly to the homework if they feel they are unfamiliar with the material. Before students can move from one homework assignment to the next, they are required to demonstrate mastery on each assignment. After all homework for a module is completed, students take practice quizzes in which online learning aids are not available. Students who do not demonstrate mastery on the practice quiz have to remediate on missed concepts before taking the quiz again. Students typically are allowed multiple attempts on the practice quiz. Though not part of the grade calculation, the quiz requires mastery before students are permitted to take the module post-test. Once prepared, students take a proctored post-test. To move to the next module, students have to demonstrate mastery on the post-test. Students unable to do so should have an opportunity to meet with the instructor who can review a student’s work on the test and recommend remediation techniques before the student retakes the test.

Each institution sets its own mastery level (prior redesigns have set mastery levels ranging from 75 percent to 90 percent of the material.) Here are some examples of decisions that other institutions have made about the mastery level required for various kinds of assessments:

	College #1	College #2	College #3	College #4	College #5	College #6
Homework	90%	70%	80%	85%	80%	90%
Quizzes	80%	75%	65%	85%	75%	80%
Module Tests	75%	70%	75%	80%	75%	75%

Mastery learning thus means that students are doing more work and learning more in redesigned courses than in traditional ones.

Modularize both course materials and course structure

The traditional format assumes that all students need to study all math course content at the same pace, treating students as one size fits all. However, 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 are bored because other students' questions mean that instructors repeatedly explain material they have already mastered, and other students feel overwhelmed by the amount of material covered in even just one class session.

In contrast, modularization assumes that each student is different, each student has different learning gaps, each student will move at a different pace—faster or slower—through different parts of the curriculum. The course or a course sequence can be divided into a series of modules or mini-modules. Modularization does not mean merely dividing the course content into modules—after all, that's no different from chapters in a textbook—and continuing to meet in small groups in traditional classroom settings with teacher-led activities. Modularization means individualizing the student experience. When students understand the material, they can move quickly through it and demonstrate mastery. When students get stuck, they can take more time to practice and receive individualized assistance. Students can also earn variable credit based on how many modules they successfully complete during a term.

There is no right or wrong number of modules. Each module should correspond to a learning objective or competency within the course. Some institutions keep traditional course names and credit amounts and modularize content within the course(s). Others develop a set of modules and assign one credit for each module.

Progress through the course(s) requires completion of each module—typically at a pre-determined mastery level—before moving to the next. This includes completing the online quizzes, homework problems, and notebook assignments that cover the objectives for the week.

This does not mean that the course should be self-paced. Self-pacing implies that students move at their own pace without any guidelines or benchmarks. Every institution needs to determine minimum expectations that a student must meet to earn credit for that term and establish timelines for completion. Freshman students are generally not accomplished time managers and need the structure provided by weekly deadlines and other progress indicators to be sure that they keep up a pace that will allow timely completion. At some points, a student may proceed more quickly than the timeline would indicate; at other points, the same student may need some extra time on a topic. Having a guide for pacing also helps faculty know when to intervene with students who are lagging.

Among the benefits that modularization offers are:

- Students can complete one course early and move into another math course in the same semester or have additional time to devote to their other courses. If the second course is not finished at the end of the semester, the student can continue the next semester at the point they left off the previous semester. Students who do not finish the required modules in one semester are able to begin work the next semester exactly where they left off the previous semester.
- If students have to drop out of a course, they do not have to start over when they return. The traditional course structure presents significant obstacles to students. Many students who begin a course withdraw due to work, family or health issues. Many of them may be working diligently but have a “life event” occur, preventing them from reaching their educational goals. When life interferes in the traditional model, students must withdraw—thereby losing tuition and any progress they have made—and start over the following term, even though they may have demonstrated mastery of some portion of the material prior to their withdrawal. In a modularized design, they can adjust their schedules instead of having to withdraw from the course. Later, they can return to the class and pick up where they left off or begin the next semester where they left off in the previous semester. They do not repeat what they have already mastered.

For more information on modularization, see the description of NCAT’s Changing the Equation program and the case studies of institutional participants at <http://www.theNCAT.org/Mathematics/CTE/CTE.htm>