

HOW TO REDESIGN A COLLEGE COURSE USING NCAT'S METHODOLOGY

V. How to Reduce Instructional Costs

The traditional course format requires instructors to carry out all of the development and delivery aspects of a course on their own. The traditional format often assumes that small classes are necessary in order to produce positive learning results because the instructor is responsible for all interactions. Responding to every inquiry, comment, or discussion personally; preparing lectures; and the hand grading of assignments, quizzes, and examinations are labor-intensive.

Course redesign involves substituting technology for much of that effort, often with assistance from different kinds of personnel. Making the substitutions discussed in the following sections enables each instructor to teach more students than before—without increasing the workload.

Q: How can redesign lead to reduced instructional costs?

A: Redesigning a whole course eliminates duplication of effort on the part of instructors and creates opportunities for using alternative staffing patterns. Faculty begin the design process by analyzing the amount of time that each person involved in the course spends on each kind of activity, which often reveals duplication of effort among multiple faculty members. Faculty members teaching the course divide their tasks among themselves, and their efforts target particular aspects of course delivery. By replacing individual development of each course section with shared responsibility for both course development and course delivery, faculty can save substantial amounts of their time while achieving greater course consistency.

When redesigns reduce the number of lectures or other classroom presentations that faculty members must prepare for and present and replace those formats with interactive learning resources and team-based learning strategies, faculty time can be reallocated to other tasks either within the same course or in other courses. Moving away from viewing instructors as the sole sources of content knowledge and assistance and instead toward greater reliance on interactive learning materials and greater student-student interaction offers many opportunities for reducing instructional costs.

Replacing hand grading with automated grading of homework, quizzes, and exams makes it possible to reduce the cost of providing feedback while improving its quality. Online weekly practice quizzes can replace weekly homework grading, and all grading and record keeping can be automated. Replacing time-consuming human monitoring of student performance with course management software makes it possible to reduce costs while increasing the level and frequency of oversight of student progress. Using instructional software also radically reduces the amount of time that faculty members typically spend on nonacademic tasks like calculating and recording grades, photocopying course materials, posting changes in schedules and course syllabi, sending out special announcements to students, and documenting course materials like syllabi, assignments, and examinations so that they can be used in multiple terms.

Q: How can we calculate the number of hours instructors will spend on the redesigned course compared with the traditional course?

A: NCAT has developed a Scope of Effort Worksheet (see Appendix D) to help campuses document that the number of hours faculty devote to the redesigned course will be the same as or fewer than the number of hours devoted to the traditional format of the course, even if class size grows or the number of sections that faculty carry increases. This is possible because the course redesign off-loads to the technology certain tasks like grading and monitoring student progress. Explaining how this occurs and documenting the changes by using the Scope of Effort Worksheet enable redesign leaders to help others on campus understand the benefits of redesign for both students and faculty.

Q: Do cost savings equal saved instructor hours?

A: Planning for cost reduction as a part of redesign consists of two steps. The first is to complete the Scope of Effort Worksheet for the traditional and redesigned formats of the course, which lets you demonstrate how the number of hours spent by each person involved in the course can change. The second step is to translate those “saved” hours into one of NCAT’s Cost Reduction Strategies described later. If you stop at the first step, you might create what NCAT calls *paper savings*. By *paper savings* we mean savings that represent a workload reduction for individual faculty members or others but do not produce cost savings to the department or institution.

Reducing time spent by individual faculty members and others as displayed on the Scope of Effort Worksheet is an *enabler* that allows you to choose a cost savings strategy. For example, a faculty member or TA who spends half the time on the redesigned course that that faculty member or TA did on the traditional course could increase section enrollment or carry two sections without an increase in workload. That then produces real savings for the institution.

Q: Does it matter whether our course enrollment is growing or remains stable?

A: If the course enrollment is relatively stable (and accommodating more students is not a goal), you must reduce the number of people involved in teaching the course and/or change the mix of personnel in order to produce cost savings.

If accommodating more students is a goal, you do not have to reduce the number of people involved in teaching the course in order to produce cost savings, although you can do this. You can reduce the cost per student (total resources devoted to the course/total course enrollment) by teaching more students with the same staffing.

Q: How can we re-structure the course to reduce instructional costs?

A: There are three ways to re-structure the course that will reduce costs.

1. Have each instructor carry more students by
 - a. increasing section size, or
 - b. increasing the number of sections each instructor carries for the same workload credit.
2. Change the mix of personnel from more expensive to less expensive.
3. Do both simultaneously.

Each of these strategies can be used whether your enrollment is growing or stable. When enrollment is stable, cost reduction means fewer resources are devoted to the course. When enrollment is growing, cost reduction means more students can be served on the same resource base. In each case, the cost per student is reduced.

Q: Are there examples of having each instructor carry more students by increasing section size?

A: Here's a calculation showing how this works:

Stable enrollment: If your enrollment is stable, this will allow you to reduce the number of sections offered and the number of people teaching the course.

Traditional: 800 students: 40 sections of 20 students each taught by 40 instructors.

Student-faculty ratio = 20:1

Redesign: 800 students: 20 sections of 40 students each taught by 20 instructors.

Student-faculty ratio = 40:1

Growing enrollment: If your enrollment is growing, this will allow you to serve more students with the same number of people teaching the course.

Traditional: 800 students: 40 sections of 20 students each taught by 40 instructors.

Student-faculty ratio = 20:1

Redesign: 1,600 students: 40 sections of 40 students each taught by 40 instructors.

Student-faculty ratio = 40:1

Chattanooga State Community College: The college reduced the cost of offering General Psychology by decreasing the number of sections (18), which ranged in size from 18 to 95 students annually, to 6 sections of 100 students each. Capacity was increased from 522 students in the traditional format to 600 students in the redesign. The traditional lecture format of the course, which met three times per week, was replaced by one face-to-face meeting and a variety of online activities. The number of full-time faculty teaching the course was reduced from 10 to 6, and all adjunct instructors were eliminated, with the added benefit of providing greater consistency among sections. One adjunct faculty member led two optional one-hour discussion groups per week, monitored mandatory threaded discussions, and provided technical support for students. Overall, the cost per student decreased from \$130 in the traditional format to \$42 in the redesign. Because each faculty member was responsible for three rather than nine hours of lecture per week, faculty had time to develop and teach new upper-level courses. In addition, classroom space was made available for other uses.

Arizona State University (ASU): The redesign of Organizational Management and Leadership enabled the university to increase section size from about 45 students to about 90 and to reduce the number of sections from six to four each term. Those changes reduced the cost per student by 59 percent, from \$373 per student in the traditional format to \$153 after the redesign. The traditional lecture format of the course, which met twice a week for 70 minutes each, was replaced by one face-to-face meeting and one online meeting. After the initial redesign, the course could accommodate 360 students rather than the 270 under the traditional format. The team believes that once the course is being taught in a new building with larger classrooms, enrollment can increase to as high as 250 students per term because one classroom will hold 150 and a second classroom will hold 100. This means that the annual enrollment can be increased to about 500 (from the current 360) without additional resources.

Q: What are examples of increasing the number of sections that each instructor carries for the same workload credit?

A: Here's a calculation showing how this works:

Stable enrollment: If your enrollment is stable, this will allow you to offer the same number of sections and reduce the number of people teaching the course.

Traditional: 800 students: 40 sections of 20 students each; instructor time spent per section = 200 hours; each instructor teaches one section for the same workload credit. Student-faculty ratio = 20:1

Redesign: 800 students: 40 sections of 20 students each; instructor time spent per section = 100 hours; each instructor teaches two sections for the same workload credit. Student-faculty ratio = 40:1

Growing enrollment: If your enrollment is growing, this will allow you to serve more students with the same number of people teaching the course.

Traditional: 800 students: 40 sections of 20 students each; instructor time spent per section = 200 hours; each instructor teaches one section for the same workload credit. Student-faculty ratio = 20:1

Redesign: 1,600 students: 80 sections of 20 students each; instructor time spent per section = 100 hours; each instructor teaches two sections for the same workload credit. Student-faculty ratio = 40:1

Cleveland State Community College: Under the traditional model, Cleveland State's math program comprised 55 sections of 24 students each in fall and spring, 45 of which were taught by full-time faculty (82 percent) and 10 by adjuncts (18 percent). Each course met three times per week. The total cost of the traditional course was \$270,675. In the redesigned model, Cleveland State offered 77 sections of 18 students each in fall and spring, all of which were taught by full-time faculty at a cost of \$219,258. Each section had one class meeting per week in a small computer lab, and students were required to spend two additional hours in a larger lab staffed by faculty and tutors. The total cost savings was \$51,417, a 19 percent reduction. The full-time-equivalent teaching load per faculty member went from 21.2 to 26.0 with no increase in workload. Faculty had been teaching five sections each per semester. In the redesign, faculty members each taught 10 or 11 sections, which met once per week, and they worked 8 to 10 hours in the lab.

The University of Alabama (UA): The redesign of UA's introductory Spanish program substituted a portion of class time with pedagogically tested and sound instructional technology components. As a result of replacing one face-to-face class hour per week with online components in Introductory Spanish I and II and two hours per week in the Intensive Review of Elementary Spanish, UA was able to accommodate 349 more students—a 33 percent enrollment increase—without increasing spending. Those changes were made possible by increasing the student load for a graduate teaching assistant from three to four sections per academic year. Due to replacement of a portion of class meeting time with online components, the teaching load increased but the amount of time graduate teaching assistants spent on the courses remained the same. The redesign enabled UA to offer 60 sections of introductory Spanish courses, an increase of 15 sections over prior offerings and thereby meeting more of

the actual demand. The cost per student for each course was reduced from \$245 to \$183, a 25 percent decrease.

Q: What are examples of changing the mix of personnel from more expensive to less expensive?

A: Here's a calculation showing how this works:

Stable enrollment. If your enrollment is stable, this will allow you to offer the same number of sections and reduce the total cost of the people teaching the course because adjuncts, tutors and undergraduate tutors are paid less than full-time faculty, and tutors and undergraduate tutors are paid less than adjuncts.

Traditional: 800 students: 40 sections of 20 students each; 30 sections taught by full-time faculty; 10 sections taught by adjuncts.

Redesign: 800 students: 40 sections of 20 students each; 10 sections taught by full-time faculty; 30 sections taught by adjuncts.

Growing enrollment. If your enrollment is growing, this will allow you to serve more students, offer more sections and reduce the cost-per-student since adjuncts, tutors and undergraduate tutors are paid less than full-time faculty, and tutors and undergraduate tutors are paid less than adjuncts.

Traditional: 800 students: 40 sections of 20 students each; 30 sections taught by full-time faculty; 10 sections taught by adjuncts.

Redesign: 1600 students: 80 sections of 20 students each; 20 sections taught by full-time faculty; 60 sections taught by adjuncts.

Tallahassee Community College: In its redesign of English Composition, the college reduced the number of full-time faculty involved in teaching the course from 32 to 8 and substituted less-expensive adjunct faculty without sacrificing quality and consistency. In the traditional course, full-time faculty taught 70 percent of the course, and adjuncts taught 30%. In the redesigned course, full-time faculty taught 33 percent of the course, and adjuncts teach 67%. Further savings were realized by reducing the amount of time and resources that the Writing Center staff had traditionally spent in working with students on basic skills. Mid-stage drafts were outsourced to Smarthinking, an online tutorial service. Overall, the cost per student was reduced from \$252 to \$145, a savings of 43%. Full-time faculty were freed to teach second-level courses, for which finding adjuncts was much more difficult.

University of Central Missouri (UCM): The redesign of Human Anatomy at UCM changed the mix of personnel to accommodate an increase in enrollment from 336 students to 480. Lab section size increased from 25 students in the traditional format to 40 students in the redesign. Non-tenure-track faculty replaced tenure-track faculty. The supervised lab sessions supplemented the one large weekly lecture session by engaging students through a team-learning approach. Graduate teaching assistants assisted by undergraduate learning assistants rather than faculty members managed the labs. Those changes reduced the cost per student by 68 percent, from \$345 in the traditional format to \$111 in the redesigned course. UCM plans to invest the cost savings in additional upper-level and graduate course offerings or in reassigned time so that faculty can become involved in the graduate research program, a long-standing desire of the UCM administration.

Q: What are examples of doing both simultaneously?

A: Most redesigns employ both strategies simultaneously as the following examples illustrate.

Arizona State University: The redesign of Women’s Studies at the university achieved cost savings by increasing class size from 150 or 200 to 400 and reducing the number of sections from nine to four annually. The instructional mix was changed to include fewer regular faculty and more graduate teaching assistants and undergraduate learning assistants who worked with small groups online, monitored online discussions, and provided individualized feedback for students on quizzes and participation. The cost per student was reduced from \$78 in the traditional course to \$57 in the redesign. The cost savings enabled the department to accommodate new student growth and meet the demands of a new graduate program.

Frostburg State University: The redesign of General Psychology reduced its cost per student in general psychology from \$89 to \$26—a 71 percent decrease—by tripling section size from 50 to 150 and changing the ratio of full-time to part-time instructors. The redesign reduced the number of in-class meetings by half, replacing them with online activities that included quizzing and small discussion groups. Twelve highly trained undergraduate learning assistants provided support for the online activities. Fewer instructors were needed to teach the course because the number of sections was reduced by a third, from 18 to 6, and required as few as one full-time faculty member (versus nine) and three adjuncts (versus nine) to teach the course. That change freed full-time faculty to teach upper-level courses.

Q: What does reducing costs mean in practice?

It is important to understand the context for reducing costs. In the past, cost reduction in higher education meant loss of jobs, but that’s not the NCAT approach. In the vast majority of NCAT course redesign projects, the achieved cost savings remained in the department that generated them and were used for instructional purposes. NCAT thinks of cost savings as a reallocation of resources that helps faculty and their institutions achieve their wish lists of things they’d like to do if they had additional resources.

Institutional participants have used cost savings in the following ways.

- To offer additional or new courses that previously could not be offered
- To satisfy unmet student demand by serving more students with the same resource base
- To break up academic bottlenecks—courses that delay students’ progress within a subject area or program because the areas or programs are oversubscribed
- To increase faculty released time for research, renewal, or additional course development
- To fund undergraduate research programs
- To deal effectively with budget cuts without diminished quality
- To apply to combinations of these

Q: Are there further opportunities for cost savings beyond these strategies?

A: After several terms of full implementation of your redesign strategy, you may achieve further savings through such things as improved retention (increased course completion rates), the impact of modularization and/or reduced space requirements. There are, however, a number of variables that may influence whether or not you are able to realize those additional savings such as the number of students who accelerate versus the number who move at a slower pace and

scheduling complexities. Because it is difficult to predict how these various elements will play out until you have some experience with the redesign over time, your plan for cost reduction should include one of the strategies listed previously which will result in immediate savings during the first term of full implementation.