Readiness Criteria

In thinking about possible courses to redesign, please answer the following questions:

1. Will changes in the course, if redesigned, have a high impact on the curriculum? Why?

2. Are decisions about curriculum in the department, program, or school made collectively--in other words, beyond the individual faculty member level?

3. Are the faculty able and willing to incorporate existing curricular materials in order to focus work on redesign issues rather than materials creation?

4. Do the faculty members have an understanding of and some experience with integrating elements of computer-based instruction into existing courses?

5. Have the course's expected learning outcomes and a system for measuring their achievement been identified?

6. Do the project participants have the requisite skills to conduct a large-scale project?

7. Do the faculty members involved have an understanding of learning theory?

8. Is your campus committed to a partnership among faculty, IT staff and administrators in both planning and execution of the redesign?

Course Planning Tool

Instructional Costs per Hour			
Faculty			
Salary			
% devoted to instruction			
% devoted to this course			
$ devoted to this course	$0		
Contact hours for course			
Out of class hours			
Total hours	0		
Cost per hour	$0		
TAs/GAs			
Salary			
% devoted to instruction			
% devoted to this course			
$ devoted to this course	$0		
Contact hours for course			
Out of class hours			
Total hours	0		
Cost per hour	$0		
Support Staff			
Position	$ per Hour	Total Hours	Total Cost
#1			$0
#2			$0
#3			$0
#4			$0

Instructional Costs of		FACULTY		TAs/GAs		Professional Staff	
Traditional Course		# of Hours	Total Cost	# of Hours	Total Cost	# of Hours	Total Cost
		Hourly rate =		Hourly rate =		Hourly rate =	
I. Course Preparation							
A. Curriculum Development			$0		$0		$0
B. Materials Acquisition			$0		$0		$0
C. Materials Development			$0		$0		$0
1. Lectures/presentations			$0		$0		$0
2. Learning materials/software			$0		$0		$0
3. Diagnostic assessments			$0		$0		$0
4. Assignments			$0		$0		$0
5. Tests/evaluations			$0		$0		$0
Sub-Total		**0**	**$0**	**0**	**$0**	**0**	**$0**
D. Faculty/TA Devmt/Training							
1. Orientation			$0		$0		$0
2. Staff meetings			$0		$0		$0
3. Attend lectures			$0		$0		$0
Sub-Total		**0**	$0	**0**	$0	**0**	$0
Total Preparation		**0**	**$0**	**0**	**$0**	**0**	**$0**
II. Course Delivery							
A. Instruction							
1. Diagnose skill/knowledge			$0		$0		$0
2. Presentation			$0		$0		$0
3. Interaction			$0		$0		$0
4. Progress monitoring			$0		$0		$0
Sub-Total		**0**	**$0**	**0**	**$0**	**0**	**$0**
B. Evaluation							
1. Test proctoring			$0		$0		$0
2. Tests/evaluation			$0		$0		$0
Sub-Total		**0**	**$0**	**0**	**$0**	**0**	**$0**
Total Delivery		**0**	**$0**	**0**	**$0**	**0**	**$0**
TOTAL		**0**	**$0**	**0**	**$0**	**0**	**$0**
GRAND TOTAL			**$0**				
Total # of students							
Cost per student							

Instructional Costs of		FACULTY		TAs/GAs		Professional Staff	
Redesigned Course		# of Hours	Total Cost	# of Hours	Total Cost	# of Hours	Total Cost
		Hourly rate =		Hourly rate =		Hourly rate =	
I. Course Preparation							
A. Curriculum Development			$0		$0		$0
B. Materials Acquisition			$0		$0		$0
C. Materials Development			$0		$0		$0
1. Lectures/presentations			$0		$0		$0
2. Learning materials/software			$0		$0		$0
3. Diagnostic assessments			$0		$0		$0
4. Assignments			$0		$0		$0
5. Tests/evaluations			$0		$0		$0
Sub-Total		**0**	**$0**	**0**	**$0**	**0**	**$0**
D. Faculty/TA Devmt/Training							
1. Orientation			$0		$0		$0
2. Staff meetings			$0		$0		$0
3. Attend lectures			$0		$0		$0
Sub-Total		**0**	$0	**0**	$0	**0**	$0
Total Preparation		**0**	**$0**	**0**	**$0**	**0**	**$0**
II. Course Delivery							
A. Instruction							
1. Diagnose skill/knowledge			$0		$0		$0
2. Presentation			$0		$0		$0
3. Interaction			$0		$0		$0
4. Progress monitoring			$0		$0		$0
Sub-Total		**0**	**$0**	**0**	**$0**	**0**	**$0**
B. Evaluation							
1. Test proctoring			$0		$0		$0
2. Tests/evaluation			$0		$0		$0
Sub-Total		**0**	**$0**	**0**	**$0**	**0**	**$0**
Total Delivery		**0**	**$0**	**0**	**$0**	**0**	**$0**
TOTAL		**0**	**$0**	**0**	**$0**	**0**	**$0**
GRAND TOTAL			**$0**				
Total # of students							
Cost per student							

Five Models for Assessing Student Learning

What follows is a summary of the most effective and efficient ways to assess student learning.

<u>Improved Learning</u>

The basic assessment question to be answered is the degree to which improved learning has been achieved as a result of the course redesign. Answering this question requires comparisons between the student learning outcomes associated with a given course delivered in its traditional form and in its redesigned form.

I. Establish the method of obtaining data

A. Pilot Phase

This comparison can be accomplished in one of two ways:

1. Parallel Sections (Traditional and Redesign)

Run parallel sections of the course in traditional and redesigned formats and look at whether there are any differences in outcomes—a classic "quasi-experiment."

2. Baseline "Before" (Traditional) and "After" (Redesign)

Establish baseline information about student learning outcomes from an offering of the traditional format "before" the redesign begins and compare the outcomes achieved in a subsequent ("after") offering of the course in its redesigned format.

B. Full Implementation Phase

Since there will not be an opportunity to run parallel sections once the redesign reaches full implementation, use baseline data from a) an offering of the traditional format "before" the redesign began, or b) the parallel sections of the course offered in the traditional format during the pilot phase.

The key to validity in all cases is a) to use the same measures and procedures to collect data in both kinds of sections and, b) to ensure as fully as possible that any differences in the student populations taking each section are minimized (or at least documented so that they can be taken into account.)

II. Choose the measurement method

The degree to which students have actually mastered course content appropriately is, of course, the bottom line. Therefore, some kind of credible assessment of student learning is critical to the redesign project.

Five measures that may be used are described below.

A. Comparisons of Common Final Exams

Some projects use common final examinations to compare student learning outcomes across traditional and redesigned sections. This approach may include sub-scores or similar indicators of performance in particular content areas as well as simply an overall final score or grade. (Note: If a grade is used, there must be assurance that the basis on which it was awarded is the same under both conditions—e.g., not "curved" or otherwise adjusted.)

1. Internal Examinations (Designed by Faculty)

Parallel Sections Example: "During the pilot phase, students will be randomly assigned to either the traditional course or the redesigned course. Student learning will be assessed mostly through examination developed by departmental faculty. Four objectively scored exams will be developed and used commonly in both the traditional and redesigned sections of the course. The exams will assess both knowledge of content and critical thinking skills to determine how well students meet the six general learning objectives of the course. Students will take one site-based final exam as well. Student performance on each learning outcome measure will be compared to determine whether students in the redesigned course are performing differently than students in the traditional course."

Before and After Example: "The specifics of the assessment plan are sound, resting largely on direct comparisons of student exam performance on common instruments in traditional and re-designed sections Sociology faculty have developed a set of common, objective, questions that measure the understanding of key sociological concepts. This examination has been administered across all sections of the course for the past five years. Results obtained from the traditional offering of the course will be compared with those from the redesigned version."

2. External Examinations (Available from Outside Sources)

Parallel Sections Example: "The assessment plan involves random assignment of students to "experimental" (redesign) and "control" (traditional) groups operating in parallel during the pilot phase of implementation. Assessment will measure student success against established national (ACTFL) guidelines, including an Oral Proficiency Interview that has been widely validated and is also in use in K-12 settings. This will allow the university to compare results of the redesign to baseline literature about results of traditional pedagogy, to compare the added effect of use of multimedia to the same material delivered conventionally, and to gauge the effect of new remediation strategies on student performance."

Before and After Example: "The centerpiece of the assessment plan with respect to direct measures of student learning is its proposed use of the ACS Blended Exam in Chemistry in a before/after design—administered to students in both traditional and redesigned course environments. A well-accepted instrument in chemistry, the ACS Exam has the substantial advantage of allowing inter-institutional comparisons according to common standards."

B. Comparisons of Common Content Items Selected from Exams

If a common exam cannot be given—or is deemed to be inappropriate—an equally good approach is to embed some common questions or items in the examinations or assignments administered in the redesigned and traditional delivery formats. This design allows common baselines to be established, but still leaves room for individual faculty members to structure the balance of these finals in their own ways where appropriate. For multiple-choice examinations, a minimum of twenty such questions should be included. For other kinds of questions, at least one common essay, or two or three problems should be included.

Parallel Sections Example: "The primary technique to be used in assessing content is common-item testing for comparing learning outcomes in the redesigned and traditional formats. Traditional and redesigned sections will use many of the same exam questions. Direct comparisons on learning outcomes are to be obtained on the basis of a subset of 30 test items embedded in all final examinations."

Before and After Example: "The assessment plan must address the need to accommodate a total redesign in which running parallel sections is not contemplated. The plan calls for a "before/after" approach using 30 exam questions from the previously delivered traditionally-configured course and embedding them in exams in the redesigned course to provide some benchmarks for comparison."

C. Comparisons of Pre- and Post-tests

A third approach is to administer pre- and post-tests to assess student learning gains within the course in both the traditional and redesigned sections and to compare the results. By using this method, both post-test results and "value-added" can be compared across sections.

Parallel Sections Example: "The most important student outcome, substantive knowledge of American Government, will be measured in both redesigned and traditional courses. To assess learning and retention, students will take: a pre-test during the first week of the term and a post-test at the end of the term. The Political Science faculty, working with the evaluation team, will design and validate content-specific examinations that are common across traditional and redesigned courses. The instruments will cover a range of behaviors from recall of knowledge to higher-order thinking skills. The examinations will be content-validated through the curriculum design and course objectives."

Before and After Example: "Student learning in the redesigned environment will be measured against learning in the traditional course through standard pre- and post-tests. The university has been collecting data from students taking Introduction to Statistics, using pre- and post-tests to assess student learning gains within the course. Because the same tests are administered in all semesters, they can be used to compare students in the redesigned course with students who have taken the course for a number of years, forming a baseline about learning outcomes in the traditional course. Thus, the institution can compare the learning gains of students in the newly redesigned learning environment with the baseline measures already collected from students taking the current version of the course."

D. Comparisons of Student Work Using Common Rubrics

Naturally occurring samples of student work (e.g. papers, lab assignments, problems, etc.) can be collected and their outcomes compared—a valid and useful approach if the assignments producing the work to be examined really are quite similar. Faculty must have agreed in advance on *how* student performance is to be judged and on the *standards* for scoring or grading (a clear set of criteria or rubrics to grade assignments.) Faculty members should practice applying these criteria in advance of the actual scoring process to familiarize themselves with it and to align their standards. Ideally, some form of assessment of inter-rater agreement should be undertaken.

Parallel Sections Example: "Students complete four in-class impromptu writing assignments. A standard set of topics will be established for the traditional and redesigned sections. A standardized method of evaluating the impromptu essays has already been established and will be used in grading each assignment. The essays are graded by using a six-point scale. The reliability measure for this grading scale has been established at 0.92. Additionally, each paper is read by at least two readers. The grading rubric will be applied to the four standard writing assignment prompts administered in parallel in simultaneously offered redesigned and traditional course sections."

Before and After Example: "The assessment plan is quite sophisticated, involving both "before/after" comparisons of student mastery of statistics concepts in the traditional course and the redesigned course. The design itself involves direct comparisons of performance on common assignments and problem sets using detailed scoring guides (many of which were piloted and tested previously and are thus of proven utility). Because the department has already established and benchmarked learning outcomes for statistics concepts in considerable detail, and uses common exercises to operationalize these concepts, the basis of comparison is clear."

E. Comparisons of Course Grades Using Common Criteria

Course grades may be used as the measure of learning if—and only if—grades are assigned on the basis of comparable performances on common instruments using common grading standards. Faculty must have agreed in advance on standards for scoring or grading.

Parallel Sections Example: "The department utilizes common grading criteria that address topic and purpose, organization and coherence, development, style, and grammar and mechanics. Specific descriptions within each of the areas are provided to distinguish between grades of A, B, C, D, and F, and faculty members are trained in the interpretation of the criteria. The criteria were established collectively and are applied across all sections of College Composition."

Before and After Example: "Assessment will use before/after comparisons of student performance in the traditional and redesigned settings. The traditional and redesigned sections of the course will use the same textbook assignments and will pursue the same department learning goals. Quizzes, hour exams, and lab assignments will test student knowledge of the same material, and the final exam will include common multiple choice questions for all course sections. Direct measures of achievement will be based on common final examinations that have been administered for many years in the traditional courses. The team will track the proportion of students who receive a C or better to see if student success rates improve."

<u>Tips</u>

- Avoid creating "add-on" assessments to regular course assignments such as specially constructed pre and post-tests. These measures can raise significant problems of student motivation. It is easier to match and compare regular course assignments.

- If parallel sections are formed based on student choice, it would be a good idea to consider whether differences in the characteristics of students taking the course in the two formats might be responsible for differences in results. Final learning outcomes could be regressed on the following: status (full vs. part-time); high-school percentile rank; total SAT score; race; gender; whether or not the student was taught by a full-time or part-time faculty member; and whether or not the student was a beginning freshman.

- In addition to choosing one of the five required measures, the redesign team may want to conduct other comparisons between the traditional and redesigned formats such as:

  1. Performance in follow-on courses
  2. Attitude toward subject matter
  3. Deep vs. superficial learning
  4. Increases in the number of majors in the discipline
  5. Student interest in pursuing further coursework in the discipline
  6. Differences in performance among student subpopulations
  7. Student satisfaction measures

PILOT ASSESSMENT PLAN

Institution _____

Course Title _____

1) Which method of comparing learning outcomes do you intend to use? (check all that apply)

_____ Parallel Sections

____ # of traditional sections ____ # of students in each section   ____total # of students

____ # of redesign sections ____ # of students in each section   ____total # of students

_____ Before and After

Source of baseline information:

Timeframe _____
                  (e.g., fall 2002 semester, AY 2003-2004, five-year average 1999-2004)

____ # of traditional sections ____ # of students in each section   ____total # of students

____ # of redesign sections ____ # of students in each section   ____total # of students

2) Which method of obtaining data do you intend to use? (check all that apply)

_____ A - Comparisons of common final exams (internal and external)

_____ B - Comparisons of common content items selected from exams

_____ C - Comparisons of pre- and post-tests

_____ D - Comparisons of student work using common rubrics

_____ E - Comparisons of course grades using common criteria

Describe briefly: _____
_____
_____
_____
_____
_____
_____
_____
_____
_____

FULL IMPLEMENTATION ASSESSMENT PLAN

Institution _____

Course Title _____

1) Which source of baseline information do you intend to use? (check all that apply)

_____ an offering "before" the redesign began

_____ parallel sections during the pilot phase

Timeframe _____
                         (e.g., fall 2002 semester, AY 2003-2004, five-year average 1999-2004)

_____ # of traditional sections _____ # of students in each section _____ total # of students

_____ # of redesign sections _____ # of students in each section _____ total # of students

2) Which method of obtaining data do you intend to use? (check all that apply)

_____ A - Comparisons of common final exams (internal and external)

_____ B - Comparisons of common content items selected from exams

_____ C - Comparisons of pre- and post-tests

_____ D - Comparisons of student work using common rubrics

_____ E - Comparisons of course grades using common criteria

Describe briefly: _____
_____
_____
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_____
_____

Cost Reduction Strategies

The 30 projects involved in the Program in Course Redesign used a variety of strategies to reduce instructional costs. Here is a summary of those strategies that have proven to be most effective.

Step 1. Identify the enrollment profile of the course
- Stable enrollment
- Growing enrollment

Step 2. Choose the appropriate cost reduction strategy.

Step 3. Choose the labor savings tactic(s) that will allow you to implement the chosen strategy with no diminution in quality.

- Substitute coordinated development and delivery of the whole course and shared instructional tasks for individual development and delivery of each individual course section.
- Substitute interactive tutorial software for face-to-face class meetings.
- Substitute automated grading of homework, quizzes, exams for hand grading.
- Substitute course management software for human monitoring of student performance and course administration.
- Substitute peer interaction or interaction with other personnel for one-to-one faculty/student interaction.
- Substitute online training materials for face-to-face training of GTAs, adjuncts and other personnel.

Is the course enrollment stable?

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 in order to produce cost savings. There are three strategies that will enable you to do this:

- Reduce the number of sections and increase the section size. This will allow you to reduce the number of people involved in teaching the course.

Example: Fairfield University reduced the number of sections from 7 to 2 and increased the number of students in each section from 35-40 to 130-140. These changes enabled Fairfield to reduce the number of full-time faculty teaching the course from 7 to 4, freeing 3 to teach other courses.

- Reduce the number of graduate teaching assistants (GTAs) involved in the course.

Examples: Penn State reduced the number of GTAs from 12 in the traditional course to 4 in the redesigned course. The University of Iowa reduced the number of GTAs from 21.5 to 17.5, and Carnegie Mellon University reduced the number of GTAs from 10 to 5.

NOTE: If you do not have GTAs (or you do not want to reduce the number of GTAs), do not despair. Of the 30 projects in the Program in Course Redesign, only 9 (2 of 10 in Round I, 5 of 10 in Round II, and 2 of 10 in Round III) employed this strategy. The other 21 used other cost-reduction strategies.

- Change the mix of personnel teaching the course.

Example: Tallahassee Community College (TCC) 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% of the course, and adjuncts taught 30%. In the redesigned course, full-time faculty teach 33% of the course, and adjuncts teach 67%. Full-time faculty were freed to teach second-level courses where finding adjuncts is much more difficult. By making these changes, TCC reduced the cost-per-student by 43% and produced an annual dollar savings of $321,000, the highest dollar savings in Round III.

Examples: Both the University at Buffalo (UB) and the University of Colorado-Boulder (UC) substituted undergraduate learning assistants (ULAs) for GTAs. At UB, the number of assistants available to help students was doubled. The hourly cost of a GTA was $39 compared to $8 for an ULA. ULAs turned out to be better at assisting their peers than GTAs because of the ULAs' better understanding of students' common misconceptions and their superior communication skills. While the employment of ULAs at UC was driven by the need to reduce costs ($23 vs. $9 per hour), the ULAs were more effective than most GTAs. ULAs were highly motivated to make the course a success. Because students regarded the ULAs as peers, they were more open about their learning difficulties with them than with GTAs.

By mixing and matching these strategies, you can create opportunities for further cost reduction. If you reduce the number of sections and increase the section size (and reduce the number of people involved in teaching the course), you may also

- Reduce the number of graduate teaching assistants (GTAs); and/or change the mix of personnel teaching the course.

Example: Virginia Tech reduced the number of sections from 38 to 1 and increased the number of students in each section from 40 to 1500. In the traditional format, a mix of tenure-track faculty (10), instructors (13), and GTAs (15) taught the 38 sections. In the redesign, tenure-track faculty members' time declined by 85%, and the time spent by GTAs decreased by 82%. The time for all instructors declined by 77%. The redesign added 1,885 hours of undergraduate peer tutoring. Students now receive greater one-on-one assistance: the total interaction time of all personnel increased from 1,140 hours in the traditional model to 2,305 hours in the redesigned course. Full-time faculty were freed to teach upper division math courses; GTAs were deployed to other departmental assignments. By making these changes, Virginia Tech reduced the cost-per-student by 77%, the highest percentage in Round I.

Example: The University of Southern Mississippi reduced the number of sections from 30 to 2 and increased the number of students in each section from 65 to 1000. These changes enabled the university to reduce the number of faculty teaching the course from 16 (8 full-time faculty and 8 adjuncts) to the equivalent of 2 full-time faculty and 4 GTAs. Prior to the redesign, 50% of the course was taught by full-time faculty, and 50% was

taught by adjuncts. Southern Mississippi eliminated adjuncts completely. The course is now taught 100% by full-time faculty supported by GTAs for writing assignment grading. By making these changes, six full-time faculty were freed to teach other courses, and the funds previously used to hire adjuncts were made available for a variety of academic enhancements in the department. The University of Southern Mississippi reduced the cost-per-student by 56%, the highest percentage reduction in Round III.

Do you want to accommodate enrollment growth?

If accommodating more students is a goal, you do not <u>have</u> to reduce the number of people involved in teaching the course in order to produce cost savings, although you <u>can</u> do this. Here are three strategies that will enable you to serve more students:

- Increase the number of sections, keep section size the same, keep personnel the same, and serve additional students.

Example: The University of Illinois at Urbana-Champaign has almost doubled the enrollment in three Spanish courses with no increase in staffing. In the traditional format, instructors met with one group (~24 students) four times per week. In the redesigned format, they meet with two groups (~20 students) two times per week each.

Example: Portland State University maintained section size at 20-24 and doubled the number of sections offered, which supported an increase in the total number of students from 690 to 1270. Because of seat-time reduction, the number of sections can be doubled in the same physical space with a small increase in personnel.

- Reduce the number of sections and increase the section size, change the mix and serve additional students

Example: The University of Tennessee-Knoxville (UTK) increased the number of students served from 1500 to 2000. In the traditional format, 16 adjunct instructors and 6 GTAs taught 57 sections (~27 students) each. In the redesigned format, GTAs are paired with experienced instructors as support partners, reducing the number of sections from 57 to 38 and doubling the number of students in each section from 27 to 54 students. UTK reduced the cost-per-student by 74%, the highest percentage in Round II.

Example: Florida Gulf Coast University (FGCU) reduced the number of sections from 31 to 2 and increased the number of students served in the first year of the redesign from 800 to 950. Full-time faculty taught 20% of the traditional course, and adjuncts taught 80%. FGCU eliminated adjuncts completely; the course is now taught 100% by full-time faculty supported by a new position called the preceptor. Preceptors, most of whom have a B.A. in English, are responsible for interacting with students via email, monitoring student progress, leading Web Board discussions and grading critical analysis essays. Each preceptor works with 10 peer learning teams or a total of 60 students. Replacing adjuncts independently teaching small sections ($2,200 per 30-student section) with preceptors assigned a small set of specific responsibilities ($1,800 per 60-student cohort) in the context of a consistent, faculty-designed course structure will allow FCGU to accommodate ongoing enrollment growth while steadily reducing its cost-per-student.

- Change the mix of personnel teaching the course and serve additional students.

Example: Rio Salado College created a new position called the course assistant to troubleshoot technology questions, monitor student progress, and alert instructors to student difficulties with the material. Approximately 90% of questions students asked were non-instructional in nature. Adding the course assistant @ $12 per hour allowed Rio to increase the number of students that could be handled by one instructor from 30 to 100.

FIVE MODELS FOR COURSE REDESIGN SUMMARY

SUPPLEMENTAL MODEL

- Retains the basic structure of the traditional course, particularly the number of class meetings.

- May simply supplement lectures and textbooks with technology-based, out-of-class activities to encourage greater student engagement with course content and to ensure that students are prepared when they come to class.

- May add technology-based, out-of-class activities and <u>also</u> change what goes on in the class by creating an active learning environment within a large lecture hall setting.

<u>Examples that Add Out-of-Class Activities and Do Not Change In-Class Activities</u>

- Students use a two-disc CD-ROM--which contains interactive activities, simulations, and movies--to review and augment text material. Students receive credit for completing four online mastery quizzes each week and are encouraged to take the quizzes as many times as needed until they attain a perfect score. Only the highest scores count.

- An automated, intelligent tutoring system monitors students' work as during lab exercises, providing feedback when students pursue an unproductive path, and closely tracking and assessing a student's acquisition of skills—in effect, providing an individual tutor for each student.

<u>Examples that Add Out-of-Class Activities and Change In-Class Activities</u>

- Students review learning objectives, key concepts and supplemental material posted on the class Web site prior to class and complete online quizzes, which provide immediate feedback to students and data for instructors to assess student knowledge levels. During class, the instructors use a commercially available, interactive technology that compiles and displays students' responses to problem-solving activities. Class time is divided into ten- to fifteen-minute lecture segments followed by sessions in which students work in small groups applying concepts to solve problems posed by the instructors. Instructors reduce class time spent on topics the students clearly understand, increase time on problem areas, and target individual students for remedial help.

- A 200-student class meets twice a week in an auditorium. The first meeting focuses on an instructor overview of the week's activities. About a dozen discussion questions are posted on the Web. Students meet for one hour in small learning teams of 10-15 students (supervised by undergraduate learning assistants) to prepare answers collaboratively and to carry out inquiry-based team projects. Teams post written answers to all questions. At the second class meeting, the instructor leads a discussion session, directing questions to the learning teams. The instructor has reviewed all posted answers prior to class and devotes class time to questions with dissonant answers among teams.

REPLACEMENT MODEL

- Reduces the number of in-class meetings but does not eliminate all in-class meetings.
- Replaces (rather than supplements) some in-class time with online, interactive learning activities.
- Gives careful consideration to why (and how often) classes need to meet in face-to-face
- Assumes that certain activities can be better accomplished online--individually or in small groups--than in a face-to-face class.
- May keep remaining in-class activities more or less the same.
- May make significant changes in remaining in-class meetings.
- May schedule out-of-class activities in 24*7 computer labs or totally online so that students can participate anytime, anywhere.

Examples that Substitute Out-of-Class Activities for Some In-Class Time and Do Not Change In-Class Activities

- Reduce lectures from 3 to 1 per week (keeping 1 lecture the same) and change 2 recitation sections to 2 computer-studio labs, where students work individually and collaboratively on computer-based activities. Students are tested on assigned readings and homework using Readiness Assessment Tests (RATs) 5-7 times during the term for 30% of their grade. Students prepare outside of class by reading the textbook, completing assignments, and using Web-based resources. Students take the tests individually and then immediately in groups of four. RATS motivate students to keep on top of the course material and enable faculty to detect areas in which students are not grasping the concepts.

- Reduce lectures from 2 to 1 per week (keeping 1 lecture the same) and reduce discussion sessions from 2 to 1 per week. Substitute Web-based tutorial modules that lead students through a topic in 6 to 10 interactive pages. Then, a debriefing section includes questions that test whether the student has mastered the content. Diagnostic feedback points out why an incorrect response is not appropriate. Students can link directly from a difficult problem to additional tutorials that help them learn the concepts.

Examples that Substitute Out-of-Class Activities for Some In-Class Time and Change In-Class Activities

- *Spanish*: Reduce class-meeting times from 3 to 2 per week. Move grammar instruction, practice exercises, testing, writing, and small-group activities focused on oral communication to the online environment. Use in-class time for developing and practicing oral communication skills.

- *English composition*: Reduce class-meeting times from 3 to 1 per week and substitute 2 workshops. Use online resources to provide diagnostic assessments resulting in individualized learning plans; interactive tutorials in grammar, mechanics, reading comprehension, and basic research skills; and discussion boards to facilitate the development of learning communities. Use in-class time to work on writing activities.

EMPORIUM MODEL

- Eliminates all class meetings and replaces them with a learning resource center featuring online materials and on-demand personalized assistance.

- Replaces multiple sections with one large section of all students.

- Depends heavily on instructional software, including interactive tutorials, practice exercises, solutions to frequently asked questions, and online quizzes and tests.

- Allows students to choose when to access course materials, what types of learning materials to use depending on their needs, and how quickly to work through the materials.

- Uses a staffing model that combines faculty, GTAs, and peer tutors who respond directly to students specific needs and direct them to resources from which they can learn.

- Requires a significant commitment of space and equipment.

- More than one course can be taught in an emporium, thus leveraging the initial investment.

Example with Open Attendance

- An open attendance model can be used when students are highly motivated, respond well to greater flexibility and are accustomed to scheduling work in the emporium around their other course responsibilities.

Examples with Required Attendance

- Elements of required attendance should be added when students are not highly motivated, founder when faced with greater flexibility and are inexperienced in scheduling work in the emporium around their other course responsibilities.

- Mandatory attendance (e.g., a minimum of 3.5 hours in the emporium) ensures that students spend sufficient time on task.

- Mandatory weekly group meetings enable instructors to follow up where testing has identified weaknesses or emphasize particular applications. Group activities help build community among students and with instructors.

ONLINE MODEL

- Eliminates all in-class meetings and moves all learning experiences online.

- Adopts successful design elements of Supplemental, Replacement and Emporium models including Web-based, multi-media resources, commercial software, automatically evaluated assessments with guided feedback, links to additional resources and alternative staffing models.

What This Model Is Not

- Individual faculty members design and deliver multiple course sections, each of which is relatively small in size.
- Web-based materials are used largely as supplemental resources rather than as substitutes for direct instruction.
- Instructors are responsible for all interactions, personally answering every inquiry, comment, or discussion.
- Faculty members spend more time teaching online and interacting with students than in classroom teaching.

Example that Depends on Heavy Use of Instructional Software

- Software presents course content; instructors do not need to spend time delivering content.
- Software increases the amount and frequency of feedback to students. All assignments are graded on the spot.
- Software enables self-pacing: each student can work as long as needed on any particular topic, moving quickly or slowly through the material.
- Software provides a built-in tracking system that allows the team to know every student's status, both time-on-task and progress through the modules.
- May add a course assistant to address non-content-related questions and to monitor students' progress, thus freeing the instructor to concentrate on academic rather than logistical interactions with students.

Example that is Web-based

- Combines multiple sections into a single 800-student online section organized around four four-week modules, each taught by faculty who are expert in the topic of the module.
- Faculty members are responsible for content materials, quizzes, and exams.
- A course coordinator is responsible for overall course administration; graduate teaching assistants grade and respond to student problems.
- Students complete a pre- and post-quiz for each module. Links to additional required readings, audio and/or video files, and other resources are provided.
- Eliminates duplication of effort for faculty who divide tasks among themselves and target their efforts to particular aspects of course delivery.

BUFFET MODEL

- Customizes the learning environment for each student based on background, learning preference, and academic/professional goals

- Requires an online assessment of a student's learning styles and study skills.

- Offers students an assortment of individualized paths to reach the same learning outcomes.

- Provides structure for students through an individualized learning contract which gives each student a detailed listing, module by module, of what needs to be accomplished, how this relates to the learning objectives, and when each part of the assignment must be completed.

- Includes an array of learning opportunities for students: lectures, individual discovery laboratories (in-class and Web-based), team/group discovery laboratories, individual and group review (both live and remote), small-group study sessions, videos, remedial/prerequisite/procedure training modules, contacts for study groups, oral and written presentations, active large-group problem-solving, homework assignments (GTA graded or self-graded), and individual and group projects.

- Uses an initial in-class orientation to provide information about the buffet structure, the course content, the learning contract, the purpose of the learning styles and study skills assessments, and the various ways that students might choose to learn the material.

- Modularizes course content.

- May allow students to earn variable credit based on how many modules they successfully complete by the close of the term, thus reducing the number of course repetitions. Students complete the remaining modules in the next term.

- Eliminates duplication of effort for faculty who divide tasks among themselves and target their efforts to developing and offering particular learning opportunities on the buffet.

- Enables the institution to evaluate the choices students make vis a vis the outcomes they achieve (e.g., if student do not attend lectures, the institution can eliminate lectures)

CASE STUDY
DEVELOPMENTAL MATHEMATICS COURSE

Intermediate Algebra, a pre-general studies course, enrolls about 1500 students every year. One half of all entering undergraduate students place into Intermediate Algebra, which essentially repeats material that students should have learned in high school. Faculty members teach the course in a traditional lecture format using common syllabi, department-wide tests and final exams that they develop collectively. Graduate teaching assistants (GTAs), who undergo substantial training and supervision, support faculty and students in the course.

The most significant academic problem in Intermediate Algebra is poor student performance. Because students enroll in such high numbers, faculty cannot track homework assignments as carefully as needed due to staffing limitations. Inadequate student-progress tracking and delays in responses to student work also impact student performance. More than 50% of students receive D or F grades, and students often need to repeat the course several times. Student success in this course has a direct impact on graduation rates. Students in the 1993 freshman class, for example, had an overall six-year graduation rate of 55% compared to a 30% rate for students who received a D or F in the Intermediate Algebra course.

The course is both expensive and inefficient. The instructors are the sole source of live instruction and must hand grade all assessments. Material is covered sequentially during a set lecture schedule, which requires a very diverse learning community to move fairly lock-step through the curriculum. At any given time, a significant number of students are engaged in instruction at an inappropriate level. The net result is that it takes a considerable amount of time (much of it wasted) for students to advance through the curriculum.

The prime objective of the course redesign is to use technology to create an active learning environment that engages students and thus increases student success rates in the course. The redesigned course will substitute capital for labor, offloading labor-intensive feedback, grading, and record-keeping from individual instructors to sophisticated software that can track and respond immediately to student work.

The goals for the redesigned course include the following:

- Move from lecture to a flexible, computer-assisted, tutorial format that allows the student to focus precisely on his or her questions and difficulties

- Encourage student attendance and homework completion by creating a more inviting learning environment

- Capture attendance and homework information electronically, allowing instructors to engage in more direct tutorial assistance

- Change the learning environment from passive to active and thus increase student performance

Summary of the Current Course Structure

- 22 sections per term of 35 students each

- 3 one-hour lectures per week

- Five or six faculty members teach one or two sections each term. They plan and deliver three lectures per week, develop and evaluate tests and assignments, and attend staff meetings.

- Five or six GTAs teach one or two sections each term. They plan and deliver three lectures per week, evaluate tests and assignments, and attend orientation and staff meetings.

Developmental Math Course			
Instructional Costs per Hour			
Faculty			
Annual Salary & Benefits	$35,000		
% devoted to instruction	100%		
% devoted to this course	50%		
$ devoted to this course	$17,500		
Contact hours for course	180		
Out-of-class hours	500		
Total hours	680		
Cost per hour	$26		
Graduate TAs/Gas			
Salary	$15,760		
% devoted to instruction	100%		
% devoted to this course	100%		
$ devoted to this course	$15,760		
Contact hours for course	180		
Out-of-class hours	500		
Total hours	680		
Cost per hour	$23		
Undergraduate TAs			
Cost per hour	$7		

Instructional Cost of Traditional Course			
	Faculty		**Graduate TAs**	
	Total Hours	Total Cost	Total Hours	Total Cost
	Hourly Rate = $26		Hourly Rate = $23	
I. Course Preparation				
A. Curriculum Development				
B. Materials Acquisition				
C. Materials Development				
1. Lectures/presentations	660	$17,160	660	$15,180
2. Learning materials/soft	165	$4,290		
3. Diagnostic assessmen	22	$572		
4. Assignments	165	$4,290	412	$9,476
5. Tests/evaluations	110	$2,860		
Sub-Total	**1122**	**$29,172**	**1072**	**$24,656**
D. Faculty/TA Devmt/Training				
1. Orientation	44	$1,144	88	$2,024
2. Staff meetings	110	$2,860	110	$2,530
Sub-Total	**154**	**$4,004**	**198**	**$4,554**
Total Preparation	**1276**	**$33,176**	**1270**	**$29,210**
II. Course Delivery				
A. Instruction				
1. Diagnose skill/knowled	11	$286	11	$253
2. Presentation	990	$25,740	990	$22,770
3. Interaction	990	$25,740	990	$22,770
4. Progress monitoring	88	$2,288	88	$2,024
Sub-Total	**2079**	**$54,054**	**2079**	**$47,817**
B. Evaluation				
1. Test proctoring	121	$3,146	121	$2,783
2. Tests/evaluation	264	$6,864	264	$6,072
Sub-Total	**385**	**$10,010**	**385**	**$8,855**
Total Delivery	**2464**	**$64,064**	**2464**	**$56,672**
TOTAL	**3740**	**$97,240**	**3734**	**$85,882**
GRAND TOTAL		**$183,122**		
Total # of students		**1500**		
Cost per student		**$122**		

CASE STUDY
COLLEGE COMPOSITION COURSE

College Composition, a required course for all A.A. and A.S. degree-seeking students, serves approximately 3,000 students annually in 100 sections of 30 students each in a traditional setting that combines lecture and writing activities. This course serves as the foundation for reading and writing courses across the curriculum. Students successfully completing College Composition must take at least one more English course and two Humanities courses that require extensive writing. There is also a state graduation requirement that assesses essay writing, English language skills and readings skills.

College Composition faces a number of academic problems in its current form:

- The student body is diverse, making it difficult to address individual needs.

- Considerable class time is given to reviewing and re-teaching basic skills, thus, reducing the amount of time students have to engage in the writing process.

- Success rates are poor (less than 60% annually), and many students have to repeat the course.

- The large numbers of students repeating the course places a financial burden on the English Department.

- There is a heavy dependence on adjunct instructors, leading to problems with instructional consistency.

- Low retention and poor transfer of skills to other disciplines are problems.

The prime objective of the redesign is to provide students with student-centered learning experiences that promote active learning through interactive technology, individualized learning plans and collaborative activities. The English Department has established a clear set of performance objectives and basic requirements of style and effectiveness, all part of a common syllabus. They seek to integrate reading and writing activities in a more consistent way, so that students develop skills they will need in subsequent courses.

The goals for the redesigned course include the following:

- Increase the consistency among the sections using technology-supported diagnostics, web lessons and other online supports
- Individualize programs for students learning
- Improve quality by increasing time on task
- Increase access by providing online any time/any place options
- Provide more timely feedback for students
- Decrease faculty time spent developing and evaluating diagnostics
- Decrease faculty time spent in preparing and delivering lectures
- Increase time for one-to-one and small group peer activity
- Decrease costs associated with the Writing Center

Summary of the Current Course Structure

- 3 contact hours per week: 2 one-hour lectures and 1 one-hour workshop style class

- Fifteen full-time faculty teach 64 sections annually. They prepare and deliver lectures; prepare and facilitate one workshop style class; prepare/revise, administer and interpret diagnostic assessments; prescribe activities based on diagnostics; create assignments and writing activities; grade written assignments; hold five office hours per week; spend four hours per week in the Writing Center; and monitor student progress.

- Ten adjunct instructors teach 36 sections annually. They prepare and deliver lectures and facilitate one workshop style class, administer and interpret diagnostic assessments, prescribe activities based on diagnostics, create assignments and writing activities, grade written assignments, monitor student progress and hold two office hours per week.

- Twenty graders provide approximately 27 hours of grading assistance per section. They provide comments and corrections for grammar and mechanics, and assist in grading final papers.

- One Writing Center Director, four permanent part-time paraprofessionals, and four hourly part-time paraprofessionals work in the Writing Center. They work one-to-one with students on grammar and mechanics, thesis, structure, style, etc., and provide an aggregate 147 hours per week of assistance to College Composition students while class is in session.

College Composition Course

Instructional Costs per Hour

Faculty	Full-time	Adjunct
Annual Salary and Benefits	$68,300	$1,563
% devoted to instruction	100%	100%
% devoted to this course	13%	100%
$ devoted to this course	$8,538	$1,563
Contact hours for course	42	42
Out of class hours	162	120
Total hours	204	162
Cost per hour	$42	$10

Professional/Support Staff Positions	$ per Hour
Writing Center Director	$26
Permanent Part-Time(PPT)	$20
Hourly (Writing Center)	$8
Graders	$8
Librarian (Faculty)	$42

Instructional Costs of the Traditional Course

	FACULTY	32	Adjuncts	18	Writing Center Director		Writing Center (PPT))		Writing Center (hourly		Grader	
	# of Hours	Total Cost	# of Hours	Total Cost	# of Hours	Total Cost	# of Hours	Total Cost	# of Hours	Total Cost	# of Hours	Total Cost
	Hourly rate $42		Hourly rate $10		Hourly rate $26		Hourly rate $20		Hourly rate $8		Hourly rate = $8	
I. Course Preparation												
A. Curriculum Development		$0		$0		$0		$0		$0		$0
B. Materials Acquisition		$0		$0		$0		$0		$0		$0
C. Materials Development		$0		$0		$0		$0		$0		$0
1. Lectures/presentations	576	$24,106	324	$3,240		$0		$0		$0		$0
2. Learning materials/software	288	$12,053	65	$650		$0		$0		$0		$0
3. Diagnostic assessments	115	$4,813	162	$1,620		$0		$0		$0		$0
4. Assignments	288	$12,053		$0		$0		$0		$0		$0
5. Tests/evaluations	115	$4,813		$0		$0		$0		$0		$0
Sub-Total	**1382**	**$57,837**	**551**	**$5,510**	**0**	**$0**	**0**	**$0**	**0**	**$0**	**0**	**$0**
D. Faculty/TA Devmt/Training												
1. Orientation	288	$12,053	97	$970		$0		$0		$0		$0
2. Staff meetings	115	$4,813		$0		$0		$0		$0		$0
3. Attend lectures/workshops	58	$2,427		$0		$0		$0		$0		$0
Sub-Total	**461**	**$19,293**	**97**	**$970**	**0**	**$0**	**0**	**$0**	**0**	**$0**	**0**	**$0**
Total Preparation	**1843**	**$77,130**	**648**	**$6,480**	**0**	**$0**	**0**	**$0**	**0**	**$0**	**0**	**$0**

II. Course Delivery												
A. Instruction												
1. Diagnose skill/knowledge	704	$29,462	216	$2,160		$0		$0		$0		$0
2. Presentation (incl 100 hrs librarian)	1508	$63,110	792	$7,920		$0		$0		$0		$0
3. Interaction	3232	$135,259	1008	$10,080	1000	$26,000	4400	$87,360	1500	$12,000		$0
4. Progress monitoring	448	$18,749	108	$1,080		$0		$0		$0		$0
Sub-Total	**5892**	**$246,580**	**2124**	**$21,240**	**1000**	**$26,000**	**4400**	**$87,360**	**1500**	**$12,000**	**0**	**$0**
B. Evaluation												
1. Test proctoring	256	$10,714	144	$1,440		$0		$0		$0		$0
2. Tests/evaluation	5184	$216,950	2916	$29,160		$0		$0		$0	2700	$21,600
Sub-Total	**5440**	**$227,664**	**3060**	**$30,600**	**0**	**$0**	**0**	**$0**	**0**	**$0**	**2700**	**$21,600**
Total Delivery	**11332**	**$474,244**	**5184**	**$51,840**	**1000**	**$26,000**	**4400**	**$88,000**	**1500**	**$12,000**	**2700**	**$21,600**
TOTAL	**13175**	**$551,374**	**5832**	**$58,320**	**1000**	**$26,000**	**4400**	**$88,000**	**1500**	**$12,000**	**2700**	**$21,600**
GRAND TOTAL		**$757,294**										
Total # of students		**3000**										
Cost per student		**$252**										

Homework for Workshop II

In preparation for the workshop, we would like your team to complete three tasks that will give you a taste of the redesign process and make the workshop a more productive and meaningful experience.

<u>Required Reading</u>

- [Round I Redesigns: Lessons Learned](#)
- [Round II Redesigns: Lessons Learned](#)
- [Round III Redesigns: Lessons Learned](#)

Analyses of the results of the three rounds of course redesign projects, with a focus on the most important quality improvement and cost reduction techniques used in the redesigns, the implementation issues they encountered, and the projected sustainability of the course redesigns.

- [Increasing Success for Underserved Students: Redesigning Introductory Courses (July 2005)](#)

A monograph examining the impact of the redesign techniques developed by the Program in Course Redesign on the success of adult students, students of color, and low-income students.

<u>Draft of sheets 1 and 2 of the Course Planning Tool (CPT)</u>

The Course Planning Tool (CPT) has proven to be an important part of the course redesign process because it facilitates a team analysis of all of the instructional tasks in both the traditional and redesigned format of the course as well as its associated costs. For the workshop, we would like you to complete a draft of sheets 1 and 2 of the CPT (the summary of personnel costs and the analysis of the course in its traditional format) for the course(s) you intend to redesign. This exercise will help you understand the various components of the course, consider those that can be changed and those that cannot, and analyze the sources of the costs of the course.

A downloadable version of the CPT, instructions for how to complete it and completed examples can be found on the Center's web site at http://www.thencat.org/PlanRes/CPTdesc.htm.

If you have difficulty downloading the tool, please contact Pat Bartscherer at patb@theNCAT.org.

If you have questions about completing the tool, please contact Carolyn Jarmon at cjarmon@theNCAT.org.

An electronic version of the CPT should be sent to Pat Bartscherer at patb@theNCAT.org.

<u>Workshop Presentation</u>

We would like each of your team members to be prepared to present a five-minute summary of your choice of redesign model and how you intend to implement the "Five Principles of Successful Course Redesign" within that model. For one part of the workshop, we intend to divide the large group into groups of 8, breaking up institutional teams, so that you can share your ideas about models and principles and receive feedback on your ideas.

References
- [Five Models for Course Redesign](#)

- [Five Principles of Successful Course Redesign](#)

We encourage you to consider all five redesign models as you think about your own plans rather than assuming that you should follow the model used by the core institutions in your particular discipline. (If you want to select a model based on what those in your discipline chose, that is, of course, also fine.) Our point is that we want you to make a thoughtful choice.

The National Center for
Academic Transformation

Corporate Associates Contact Information

The National Center for Academic Transformation and its Corporate Associates work closely together to ensure that educational institutions participating in cutting-edge course redesigns have knowledge of the best technology and best content to produce the best outcomes. By strengthening the communication between those creating the technology and content and those using it, we can further our shared mission of improved learning at reduced costs.

As project teams consider which tools to use, questions specific to a course redesign project may arise that cannot be answered by the sales representative that is assigned to your institution. If that situation arises, please refer to the contact information below for a person at each of the companies we currently work with that NCAT knows is familiar with the NCAT course redesign program and can help. In addition, teams might be contacted by these companies proactively but are under no obligation to work with them. Please note that NCAT does not endorse any particular company, software or tool but rather all tools that are proven to be effective in improving learning outcomes and reducing instructional costs.

Company	Contact(s)
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