Six Models for Course Redesign

http://www.thencat.org/R2R/R2R_Planning_Resources.htm
http://www.thencat.org/PlanRes/R2R_ModCrsRed.htm

The following links summarize the characteristics of the course redesign models that emerged from the Program in Course Redesign.

The Supplemental Model - The supplemental model retains the basic structure of the traditional course and a) supplements lectures and textbooks with technology-based, out-of-class activities, or b) also changes what goes on in the class by creating an active learning environment within a large lecture hall setting.

The Replacement Model - The replacement model reduces the number of in-class meetings and a) replaces some in-class time with out-of-class, online, interactive learning activities, or b) also makes significant changes in remaining in-class meetings.

The Emporium Model - The emporium model replaces lectures with a learning resource center model featuring interactive computer software and on-demand personalized assistance.

The Fully Online Model - The fully online model eliminates all in-class meetings and moves all learning experiences online, using Web-based, multi-media resources, commercial software, automatically evaluated assessments with guided feedback and alternative staffing models.

The Buffet Model - The buffet model customizes the learning environment for each student based on background, learning preference, and academic/professional goals and offers students an assortment of individualized paths to reach the same learning outcomes.

The Linked Workshop Model - The Linked Workshop model provides remedial/developmental instruction by linking workshops that offer students just-in-time supplemental academic support to core college-level courses.

The Supplemental Model details

- 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 also change what goes on in the class by creating an active learning environment within a large lecture hall setting.

Examples that Add Out-of-Class Activities and Do Not Change In-Class Activities

- 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.

University of New Mexico: General Psychology

- An automated, intelligent tutoring system monitors students' work 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.

Carnegie Mellon University: Introductory Statistics

Examples that Add Out-of-Class Activities and Change In-Class Activities

- 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.

University of Massachusetts-Amherst: Introductory Biology

- 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 details

The 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 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.

Penn State University: Elementary Statistics

- 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.

University of Wisconsin-Madison: General Chemistry

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.

Emporium Model Details

The Emporium Model

- Eliminates all lectures and replaces them with a learning resource center model featuring interactive software and on-demand personalized assistance.
- Depends heavily on instructional software, including interactive tutorials, practice exercises, solutions to frequently asked questions, and online quizzes and tests.
- Allows students to choose 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, peer tutors and others who respond directly to students' specific needs and direct them to resources from which they can learn.
- May require a significant commitment of space and equipment.
- More than one course can be taught in an emporium, thus leveraging the initial investment.

Examples: Mandatory Lab Hours Chosen by Students

Mandatory attendance (e.g., a minimum of 3.5 hours weekly in the emporium) ensures that students spend sufficient time on task and receive on-demand assistance. These hours may be scheduled at the student's convenience.

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.

Louisiana State University: College Algebra
The University of Alabama: Intermediate Algebra
The University of Idaho: Precalculus

Examples: Pre-Scheduled Mandatory Lab Hours

Mandatory attendance (e.g., a minimum of 3.5 hours weekly in the emporium) ensures that students spend sufficient time on task and receive on-demand assistance. These hours are scheduled by the institution for student cohorts.

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.

Cleveland State Community College: Basic Math, Elementary Algebra and Intermediate Algebra
Jackson State Community College: Basic Math, Elementary Algebra and Intermediate Algebra

Fully online model details

- 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.

Rio Salado College: Introductory Algebra

Example that is Web-based

- Combines multiple sections into a single online section organized around 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.

The Buffet Model details

- Customizes the learning environment for each student based on background, learning preference, and academic/professional goals.
- Requires an online assessment of 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 students do not attend lectures, the institution can eliminate lectures).

Quizzing

How to Use Mastery Quizzing to Improve Student Learning: Advice from NCAT's Redesign Scholars

Quizzing is an effective tool that compels students to review material. Used by many teachers, in a variety of disciplines, from the primary grades through graduate school, this tool is perhaps the most universally recognized way to get students to prepare for class. We have found that web-based quizzing can be an effective and efficient pedagogical tool when used appropriately and a major contributor to improved student learning.

What follows is a summary of what we believe to be the most effective ways to use quizzing.

- Quizzes should be required rather than voluntary.

If students do not have to take quizzes, many of them will not bother if only because students do not like the idea of being evaluated. If students do not take the quizzes, they cannot benefit from the feedback that tells them what aspects of their learning are incorrect.

- Quizzes should be treated as an interactive exercise rather than an evaluation.

In addition to reducing the anxiety associated with evaluation, this encourages students to use the quizzes as an index of what they need to study.

- Students should be allowed—in fact, encouraged—to take quizzes repeatedly so that they can master the material.

Consistent with the idea that the quiz is a learning tool rather than an evaluation tool, repeated attempts facilitate student mastery of the material. They should be encouraged to take quizzes as often as necessary to demonstrate their mastery of the material.

- The highest grade; not the first, most recent or average grade, should be accepted as evidence of ability.

If students are graded on their first attempt, they see the quiz as an evaluation rather than a learning tool. If the quiz grade is based on the most recent score, there may be a disincentive to continue to take the quiz (to practice) after an acceptable grade has been achieved. If grades are based on an average grade, students are not likely to take the quiz repeatedly, if only because a bad score can dramatically reduce their chances of doing well.

- Quizzes should be low stakes.

The point value associated with taking quizzes should be less than that associated with other evaluative tools (exams, papers, etc.). This reduces the stressfulness of quizzing, making a quiz less like an evaluation and more like an opportunity to gain feedback on what students need to study more carefully.

- Students should have the opportunity to see how many and which questions they answered (in)correctly immediately after completing each quiz.

Consistent with the importance of immediacy of reinforcement, this allows students to see how they did even as they remember why they answered questions as they did.

- Ideally, for each question answered incorrectly, feedback should include information on where to turn to find the correct answer.

This may be in the form of an indication of which page to turn to, or, better, a link to a web-based image of the page(s) to review. The advantage of the web-based link is that it makes the process of quizzing more interactive, and less like a study tool.

- Item selection should be randomized to make it harder for students to cheat.

If every student sees the same quiz items in the same order, students will compare notes and prepare answers to the questions rather than understanding the material. For the same reasons, there should be several different versions of each quiz item.

- Quizzes should be due frequently.

In keeping with the idea that massed practice is less effective than spacing learning throughout the semester, quizzes should be due on a regular basis (once, twice or three times a week) throughout the semester, not just before exams.

<u>Quiz Questions</u>

- Order of questions

The order of the questions (in the same order as material is covered within the text or randomly arranged) is unrelated to the efficacy of quizzing. Instructors who prefer to make their quizzes more difficult by randomly arranging the order of questions should be encouraged to do so.

- Number of questions

The number of questions that should appear on a quiz should be based on what the course instructors consider to be appropriate for the class. We have found that quizzes with somewhere between 15 and 25 items work well. These 15-25 items should be drawn from a quiz pool of 100-200 questions per quiz assignment to ensure that students are taking different quizzes with each attempt.

- Multiple-choice questions

When using multiple-choice questions, where possible (i.e., the question does not have all of the above, A and B or other similar answers as options) the order of the answers should be scrambled. This makes it harder for students to focus on the answer order and tends to focus them on what the correct answer is.

- Short-answer questions

Because spelling is important when answering short-answer questions, students may understand the concept but answer incorrectly. We discourage the use of short-answer questions in quizzing unless spelling is a part of the course learning objectives (e.g., foreign languages.)

- Essay questions

Essay questions may be appropriate for quizzing but should be used sparingly, if only because of the time and effort required to grade them.

Publisher Test Banks

Most publishing companies provide test banks in conjunction with their textbooks. Often, answers provide guided feedback linked to the textbook—e.g., students can click and see a PDF file of a page they need to study. Including all items provided by the publisher without reviewing them is not a good idea, if only because many of the items are not good questions. Some are inconsistent with course goals; others may not be important enough to be included. Instructors need to screen questions from publisher test banks before including them in quizzes.

Five Principles of Successful Course Redesign

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From the 30 projects involved in the Program in Course Redesign, we have identified five course redesign models. Each of these models embodies five principles that lead to successful course redesign, and each of these principles has both a quality dimension that contributes to improved student learning and a cost dimension that contributes to reduced instructional costs. The following principles are essential to achieving success in course redesign.

Principle #1: Redesign the whole course.

In each model, the whole course--rather than a single class or section--is the target of redesign. The course is treated as a set of products and services that can be continuously worked on and improved by all faculty rather than as a "one-off" that gets re-invented by individual faculty members each term. The collective commitment of all faculty teaching the course coupled with the capabilities provided by information technology leads to success. Information technology enables best practices to be captured in the form of interactive Web-based materials supported by sophisticated course-management software. Faculty can systematically incorporate feedback from all involved in the teaching and learning process, adding to, replacing, correcting and improving an ever-growing body of learning materials and best practices.

Improving Quality

Any large introductory course taught by multiple instructors faces the problem of "course drift," especially when the instructors are adjunct faculty members. The phrase "course drift" refers what happens when individual instructors teach the course to suit their individual interests rather than to meet agreed-upon learning goals for students, resulting in inconsistent learning experiences for students and inconsistent learning outcomes. Redesign that ensures consistent content coverage means that all students have the same kinds of learning experiences, resulting in significant improvements in course coherence and quality control.

Reducing Cost

Redesigning the whole course eliminates duplication of effort on the part of instructors and creates opportunities for using alternate 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 target their efforts to 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.

Examples

Florida Gulf Coast University's traditional course comprised a growing number of 30-student sections. Because the course utilized a large number of adjuncts (approximately two-thirds of the sections were taught by adjuncts), there was significant course drift, yielding uneven coverage of the course topics and uneven student learning. Teaching was uncoordinated; some adjuncts did not adhere to the course learning goals and objectives, and some did not use the selected text. The redesign moved all students into a single section, using a common syllabus, textbook, set of assignments and a course Web site,

organized in six modules, each designed by faculty experts. Students were placed into cohort groups of 60 and within them, peer-learning teams of six students each. Preceptors, a newly created position, were responsible for interacting with students and grading critical analysis essays. A single full-time faculty member, responsible for both academic matters and preceptor supervision, taught the course, working closely with a full-time course coordinator responsible for administrative aspects. The model allows FGCU to scale by adding preceptors while maintaining important faculty oversight via ongoing curricular review and course coordination.

The University of Southern Mississippi's redesign moved 16 to 20 face-to-face lecture sections (approximately 60 students each) per term into a single 800-student online section organized around four four-week modules. A course coordinator, responsible for overall course administration, managed the team-teaching of four faculty members who each taught one four-week module in their area of expertise and were responsible for content, complementary materials, quizzes, and exams. Writing assignments were administered by WebCT and were graded by graduate assistants. The coordinator and the four faculty members each received credit for teaching a single course. Before the redesign, USM needed to staff 16 to 20 sections; after the redesign, the university needed the equivalent of only five staffed sections to serve all students.

Additional examples of projects that dealt explicitly with course drift and/or moved to shared course development and delivery among faculty include Brigham Young University, Penn State University, Tallahassee Community College, The University of Alabama, the University of Idaho and Virginia Tech.

Principle #2: Encourage active learning.

Each redesign model makes significant shifts in the teaching-learning enterprise, making it more active and learner-centered. Lectures and other face-to-face classroom presentations are replaced with an array of interactive materials and activities that move students from a passive, note-taking role to an active-learning orientation. As one math professor puts it, "Students learn math by doing math, not by listening to someone talk about doing math." Instructional software and other Web-based learning resources assume an important role in engaging students with course content. Resources include tutorials, exercises and low-stakes quizzes that provide frequent practice, feedback and reinforcement of course concepts. In some instances, classroom meetings are partially or entirely supplanted by online learning activities; in others, active learning environments are created within lecture hall settings supplemented by out-of-class activities. In moving from an entirely lecture-based to a student-engagement approach, learning is less dependent on words uttered by instructors and more dependent on reading, exploring, and problem-solving undertaken actively by students.

Improving Quality

Encouraging active learning is a well-accepted pedagogical principle that leads to improved student learning. As Arthur W. Chickering and Zelda F. Gamson note in their 1987 *Seven Principles for Good Practice in Undergraduate Education*, "Learning is not a spectator sport. Students do not learn much just sitting in classes listening to teachers, memorizing prepackaged assignments, and spitting out answers. They must talk about what they are learning, write reflectively about it, relate it to past experiences, and apply it to their daily lives. They must make what they learn part of themselves. Working with others often increases involvement in learning. Sharing one's own ideas and responding to others' reactions sharpens thinking and deepens understanding."

Reducing Cost

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 source of content knowledge and assistance to a greater reliance on interactive learning materials and greater student/student interaction offers many opportunities for reducing instructional costs.

Examples

The redesigns of the Universities of Alabama, Idaho and Virginia Tech depended heavily on instructional software, including interactive tutorials, computational exercises, electronic hyper-textbooks, practice exercises, solutions to frequently asked questions, and online quizzes. Modularized online tutorials presented course content with links to a variety of additional learning tools: streaming-video lectures, lecture notes, and exercises. Navigation was interactive; students could choose to see additional explanation and examples along the way. Online weekly practice quizzes replaced weekly homework grading. With the development of a server-based testing system, large databases of questions were easily generated, and grading and record-keeping were automated.

Additional examples of projects that made heavy use of interactive learning materials include Rio Salado College, Tallahassee Community College, the University of Iowa, the University of Tennessee, Knoxville, and the University of Wisconsin-Madison.

Redesign at the University of Colorado at Boulder encouraged active learning through the use of peer-learning teams. The entire class (~200 students) met twice a week. At the first meeting, the instructor provided an overview of the week's activities. About a dozen discussion questions were then posted on the Web, ranging from factual questions to complex questions requiring students to draw conclusions. Midweek, students met for one hour in small learning teams of 10 to 15 students (supervised by undergraduate learning assistants) to prepare answers collaboratively and to carry out inquiry-based team projects. Teams were supported by software that allowed them to collaborate synchronously or asynchronously. Teams posted written answers to all questions. At the next class meeting, the instructor led a discussion session in which he directed questions to the learning teams. Rather than emphasizing students' mastery of facts, the redesign taught students to develop their understanding through written and verbal communication and to draw conclusions from collaborative inquiry-based activities.

Additional examples of projects that made team-based learning an important part of their redesigns include Fairfield University, Florida Gulf Coast University, the University of Dayton, the University of Illinois at Urbana-Champaign, the University of Iowa, the University of Massachusetts Amherst, and the University of Tennessee, Knoxville.

Principle #3: Provide students with individualized assistance.

In traditional lecture or classroom formats, students are often unlikely or unable to ask questions. Office hours attempt to mitigate this problem, but students notoriously do not take advantage of them. Students need help when they are "stuck" rather than during fixed times or by appointment. Each model either replaces or supplements lecture time with individual and small-group activities that take place in

computer labs--staffed by faculty, graduate teaching assistants (GTAs) and/or peer tutors—and/or online, enabling students to have more one-on-one assistance. Students cannot live by software alone, however. When students get stuck, the tutorials built into most software programs are not enough to get them moving again. Students need human contact as well as encouragement and praise to assure them that they are on the right learning path. An expanded support system enables students to receive help from a variety of different people. Helping students feel that they are a part of a learning community is critical to persistence, learning, and satisfaction.

Improving Quality

Offering students help when they need it rather than according to a schedule not only addresses the particular problems they encounter but also helps keep them on task. Students who are unable to receive help at the time they need it too often give up and do not complete the task that they have been assigned. In addition to providing individualized assistance to students, faculty and others responsible for the course can learn what areas are most difficult for students and can continuously improve the learning activities included in the course.

Reducing Cost

By constructing support systems of various kinds of instructional personnel, the projects apply the right level of human intervention to particular student problems. Highly trained, expert faculty members are not required for all tasks associated with a course. By replacing expensive labor (full-time faculty members and graduate teaching assistants) with relatively inexpensive labor, less expert (adjunct faculty members, undergraduate peer mentors and course assistants) where appropriate, it is possible to increase the person-hours devoted to the course and the amount of assistance provided to students.

Examples

The Universities of Alabama and Idaho and Virginia Tech staffed their learning centers with a combination of faculty, GTAs, and peer tutors, who responded directly to each student's specific, immediate needs. Emporium helpers did not answer students' questions but rather directed students to resources from which they could learn. By creating a kind of triage response team, the universities increased the number of contact hours for students while greatly decreasing the cost per hour for that contact. Staffing adjustments could be made based on real use. For example, Alabama's initial plan was to staff primarily with instructors and to use graduate students and upper-level, undergraduate students for tutorial support. It soon became apparent that the undergraduates were as effective as the graduate students in providing tutorial support, thus eliminating the need for graduate students. Based on data collected during the first semester of operation, Alabama also reduced the number of instructors and undergraduate tutors by matching staffing levels to student-use trends.

Another redesign strategy is to contract with companies that specialize in providing on-demand, individualized assistance. Tallahassee Community College outsourced the evaluation of student essay drafts to SMARTHINKING, a company that provides high-quality, real-time, online academic support for core courses in higher education through chat technology, virtual whiteboards and personalized feedback. Institutions can contract with SMARTHINKING to provide tutorial services for their students, either supplementing existing campus services or outsourcing them entirely. Both students and faculty reported consistent 24-hour turnaround, valuable suggestions for improved writing, and supportive

commentary; both felt that the responders were highly capable and professional. TCC's use of SMARTHINKING both saved faculty time and increased quality.

A third strategy is to create new kinds of cost-effective positions to provide individualized assistance. Rio Salado College created a new position called a course assistant to address non-content-related questions (which constituted 90 percent of all interactions with students!) and to monitor students' progress. The addition of a course assistant freed the instructor to concentrate on academic rather than logistical interactions with students. As a result, one instructor was able to teach 100 students concurrently enrolled in any of four courses. Before the redesign, the instructor typically taught 35 students in one section. Students, in turn, received more help in a timelier manner.

Additional examples of projects that increased the amount of individualized assistance available to students include Florida Gulf Coast University, The Ohio State University, Penn State University, and Riverside Community College.

Principle #4: Build in ongoing assessment and prompt (automated) feedback.

Increasing the amount and frequency of feedback to students is a well-documented pedagogical technique that leads to increased learning. Rather than relying on individual faculty members in small sections to provide feedback for students--a technique known to increase faculty workload significantly--, each model utilizes computer-based assessment strategies. In many cases, a large bank of problems for each course topic is built into instructional software, and assignments are graded on the spot. In other cases, publishers provide test banks that accompany textbooks, enabling faculty to create low-stakes mastery quizzes. Both techniques enable students to work as long as needed on any particular topic, moving quickly or slowly through the material depending on their comprehension and past experience or education. By automating the feedback process, every problem or question is graded, and students receive specific information about their performance. This, in turn, leads to more efficient and focused time on task and higher levels of learning. Building in ongoing assessment and automated feedback also lets faculty know how well students are (or are not) doing and take timely corrective action.

Improving Quality

Shifting the traditional assessment approach in large introductory courses, which typically employ only midterm and final examinations, toward continuous assessment is an essential pedagogical strategy. Students can be regularly tested on assigned readings and homework using short quizzes that probe their preparedness and conceptual understanding. These low-stakes quizzes motivate students to keep on top of the course material, structure how they study and encourage them to spend more time on task. Online quizzing encourages a "do it till you get it right" approach: Students can be allowed to take quizzes as many times as they want to until they master the material. Students need detailed diagnostic feedback that points out why an incorrect response is inappropriate and directs them to material that needs review. Automating assessment and feedback enables repeated practice as well as providing prompt and frequent feedback--pedagogical techniques that research has consistently proven to enhance learning.

Reducing Cost

The idea of giving students prompt feedback is a well-known pedagogical technique that leads to improved learning. Pedagogy in itself has nothing to do with technology. What is significant about using technology is that doing so allows faculty to incorporate good pedagogical practice into courses with very large numbers of students—a task that would have been impossible without technology. When instructors and/or teaching assistants are responsible for grading, typically they must make compromises such as spot-grading or returning composite scores to students. By replacing hand-grading with automated grading of homework, quizzes and exams, it is possible to reduce the cost of providing feedback while improving its quality. In addition, by assessing and aggregating what students do and do not understand, both individually and collectively, faculty are able to spend class time on what students do not know rather than wasting time on what they already understand, a great improvement over the one-size-fits-all lecture method.

Examples

Automated low-stakes quizzes enable both students and faculty to determine what individual students have and haven't learned. At The University of New Mexico, students received credit for completing three online mastery quizzes each week. Students were encouraged to take the quizzes as many times as needed until they attained a perfect score. For all quizzes, only the highest scores counted. The more time students spent taking quizzes and the higher their scores, the better they performed on in-class exams.

To determine whether quizzes that were mandatory (i.e., required for course credit) or voluntary (no course credit) would differentially affect exam and grade performance, UNM faculty conducted an experiment. Students in one section received course points for completion of weekly online mastery quizzes; students in the other section were encouraged to take the mastery quizzes, but received no course points for doing so. On in-class exams, students who were required to complete quizzes for credit always outperformed students in the section where taking quizzes was voluntary and received more As, Bs, and Cs, in addition to fewer C- or below grades. Students took more quizzes, scored higher, and spent longer on quizzes when course credit was at stake than students in the section where quizzes were not linked to credit. Moreover, relatively few students successfully completed quizzes when credit was not a consequence; some students chose not to take quizzes at all.

A second strategy is to build in assessments for students to use both individually and in groups. As part of Penn State's statistics redesign, students were regularly tested on assigned readings and homework using Readiness Assessment Tests (RATs), short quizzes that probed students' conceptual understanding. Constituting 30 percent of the students' grades, RATs were given five to seven times during the course. Students prepared to take the RATs outside of class by reading the textbook, completing homework assignments, and using Web-based resources. Students then took the tests individually. Immediately following the individual effort, the students took the same test in groups of four. In addition to motivating students to keep on top of the course material, RATs proved to be very effective in detecting areas in which students were not grasping the concepts, enabling faculty to take corrective actions in a timely manner.

A third strategy is to take advantage of "smart" feedback systems. Carnegie Mellon's redesign used StatTutor, an automated, intelligent tutoring system that monitored students' work as they went through lab exercises. StatTutor provided them with feedback when they pursued an unproductive path and closely tracked and assessed each student's acquisition of skills in statistical inference—in effect, providing a personal tutor for each student. After using StatTutor, students were able to achieve a level

of statistical literacy not deemed possible in the course before its redesign. Florida Gulf Coast University used a software program called the Intelligent Essay Assessor (IEA) to grade short, well-structured students essays. The Intelligent Essay Assessor, once programmed, assessed student essays between 100 and 500 words based on their content and their grammar, mechanics, etc. This software required careful preparation for use, but once fine-tuned, it reliably scored short paragraphs and saved faculty a lot of grading time.

By assessing what students do and do not understand and aggregating the results, instructors are able to use class time more productively. At the University of Massachusetts Amherst, students reviewed learning objectives, key concepts, and supplemental materials posted on the class Web site before class. To assess their preparation for class, students then completed online quizzes worth points toward the final grade, which provided immediate feedback to students and data for instructors to assess students' knowledge levels. Instructors were able to reduce class time spent on topics that the students clearly understood, increase time spent on problem areas, and target individual students for remedial help. During class, UMass used ClassTalk, a commercially available, interactive technology that compiles and displays students' responses to problem-solving activities. Class time was divided into ten- to fifteen-minute lecture segments followed by sessions in which students worked in small groups applying concepts to solve problems posed by the instructor. Group responses were reported through ClassTalk. The instructor moderated the discussions and drew out key issues to reinforce specific ideas or reveal misconceptions. Similarly, at the University of Colorado at Boulder, peer-learning teams posted answers to sets of inquiry-based project questions posed by the instructor online. The instructor used software to review all the posted written answers to a given question. If all the teams correctly answered a given question, the instructor skipped that question. Instead, he devoted the discussion time to questions with dissonant answers among teams.

Additional examples of projects that made heavy use of automated feedback include Florida Gulf Coast University, the University of Iowa and the University of Southern Maine.

Principle #5: Ensure sufficient time on task and monitor student progress.

Each redesign model adds greater flexibility in the times and places of student engagement with the course. This does not mean, however, that the redesign projects are "self-paced." Rather than depending on class meetings, the redesigns ensure student pacing and progress by requiring students to master specific learning objectives, frequently in modular format, according to scheduled milestones for completion. Although some projects initially thought of their designs as self-paced, open-entry/open-exit, they quickly discovered that students need structure (especially first-year students and especially in disciplines that may be required rather than chosen) and that most students simply will not make it in a totally self-paced environment. Students need a concrete learning plan with specific mastery components and milestones of achievement, especially in more flexible learning environments.

Most software packages have excellent tracking features, allowing faculty to monitor students' time on task. All projects have seen a fairly strong, direct correlation between student success and time on task. A frequently encountered problem was getting students to spend enough time on task working with the software. Some students were slow to log in, getting too far behind to catch up. Worse yet, some students never logged on. Most projects found it necessary to require students to log in at specific intervals and to spend a minimum amount of time working with course materials. Others established some form of early alert intervention system-- a kind of "class management by exception" process, whereby baseline performance standards were set and those who were falling too behind were

contacted. Email can be used to post messages and communicate with students to encourage them to "come to class."

Improving Quality

As Arthur W. Chickering and Zelda F. Gamson note in their 1987 *Seven Principles for Good Practice in Undergraduate Education*, "Time plus energy equals learning. There is no substitute for time on task. Learning to use one's time well is critical for students and professionals alike. Students need help in learning effective time management. Allocating realistic amounts of time means effective learning for students and effective teaching for faculty." Even though we know that time on task is essential to effective learning, it is difficult for faculty members in traditional formats unaided by technology to ascertain how much time on task each student is actually spending and to take corrective action.

Reducing Cost

By replacing time-consuming human monitoring of student performance with course management software, it is possible to reduce costs while increasing the level and frequency of oversight of student progress. Sophisticated course-management software packages enable faculty members to monitor student progress and performance, track their time on task, and intervene on an individualized basis when necessary. Course management systems can automatically generate many different kinds of tailored messages that provide needed information to students. They can also communicate automatically with students to suggest additional activities based on homework and quiz performance, or to encourage greater participation in online discussions. Using course-management systems radically reduces the amount of time that faculty members typically spend in non-academic tasks like calculating and recording grades, photocopying course materials, posting changes in schedules and course syllabi, sending out special announcements to students—as well as documenting course materials like syllabi, assignments, and examinations so that they can be used in multiple terms.

Examples

At The University of New Mexico, students who scored 75% or less on the first exam, which was administered at the end of the third week, were told that they should attend a weekly 50-minute studio for the remainder of the semester. During studios, students had the opportunity to work on multimedia course material, take quizzes, learn a memorization strategy, and discuss their course performance with undergraduate TAs (who were recruited from students who received A's in the course the previous semester). Those students who were advised to attend but who failed to attend any studio typically failed the course. In contrast, the more studios a student attended, the better their course performance.

Whereas Virginia Tech followed an open-attendance model in its redesign, the Universities of Alabama and Idaho added mandatory attendance and required group meetings to ensure that students spent sufficient time on task. Alabama required students to spend a minimum of 3.5 hours per week in its learning center and to attend a thirty-minute group session each week. This session focused on students' problems and allowed instructors to follow up in areas where testing defined weaknesses. Idaho students were assigned to focus groups, of 40 to 50 students each, grouped according to their majors, so that particular applications could be emphasized. Groups met once a week to coordinate activities and discuss experiences and expectations. Both universities believe that the group activities helped build community among students and between students and instructors.

Additional examples of projects that focused on providing structure to ensure sufficient time on task include Rio Salado College, Riverside Community College, and The Ohio State University.

Conclusion

One of the strongest reasons for using information technology in teaching and learning is that it can radically increase the array of learning possibilities presented to each individual student. Thus, the "right way" to design a high-quality course depends entirely on the type of students involved. Students need to be treated like individuals, rather than homogenous groups, and should be offered many more learning options within each course. By customizing the learning environment for each student, institutions are likely to achieve greater learning successes.

Rather than maintaining a fixed view of what all students want or what all students need, institutions must be flexible and create environments that enable greater choice for students. Students differ in the backgrounds they bring to a course. While some students have strong prior experiences in a particular discipline, either through good high school preparation or other work experience, other students have weaker backgrounds. Offering students greater choice so that they can identify and spend time on the areas where they lack knowledge rather than spending equal time on all areas can accommodate such variation in backgrounds.

Students also differ in the amount of interaction that they require with faculty, staff, and one another. At the British Open University, for example, approximately one-third of the students never interact with other people but pursue their studies independently. New York's Excelsior College reports that 20 percent of its students take up to 80 percent of staff time, indicating a strong need for human interaction, in contrast to the 80 percent of students who require very little interaction. Rather than assuming that all or most course activities need to be conducted face-to-face, successful course redesigns begin by considering what aspects of the course require face-to-face time and what aspects of the course can be better conducted online.

Currently in higher education, both on campus and online, we individualize faculty practice (that is, we allow individual faculty members great latitude in course development and delivery) and standardize the student learning experience (that is, we treat all students in a course as if their learning needs, interests, and abilities were the same). Instead, we need to do just the opposite: individualize student learning and standardize faculty practice. By thinking more creatively about how to develop course designs that respond to a variety of learning styles and preferences, we can include structures and activities that work well with diverse types of students and lead to better, more cost-effective learning for all.

Six Innovative Course Redesign Practices

- Creating "Small" Within "Large"
- Undergraduate Learning Assistants (ULAs)
- Freshmen Don't Do Optional
- Modularization
- New Instructional Roles
- Avoiding "Either/Or" Choices

Creating "Small" Within "Large"

One characteristic of many course redesigns is large class size. Some redesigns begin with large lecture sections and retain those large sizes in the redesign; others reduce the number of sections offered and create larger classes; and, still others combine all sections into one large section. Clearly, larger sections can reduce costs, yet these redesign projects also increase student learning. One way to counteract large section size is to create "small" within "large" by using techniques such as peer learning teams and small learning communities that lead to greater student success.

University of Colorado-Boulder (UC): Astronomy

UC divides its large, 220-student class into small learning teams of 10 to 15 students. The professor provides an overview of the week's activities at a weekly meeting of the full class. About a dozen discussion questions are posted online, ranging from factual questions testing basic knowledge, to complex questions requiring students to draw conclusions, to questions intended to elicit controversy. Midweek, students meet in teams for one hour to prepare answers collaboratively and to carry out inquiry-based team projects. Each team is supervised by an undergraduate coach. Supported by software that allows them to collaborate synchronously or asynchronously, teams post written answers to all questions. At the third weekly class meeting, the professor leads a discussion session in which he directs questions not to individual students but to the learning teams. Before the meeting, the professor uses software to review all the posted written answers to a given question, allowing him to devote the discussion time to questions with dissonant answers among teams. Periodically, the professor poses a related question and gives the class time for each team to formulate an answer.

Florida Gulf Coast University (FCGU): Fine Arts

FGCU offers its required fine arts course in a single large (930 students) section, using a common syllabus, textbook, set of assignments and materials and course Web site. Students are placed into cohort groups of 60 and, within these groups, into peer learning teams of six students each. Learning teams engage in Web Board discussions that require students to analyze two short essays in preparation for producing their own short essays on module exams. The Web Board discussions increase interaction among students, create an atmosphere of active learning and develop students' critical thinking skills. The course is taught 100% by full-time faculty members, who design content modules in their field of expertise and are supported by a newly created 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.

See also

- Fairfield University (Biology): student teams of 2-3
- IUPUI (Sociology): online discussion groups

- University of Central Florida (Government): 10-student online discussion groups
- University of Idaho (Math): student focus groups

Undergraduate Learning Assistants (ULAs)

Using undergraduates as peer tutors or learning assistants can radically increase the amount of personalized assistance available to students and do so cost effectively. When properly trained, undergraduates have turned out to be better at assisting their peers than graduate students. Because the students regard the learning assistants as peers, they tend to be more open about their difficulties in comprehension than they would be with graduate students, and this leads to better feedback to the instructor. Selection criteria for ULAs include: 1) students who have taken the course and scored in the top 20th percentile; 2) students who understand the goals of the redesigned course and are eager to help make it work; and 3) students who are mature and display leadership skills. Colleagues can be asked to identify students who meet the first criterion. In a brief interview, instructors can assess whether the applicant would be an enthusiastic participant and has the interpersonal skills to be a good team leader.

University of Colorado-Boulder (UC): Astronomy

UC has found that ULAs are more effective than most GTAs in introductory science courses. They are highly motivated to make the course a success. Students meet once a week in learning teams of 10 to 15 supervised by an undergraduate coach to prepare answers to discussion questions collaboratively and to carry out inquiry-based team projects. In meeting with their learning teams, ULAs are expected to help students understand how to use the course technology and to guide the students' collaborative work. They are instructed specifically not to tell the students "the right answers" but are given guidelines to teach students how to find the answers for themselves. One evening each week, the instructor meets with the ULAs for about an hour to discuss upcoming work and to review successes and failures. The ULAs report that their ULA experience was one of their best experiences as an undergraduate. About one-third of them changed their majors to one of the natural sciences as a result of the experience.

University at Buffalo (UB): Computing

One of the most effective changes in UB's course redesign involves using ULAs rather than GTAs. Not only is the number of assistants in each lab doubled, but also the ULAs turn out to be better at assisting their peers than the GTAs. Both faculty and students report that ULAs are more effective than GTAs because of the ULAs' better under-standing of course content, superior communication skills and better understanding of students' common misconceptions about computers. Increased lab hours enable the students to have more one-on-one assistance. In addition, students can complete all of their projects during the labs and thus make use of the ULAs and their peers.

See also

- Eastern Washington University (Psychology): peer mentors lead small discussion seminars
- Penn State University (Statistics): undergraduate students assist in labs and grade homework assignments supervised by GTAs
- Wayne State University (Math): undergraduate student tutors provide help to students in labs

Freshmen Don't Do Optional

Course redesign always succeeds when we engage students in doing the coursework, yet typically 30% or so may fail to participate in scheduled learning activities. Some institutions have been more successful than others in addressing the issue of "non-participating" students. Many redesign projects have found that students will participate in supplementary activities like homework and mastery quizzes *if* they require student participation and *if* they give points for doing so. Students participate more, score higher, and spend

longer on supplementary activities when course credit is at stake.

The University of Southern Maine (USM): Psychology

At USM, students are required to complete quizzes online in order to master material before coming to class. Students are allowed to take quizzes several times, until they received a satisfactory grade or time runs out. Feedback directs students to specific material that they need to review. USM can continually monitor student progress. Both the instructor and the students know how they are doing in relation to others in class. Students report that they check their status frequently. Instructors find that this feature helps them identify and work with students who are doing poorly as well as acknowledge the efforts of the best students. Students in redesigned sections spend more time studying for the course (typically 3 - 5 hours per week in contrast to 1 - 3 hours) than for other traditionally-taught introductory courses.

University of New Mexico (UNM): Psychology

At UNM, psychology students receive credit for completing three online mastery quizzes, which test both factual and conceptual knowledge, each week. Students are encouraged to take quizzes as many times as needed until they attain a perfect score. Only the highest scores count on all quizzes. The more time students spend taking quizzes, the better they perform on in-class exams. To determine whether quizzes that are mandatory (required for course credit) or voluntary (no course credit) would differentially affect exam and grade performance, UNM conducted an experiment. Students in one section received course points for completing quizzes; students in another section were encouraged to take the quizzes but received no course points for doing so. On in-class exams, students who were required to complete quizzes for credit always outperformed students where taking quizzes was voluntary. Moreover, relatively few students completed quizzes when credit was not a consequence.

University of Alabama (UA): Math

Some institutions recognize that giving course points for attendance increases student engagement and learning but are hesitant to do so because they think it will inflate grades. To determine what effect giving attendance credit has on final grades, UA analyzed the grades of 3,439 students in five courses during the fall 2005 semester. Attendance credit had no effect on the grades of 86.8% of the students. For 4.5% of the students, attendance credit increased their grade by a +/-. For 0.5%, attendance credit allowed them to pass the course. For 1%, attendance credit caused them not to pass the course, and for 7.3%, attendance credit decreased their grade by a +/-. Thus, the argument that giving attendance credit inflates grades isn't supported by the data.

Modularization

Many students get to the end of a course having mastered a large percentage of the material but not enough to pass the course. They are then forced to repeat the entire course. Others are required to take a developmental course because of low placement scores when they only lack a small part of the course content. Course modularization offers institutions a way to accommodate "partial" learning by letting students study only what they don't know and make more rapid progress.

Ohio State University (OSU): Statistics

In its redesign of a five-credit introductory statistics course, OSU moved to a modular course format using technology to manage course administration and monitor weekly progress reports and diagnostics. Students can earn from one to five credits based on successful module completion. By requiring students to demonstrate a passing level proficiency in one unit before proceeding to the next, severe deficiencies can be identified and addressed early, resulting in a lower failure/withdrawal rate. Previously, several hundred students fell behind each year and felt compelled to withdraw. Now if a student completes three of the modules (60% of the material), they receive three credits rather than failing the course. Rather than having to re-enroll for a five-credit course, they can

take the remaining two credits in the subsequent semester. Analysis of previous data on drops shows that OSU can eliminate one-fourth of the course repetitions, thereby opening slots for an additional 150 students per year.

Drexel University : Computer Programming

Drexel University combined two introductory computer programming courses—one the primary entry point for computer science majors and the other a less technical version of the same course for non-majors—into one course organized in modules. The modules cover particular aspects of computer programming at five different levels of subject mastery and skill acquisition. Non-majors must demonstrate mastery through level three; computer science majors through level five. Course credit is variable, depending on the number of modules successfully mastered and the level of skill mastery the student attains. Students who have difficulty with the higher levels can change majors and receive course credit without having to drop the course and repeat modules already mastered. Non-majors who develop an interest in becoming a computer science major may go further than originally planned and meet the more stringent requirements.

Seton Hall University (SHU): Math

Some students simply need more time to succeed. After carefully monitoring student progress, SHU discovered that some students in their developmental math sequence were working but working more slowly than others. Seton Hall decided to implement three progress tracks for students: fast, regular and gentle. If students are failing the course after the second chapter test, they are encouraged to sign a learning contract, which states that they will work through the course material in two semesters instead of one (the gentle track.) A few students working on the fast track have finished the course before the end of the semester. They enjoy having extra time to focus on their other courses at the end of the term when the workload is the heaviest.

New Instructional Roles

Are highly trained faculty members needed to conduct all tasks associated with delivering a course? By constructing an instructional support system that comprises various kinds of personnel, institutions can apply the right level of human intervention to particular kinds of student problems. Large-scale course redesigns have created new kinds of positions such as course assistants, preceptors and course coordinators that have specific roles within the course, leaving faculty free to concentrate on those tasks that require their level of expertise. Re-thinking faculty roles within large courses can lead to innovative approaches to staffing.

Rio Salado College (Math): The Course Assistant

Rio Salado 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. This position was filled first with a math tutor, but the responsibilities of the course assistant did not require math skills; therefore, there was no reason to pay a tutor rate when those skills would be underutilized or never utilized. The "permanent" assistant was a very advanced high school student who found the hours, compensation, and responsibilities satisfactory.

Florida Gulf Coast University (Fine Arts): The Preceptor

FGCU reduced the number of sections from 31 to 2 and increased the number of students served from 800 to 950 in the first year of its redesign. In the traditional course 20% of the instructors were full-time and 80% were adjuncts. In the redesign, 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.

The University of Southern Mississippi (Literature): The Course Coordinator

Prior to the redesign, 50% of USM's course was taught by full-time faculty, and 50% was taught by adjuncts. The university replaced 16 minimally coordinated sections with a coherent, single online section of 1000 students and reduced the number of faculty teaching the course from 16 (8 full-time faculty and 8 adjuncts) to the equivalent of 2 full-time faculty supported by four GTAs, eliminating adjuncts completely. A course coordinator directs the team-teaching of four faculty members and four GTA writing assignment graders. Each faculty member teaches a module in his or her area of expertise for four weeks. Faculty experts also collaborate on designing quizzes and exams and the selection of complementary materials. The course coordinator keeps the entire team working in concert.

Avoiding "Either/Or" Choices

We know that students bring different backgrounds, interests and abilities to college courses, yet what do we offer them most of the time? A fixed meal! The meals may be different from course to course—some may be lecture-based, others may be fully online—but most courses employ single strategies. One way to avoid "either/or" choices in course redesign is to offer students a buffet of learning opportunities or a menu of choices that enable them to take different paths to achieve the same learning outcomes.

Ohio State University (OSU): Statistics

OSU's redesign vision is to implement a buffet strategy, offering students an assortment of interchangeable paths that match their individual learning preferences and abilities to learn each course objective. When fully implemented, OSU's buffet of learning opportunities will include lectures, individual discovery laboratories (in-class and Web-based), team/group discovery laboratories, individual and group review (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 (graded by teaching assistants or self-graded), and individual and group projects. Students may elect to practice working with a concept in a data analysis laboratory, in an individual Web-based activity, or in a facilitated study session or by explaining it to others in a jigsaw-formatted review. The buffet strategy will accommodate choice in course sequencing: some students prefer to learn by starting with the big picture and moving to specific examples while others learn best by starting with specifics and moving to the general principle.

Tallahassee Community College (TCC): English Composition

TCC's redesign of nearly 60 sections of College Composition involving more than 30 instructors includes a buffet of learning opportunities and options for instructors: course Web site with individual sectional access, pre-loaded with the redesigned course curriculum; individualized state-test diagnostics and routing into learning resources housed on the textbooks' companion Web sites; a menu of common writing assignments for individual instructor and student selection that require the integration of reading with writing; an online training manual to assist instructors with the course redesign and the technological components; increased use of technological ancillaries and resources including online tutoring and response to writing; a battery of reading and writing tests that are computer-housed, scored, and recorded in the course Web site; utilization of two online library and information literacy ancillaries; and the establishment of communities of learners through the Web site discussion board.

Florida Gulf Coast University (FGCU): Fine Arts

FGCU began its redesign with the idea of offering students a wide variety of learning experiences to meet their different learning

styles—textual based material, on-line material, practice exams, lectures, labs, etc. The team planned to link each of these experiences to students' different learning styles. When they implemented their plan, they discovered two things: 1) students did not attend any of the face-to-face learning experiences, preferring the text and online materials; and, 2) students did better than students in face-to-face courses who attended lectures. As a result, FGCU eliminated certain elements of the course and moved from a buffet to a fully online model.