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## Using Market Segmentation to Develop a Large Section, Web-enhanced Survey Course

by Jason Cole and Bruce Robertson

Like many public universities, San Francisco State University ([SFSU](#)) recently adopted a strategy of offering mega-sections of core classes as a way of managing increasing enrollment in a resource-constrained environment. One of these classes, Introductory Marketing, a traditional lecture format with three high-stakes exams, was held in a movie theater adjacent to campus and was offered early in the morning to avoid conflicts with the theater's operation. The theater had a capacity of 400 seats, and enrollment in the class was typically between 350 and 400 students. The large size, unfriendly time, and off-campus location combined to make this section the least desirable of the course. Unlike other courses at SFSU—where student demand for seats in both required and elective courses regularly exceeded supply because of increasing enrollments and limited resources—seats in this section were always available. This meant some students were forced into the mega-section as a last resort in order to complete their schedules or to graduate on time. Students, faculty, and administrators accepted this section as a tolerable compromise.

However, two weeks before the start of classes in fall 2002, the instructor learned that the university had been unable to renew the lease for the movie theater. The result was the following logistical scenario:

- No classrooms capable of seating the more than 300 students already registered for the class were available on campus.
- No money was available to hire teaching support in addition to the professor and teaching assistant already assigned to the class.
- Any solution had to be developed very quickly, using existing campus resources.
- The university was willing to invest some of the money reserved for theater rental to support Web-enabled technology.

Our solution to this problem was to build a hybrid (combination online-offline) course on the backbone of a traditional lecture hall format. Because we were unsure how students might react to online delivery of a required course, we chose to migrate the familiar traditional format to the new hybrid medium in order to increase student acceptance of the new class. In addition, the very short time frame made the process of developing a radically new pedagogy, validating it, and gaining the necessary approvals for the change unfeasible. The purchase of a videostreaming server created a virtual 2,000 seat classroom—more than replacing the 400 seats lost in the theater—and thus afforded the opportunity to develop a course that could serve more students at a potentially lower cost than the traditional mega-section.

Furthermore, we believed that the effective use of technology in conjunction with a market-segmentation approach to instruction could allow us to meet the educational requirements of these students as well as or better than we could with a more traditional format. In what follows, we indicate how we employed the concept of market segmentation to anticipate the distinctive learning needs of our students and how we incorporated technology within the course design to meet those needs within our budgetary constraints. After outlining the results of the course in terms of student reception and feedback, we provide further commentary on the advantages of this approach for institutions as well as students and instructors. As argued by Twigg (2003), effective technology-enhanced course redesign can have substantial benefits for institutions seeking to expand access and improve quality while also reducing cost in large introductory classes; as we hope to illustrate, a course redesign strategy that uses market segmentation to guide technological innovation offers a particularly worthy model for realizing such benefits.

## **Designing the Hybrid Course with Students in Mind**

Market segmentation recognizes that any large group of customers (in this case, students) contains distinct clusters of individuals with different needs. We first identified the segments to address and then designed technology and pedagogy to meet their needs.

After analyzing student data available from the college, we identified two overlapping clusters of students with unique needs: students who worked and students who learned English as a second language (ESL). In a preliminary survey of students enrolled in the class, two thirds of the students reported working full time. In a separate question, two thirds of the students also identified themselves as ESL students (40% reported learning a version of Chinese as their first language).

Working students have different needs and constraints than non-working students, and their numbers are increasing. Their biggest challenge is to balance the day-to-day responsibilities of their job against the requirements of a class. The majority of students typically report that working limits the number of classes they take, constrains their schedules, and has a negative effect on their grades (Livingston and Wirt 2003). A rigid schedule typical of many college classes (exam dates/assignment due dates are set in advance) and logistical issues make it difficult to design a class flexible enough to meet the needs of working students. An emergency at work, a change in work schedule, or occasional out-of-town travel over the course of a semester may cause a working student to miss scheduled lectures or even examinations. This creates a need for the instructor to provide extra assistance to these students during office hours or to schedule make-up exams outside of regular class meetings. The instructor who taught the mega-section before this redesign regularly experienced long lines of working students waiting outside of the office during office hours.

ESL students, the fastest-growing student segment in this country, also have different needs from those students who speak English natively (Livingston and Wirt 2003). Students less fluent in a language may have trouble understanding the lecturer and may want repetition (McInnis 1998). In traditional classes, we have observed international students bringing personal tape recorders to lectures in order to be able to replay the lecture later. In addition, ESL students have difficulty expressing themselves in written English, especially in test situations where a short answer or essay format requires spontaneous, time-constrained composition (Ormrod 2000).

### **The Traditional Course and the Hybrid Course**

Because this introductory course satisfied multiple degree requirements, class composition included students majoring in the discipline, students majoring in other disciplines, and students yet to declare a major. Adrian and Palmer (1999) suggest four teaching methods for a successful introductory class:

team preparation of a project.

- use of chapter objectives,
- lectures and discussions on the textbook material,
- frequent quizzes with prompt feedback, and

When taught as a traditional large-section class, our course used the traditional lecture/test format with PowerPoint slides and multiple-choice examinations. This version of the course thus incorporated two of Adrian and Palmer's recommendations: chapter objectives and lectures/discussions on the textbook material. The purpose of the course was to expose students to the basic concepts and vocabulary of a field as an academic discipline and as a field of practice.

With this objective in mind, and guided by the specific needs of the segments previously identified, we incorporated new forms of content delivery, interaction, and assessment in the hybrid version of the course ([Exhibit 1](#)). This allowed us to add frequent quizzes with immediate feedback as a method, bringing us closer

to the ideal proposed by Adrian and Palmer (1999). However, the sheer size of the class—there were 355 enrolled on the first day of class and another 68 students added the class after the semester started for a total enrollment of 423—made a group project impractical since a project using teams of 4-5 students would involve 75-100 small groups.

### *Content Delivery Options*

For students who wanted to take the traditional class, the class met three times a week at 8:00 in the morning; the class was held in a technology-enhanced 130-seat classroom equipped with an overhead video projector as well as a console with video player, Internet connection, and addressable cable television. Professors delivered lectures in person, and the class Web site made a study guide for each lecture available to students beforehand ([Exhibit 2](#)).

In turn, the classroom also became the studio for creating videostreamed lectures for the online portion of the class. The university's academic technology team, consisting of a university staff member and two student assistants, developed a system to display slides and video simultaneously over the Internet. The presentation slides were converted to jpeg format and uploaded to the server for the instructor's use in advance of the lecture. During the lecture, a video camera in the back of the classroom fed the digitized videostream to the server; following the lecture, the videostream and the presentation slides were posted to an internal Web site where students could access them 24 hours a day ([Exhibit 3](#)).

A delayed rebroadcast also occurred on the same day as the lectures. The instructor reserved a classroom where a videotape of the lecture was replayed at an alternative time slot; students could thus go to the classroom and view the tape at a more convenient time and place as their schedules permitted. Following the video, the instructor appeared in person to handle questions and lead discussion as needed. Additionally, students could view a videotape of the lecture in the library's media center. These options gave students the freedom to attend the lectures in person or remotely, synchronously or asynchronously, according to their individual preferences.

### *Interactivity Options*

We redesigned this course to create as many opportunities for interaction as possible. First, students could attend the lectures and participate in class. The instructor was very interested in student participation and would frequently provide opportunities for students to respond to questions or ask questions themselves during the course of the lecture. The instructor also benefited from the real-time feedback from the students in attendance and utilized their reactions and questions for teachable moments.

Each Friday was a discussion day—the cameras were turned off to allow in-depth discussion about any of the course content for students who wanted high-quality face time with the instructor. Having the cameras turned off reinforced the concept that these discussions were optional. The purpose was to encourage interested students to explore the subject area with a student-driven agenda. This gave students who may not have been coming to class because they already knew the subject, or because the content was too basic, an opportunity to engage at their own level of interest.

In addition, several discussion boards hosted on the class Web site allowed asynchronous participation in the class ([Exhibit 4](#)). Students also had the options to submit questions via e-mail or visit the professor's office.

### *Assessment Options*

Using the course management system, we designed the assessment component of the class by incorporating modules that allowed for self-guided assessment and reinforcement. Research has indicated that multiple-choice questions yield equivalent validity as short-answer questions in marketing courses (Bacon 2003); a multiple-choice format thus became a key component of the online course offering. Each

week, instructors and teaching assistants created a bank of approximately 100 multiple-choice questions covering the concepts presented in class. In turn, each week students logged onto the class Web site and took a mini test consisting of 10 questions randomly drawn from the overall pool of questions; immediately upon completion, students saw their score for the test along with the correct answers ([Exhibit 5](#)). Students were allowed unlimited attempts to retake these mini tests for credit in order to improve their score; students who had achieved a perfect score could also continue taking practice versions of each mini test in order to measure their knowledge without the risk of lowering their grade. The more times they attempted the tests, the more this behavior was rewarded as the likelihood of seeing a familiar question increased. This also increased the salience of incorrect answers and new questions. Thus, through repetition, students' cognitive resources were subtly focused on reinforcing familiar material at the same time that they were assimilating new material into their developing conceptual framework.

As the purpose of this class was to introduce students to vocabulary and concepts that would be reinforced as they progressed in their academic careers, the specific questions used in the test pools emphasized key definitions and taxonomies. The importance of a specific topic was emphasized by increasing the number of questions related to that topic in the test pool, which would thereby increase the likelihood that these questions would appear on any given test. In cases where there was a genuine misunderstanding about one of the questions, students were likely to use e-mail to ask for clarification. The majority of substantive e-mail interactions were stimulated by a student having a question about why a specific answer on the weekly mini test was correct (or incorrect). In this regard the online tests allowed students to ask more targeted questions to ensure that their knowledge of the material was comprehensive and accurate as the semester progressed.

Another key motivation for taking additional practice versions of the mini tests was that they gave students the opportunity to prepare for the final exam. Most sections of this course use a form of a multiple-choice test as the final exam, and in this section, the final examination consisted of 50 questions randomly drawn from the same pool as the mini tests. In order to ensure that the final reinforced the main concepts in the class, a stratified random sample was used to make sure that the appropriate number of questions was drawn from each mini-test pool. The final exam was also offered online, in a proctored computer lab, over several days, allowing students to sign up for a time to fit their schedules. Because each student had a different randomly generated final, there was little risk of a student's reading answers from another student's exam.

This combination of low-stakes mini tests and a high-stakes final exam was intended to discourage cheating. Although we had no way of knowing under what circumstances students were taking the mini tests, the students were aware that they would have to take a comprehensive final examination covering the same material in a proctored computer lab at the end of the semester. If a student were not personally taking the mini tests, the chances of doing well on the final exam (which counted for half of the grade) were poor. If the student wanted to game the system by memorizing the test bank, the sheer size of the bank (almost 1,300 questions by semester's end) made that difficult.

By reinforcing the importance of key topics through all modes of content delivery, the hope was to encourage students to use repetition to help them master the concepts rather than to simply memorize the answers to the questions. Moreover, because of the introductory nature of the course, this approach to assessment lent itself more readily to the subject matter; in an advanced course dealing with more elaborate theoretical models, such assessment methods would not be appropriate.

## **Results**

In assessing this course redesign, we had two major concerns:

- Was the hybrid class as satisfying to students as the traditional class it replaced?
- Did the segmentation strategy work?

We administered a survey measuring perceived satisfaction (Keller 1987) and documenting students' hours worked, first language learned, and various content delivery options utilized ([Exhibit 6](#)). The survey was available to students during the last three weeks of the semester; students taking the survey were therefore almost finished with the class, but they had not yet received their final grades. Students received ½ point extra credit for participating in the survey. Of 423 students enrolled in the class, 391 attempted the survey for a 92.4% participation rate. Of those who participated in the survey, 37 failed to complete it because of technical problems (if a student left the Web site before finishing, the computer showed the survey as being completed), which thus yielded a final total of 353 usable responses.

Overall, students were satisfied with the hybrid class. Scores in all segments were significantly higher than 3 (neutral on a scale of 1-5). As a control, we measured satisfaction in a daytime (traditional) and an evening (traditional) section of the same class. A one-way analysis of variance found no significant difference in satisfaction between the traditional classes and the hybrid class ( $p < .869$ ). Instructor ratings for the course were also very strong, and in the second semester, several students dropped out of traditional classes to add the hybrid course. This data suggests that in terms of perceived relevance, role clarity, and satisfaction, the hybrid course was at least as good as the traditional course.

Moreover, different segments approached the content delivery, interactivity, and assessment options differently ([Table 1](#)). As indicated by the survey data in the top portion of Table 1, students working part-time were more likely than non-working students to participate in the class using e-mail (mean perceived usage of 1.1 versus 0.7) and threaded discussion groups (mean perceived usage of 1.2 versus 0.7). As indicated by the behavioral measures in the bottom portion of Table 1, non-working students were more likely than students working full-time to view the archived lectures (43.8% versus 30.8%). Given the time constraints faced by working students, we would have expected working students to be more likely to use the archived lessons, which were available 24/7 from any location and could fit into any schedule, than the live lectures, which were offered only once at a specified time and place. This finding may still reflect the relative time investment that full-time students can provide in comparison to working students.

ESL students reported attending more lectures and Friday discussions than did native English speakers, most likely because they were using these opportunities to have the material in the book explained. However, we were surprised to find that ESL students viewed fewer lecture archives than native English speakers. We had expected them to use the lecture archives for repetition; instead, ESL students sought repetition through the practice tests. ESL students accessed an average of 85% of the practice tests compared to the 74.4% accessed by native speakers ( $p < .05$ ). Such figures suggest that ESL students used the practice tests to familiarize themselves with the language and style of questions they would later find on the high-stakes final.

Although student use of the lecture archive was not entirely consistent with our expectations, student responses indicate that the hybrid course was at least as good as the traditional course it replaced in terms of overall satisfaction. This suggests that students of all groups still found the course sufficiently flexible to meet their diverse needs.

### **Continued Growth**

Because the hybrid class was so well received, we continue to offer the class with some modifications. First, we found a more attractive time slot, meeting twice a week at 9:30 a.m. rather than three times a week at 8:00 a.m. Because attendance at the Friday discussions and at the delayed rebroadcasts was very low—three to six students—we felt that discontinuing these elements would have a negligible impact on student satisfaction. Students' needs could be effectively met through live classes, real-time stream, archived stream, and videotape. Students who desired one-on-one contact with the professor visited the professor's office.

Enrollment in the class has grown dramatically. Because students indicated a preference for the online format over traditional classes, we were able to phase out the other sections of this course, increasing its cost

effectiveness. Currently, one tenure-track faculty member teaches this class as an entire teaching load, and one part-time teaching assistant supports the instructor. By the end of the second year, the class had developed a strong reputation, and the class was cited for excellence in general education teaching by the university's undergraduate advising center based on feedback from non-business majors taking the course as an elective. In the most recent semester, more than 900 students enrolled in the class, including 240 students (representing 40 majors) from other colleges.

## **Discussion**

As universities struggle with increasing enrollments—faced with increasing diversity in student populations and growing numbers of working students on the one hand (Livingston and Wirt 2003) and perceptions that tuition costs are out of control and university spending is wasteful on the other hand (Boehner and McKeon 2003)—they will become increasingly reliant on technology to provide quality educational experiences to larger numbers of students in a resource-constrained environment. This hybrid class is one such approach. We currently serve 900+ students using a 130-seat classroom at a lower cost than the 400-seat maximum capacity section it replaced. While using technology to implement a market-segmentation strategy does not eliminate the pedagogical drawbacks associated with large class size and lecture/test format, it does provide an alternative in situations where massive enrollment is difficult to avoid. The segmentation approach can be a valuable tool in focusing limited resources in ways that will enhance the learning experience for the student.

This segmentation scheme was developed a priori, drawing on the observations of faculty and staff familiar with the student population and validated empirically with a post-hoc survey. While the needs of working students and ESL students are particularly salient at this university, certainly there are other groups of students whose unique needs can be met by using Web-enabled course designs.

This approach puts students in control of the classroom experience in a number of ways. Students today are much less tolerant of bureaucratic issues that delay graduation (Boyer Commission 1999). Because the hybrid class is schedule-friendly, it helps students to avoid such issues while providing them with greater freedom to choose a program that best suits their educational goals. Some students even schedule this class with another required class meeting at the same time in order to complete their core classes more quickly. In turn, the mini test component of the course allows students to assess their progress as often as they want and is available 24/7. This allows ESL students plenty of opportunities for repetition and allows working students to coordinate their school and work schedules more effectively. By proactively identifying the needs of student segments and using technology to address these needs in the context of a large-section class, we can maintain perceptions of relevance and satisfaction while allowing for dramatic growth in class size.

From the instructor's perspective, this approach also offers a positive adjustment to the traditional lecture/test format of the course. In terms of the lectures, the only students who attend class in person are the ones who choose to be there. Our experience has been that attendance eventually settles down at around 10% of enrollment, and this gives the instructor a large enough audience to get real-time feedback on the lectures. In terms of testing, the online testing program is very instructor-friendly. Because the computer manages logistics, creating and grading tests takes very little effort. Few instructors have the time or energy to grade as many as 100 unique quizzes for each individual student in a course with large enrollment, whereas the computer can perform this task. In addition, students seem less likely to argue about poor outcomes, perhaps because they perceive the computer as more accurate than a human being. Testing takes place between the student and the computer, and the feedback is instantaneous, leaving no room for argument. Students are more likely to perceive the instructor as a coach and mentor who supports them through the assessment, rather than as the judge and jury that inflicts the assessment on them.

We recommend thinking of an introductory course as a foundation upon which other courses build rather than as an end in itself. Brown and Duguid (2000), arguing from the perspective of situated cognition, recommend a foundational understanding of the vocabulary and overall worldview of an academic discipline before students participate in a practitioner community. A hybrid course adapted to meet diverse student populations



can be an effective way to familiarize students with concepts they will need before they can apply them in more advanced courses.

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