A sustainable agriculture course delivered nationally via AG*SAT

Background
A sustainable agriculture course was developed during 1990-1991 at Iowa State University to examine the development of modern agricultural practices and how they affect the social and ecological environment. According to the project investigators, the purpose of the course was to introduce students to the concept of systemic thinking and to humanist methods of inquiry. They also wished to help students recognize the limitations of scientific reductionism as an exclusive method of inquiry. Because of this general philosophical approach, they regarded this course as one that addressed contemporary agricultural issues rather than a course in agricultural science per se.

The investigators had taught a similar course the previous winter via satellite uplink for ISU’s Off Campus Programs. That course, which targeted professional agriculturists enrolled in B. S. or M. S. degree programs, influenced the planning and design of the AG*SAT course tested in this project.

The term "AG*SAT" denotes both a satellite delivery system and a corporation that offers agricultural courses to U. S. land grant institutions. AG*SAT satellite distribution enables an instructor at one campus to simultaneously teach hundreds of students at sites scattered across the country. Initial research for sharing coursework via satellite was conducted by Utah State University; other states, including Iowa, had distributed other types of courses via satellite before AG*SAT was formed.

Approach
A production team—including an instructor, a TV producer/director, an agricultural educator, and an instructional media specialist—planned the course. They publicized it through academic deans of institutions affiliated with AG*SAT. A total of 11 institutions participated. Four months before the course was to begin airing at a particular institution, the team mailed out course descriptions, technical prerequisites, and site coordination advice. Although each institution collected its own course fees, no access fees were charged because the course was a pilot project.

Pre-production activities: The instructor developed the syllabus for the AG*SAT course on the basis of the earlier Off Campus Programs telecourse and an experimental course that had been taught in a traditional format. The AG*SAT course was to consist of 13 two-hour broadcasts featuring subject matter specialists. However, student feedback indicated that this approach lacked a unifying theme and resembled a seminar series more than an organized course of study. As a result, the course was substantially modified. Main topic categories included an introduction distinguishing sustainable from conventional agriculture, a review of the mechanization of agriculture, chemical agriculture, transitions to more sustainable agriculture, and the philosophy of agriculture. Speakers included soil and plant scientists, a former state commissioner of agriculture, the late founder of the Rodale Institute, the director of the Land Institute, the president of United Farm Workers, and farmers from various regions of the United States, among others.

Feedback from the earlier ISU telecourse also suggested that students had difficulty accessing and comprehending scholarly references. Thus, the planning team located literature from
the popular press to complement or parallel scientific literature. They also compiled an extensive literature list on sustainable agriculture, and they searched video banks of various libraries to obtain footage that would exploit the strengths of the visual medium for conveying information.

Timing and financial constraints prevented the team from producing as much original, on-site, "roll-in" videotape footage as planned. Some footage was shot in Iowa and California, although the shooting schedule was limited by the season. These custom videotape sequences constituted 12 percent of the course's broadcast time.

**Instructional design elements:** The two-credit course consisted of 30 one-hour broadcasts delivered twice weekly over 15 weeks. A time slot was chosen that would not conflict with different time zones. The team designed the course with an awareness that live and remote audiences have different needs, and that technology exists to tailor presentation formats to these needs. Four example, one participating institution was able to rebroadcast the AG*SAT course via a state telecommunications network that enabled remote viewers to communicate with the central site via closed-circuit microphone.

Previous experience with the limitations of sets, broadcast formats, and studio time, as well as logistical difficulties with the handling of call-in questions, prompted the team to create a delivery model for the AG*SAT course that (1) allowed the instructor as much control as possible over all media employed; (2) enabled students to interact with the instructor as directly as possible while allowing him to control how the broadcast time would be used, and (3) provided for a presentation that was interesting both in content and visual terms.

**Delivery mechanisms:** The team's objective was to create an informal setting that would encourage viewers to interact. Thus the broadcast set featured the instructor seated at his desk. On the desk were books, newspapers, a computer, and other devices that the instructor would use to share information with viewers. Other "props" included photographic slides, videotape, photographs, data in tabular form, and computer software, all of which were displayed in a variety of ways: by pointing to them, zooming in, "hovering" above them, or as a full screen. The instructor manipulated two independent displays—one on his own computer monitor, and another broadcast directly. A pastoral farm scene served as a set backdrop. The purpose of the technology was to deliver information to enhance students'
understanding as directly and unobtrusively as possible; thus, the team avoided showing the instrumentation in operation.

Students were given the instructor’s fax number as well as his electronic mail address. Faxing (as opposed to phoning in) of student questions allowed the instructor to monitor the source of the questions as well as address them when and how he wished during the broadcast.

AG*S AT determined that each downlink site needed a resident course coordinator and a class proctor. The duties of each were specified and mailed to all affiliates prior to airing of the course. Because the AG*SAT course depended largely on these local site personnel, the team produced a special broadcast for them one day before regular class broadcasts were started. This orientation introduced the delivery technology, the mechanism for transmitting questions to the studio, the workings of the electronic bulletin board for interaction among participants at various locations, and a summary of the course’s syllabus and central concepts. This procedure complemented the materials mailed to site coordinators three weeks before the broadcasts began. In addition, weekly mailings included an outline of each upcoming broadcast plus master copies of articles for duplication and distribution to students. The outlines listed topics to be covered and suggested readings, study questions, and sources of other information.

At the time, few appropriate textbooks were available. The instructor chose one that provided a comprehensive introduction to agroecology for a general academic audience but did not require it because of its cost. An extensive reading list provided supplementary information.

Those involved agreed that students should be evaluated by their own credit-granting institutions.

Findings

This was the first telecourse experience for 73 percent of the 153 students participating; in a course evaluation, 72 percent indicated that no sustainable agriculture course or curriculum was available in their locales. They reported satisfaction with their overall experience as well as with course content. Although the audience was diverse in terms of geographical location, background, academic status, and gender, they generally approved of the level of the material presented as well as its applicability to their geographic region.

Students also provided constructive criticism. Those who wanted to take detailed notes felt that too much was happening or that information came too rapidly to accommodate their comprehension rate. In response, the team slowed the delivery pace and reduced the amount of information delivered in each broadcast. Students also ranked highly the educational value of the media used.

Interactivity: Fax transmissions from students were plentiful at the start of the course. They decreased to almost none, however, near the end. Evaluations revealed that only half of the respondents had convenient access to fax machines; five of the eleven institutions reported using them. Students felt air time had been better used delivering information than addressing student questions. Those dissatisfied with the fax as their main avenue for interaction preferred to raise questions in discussion groups led by their site coordinators. Approximately half of the respondents conducted such groups.

The project team concluded that direct interaction is essential to the telecourse’s success. To minimize disadvantages of open telephone communication (such as prank calls, rambling questions, calls from those not officially registered in the course, etc.), they suggest rotating open phone lines among sites, allowing the instructor to interact directly with students of each affiliated institution on a schedule. Recent developments in videophone technology may also serve to supplement telecourse interactivity in the future.

Some students expressed intimidation about their questions being broadcast nationally;
identifying them on the air by first name (from the fax), instead of establishing rapport, seemed to have the opposite effect. The instructor, on the other hand, considered the fax mode useful for correcting occasional factual errors in his delivery and for requesting immediate feedback from students. For example, when he asked for opinions on farmer reticence to adoption of reduced tillage practices, a number of institutions responded promptly via fax.

A similar pattern developed for use of the electronic bulletin board; participation was greater during the first half of the academic term. (This was due partly to the system being off-line for 10 days during the second half.) Still, only a small proportion of the course’s total enrollment, representing 5 of the 11 institutions, used the bulletin board. Some students did not because they were unaware of their access to suitable computer facilities. Electronic communication was still not a widely accepted medium among agriculturists at the time of this project.

Students generally valued the outlines provided each week for the course, but their reactions to the recommended readings were mixed.

**Recommendations:** The project team recommended that such courses begin pre-production at least a year in advance. This allows time for taping of seasonal activity. The most time-consuming portion of the project was the taping and editing of video material. The team made specific recommendations to the AG*SAT Corporation about the timing and level of financing for institutions undertaking such course development in the future.

Academic institutions need up to five months lead time for students to be recruited and enrolled in such courses. The team emphasized that to ensure the success of future AG*SAT courses, course initiators should seek to involve committed site coordinators and class proctors, perhaps by conducting workshops for these personnel, so that course content, delivery strategies, and educational philosophies can be explored and discussed.

Scheduling caused some problems: namely, fitting 60-minute programs into 50-minute class periods and adapting to institutions on quarter rather than semester schedules. Some institutions started the broadcasts before their official term started; others finished the course by videotaping the broadcasts. Students who did not see all transmissions "live" indicated that they did not get the full benefit of the course. (Indeed, only those who participated live could interact via fax and electronic bulletin board.) Thus, AG*SAT was encouraged to explore offering modules of different academic term lengths.

**Implications**

The importance of educational delivery systems such as those using satellite technology will increase as commuting costs increase. Further, as land grant universities strive to use their budgets as wisely as possible and increase their specialization, such technology will gain in popularity. Students of this satellite course regarded it highly because it enabled participation in a course not normally available at their institution, it expanded appreciation for agricultural systems different from their own, it allowed them to see and hear leading experts discuss their various disciplines, and it was "interesting to watch" (a frequent comment).

Television has proven its effectiveness as a medium for communicating information to a wide variety of audiences. This project accelerated the rate at which sustainable agriculture information reached a broad audience; it also provided a fresh and timely means of conveying that information. Experience with this satellite course has demonstrated that the AG*SAT concept has potential as an increasingly important, innovative means of educating Iowans about the concepts, science, and philosophy of sustainable agriculture.