



# Distance Education

## A New Course in Wildland Fire Ecology

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### ABSTRACT

Distance education, facilitated by modern telecommunications and computer technology, is revolutionizing delivery of college-level courses. In creating an interdisciplinary course on wildland fire, we learned that initial investments of at least \$100,000 may be required, particularly for a video-based offering. Specialists in media production and web page development are crucial—not just to allow faculty to focus on content, but also to produce material that compares favorably with the TV productions students are familiar with. We further recommend conducting a pilot test with a live audience of students. Despite the challenges, we believe that many natural resource courses lend themselves to this format because of the photogenic nature of the topics and widespread interest in them, and that—over time—distance education courses can recoup the costs of their development.

**Keywords:** communication; distance learning

In late 1998 Oregon State University (OSU) anticipated the need for a new college-level course that would cover ecological aspects of wildland fire management. The higher frequency of large—often catastrophic—fires across western landscapes was certainly one of the drivers behind this effort. However, we also recognized the constructive, rejuvenating role that fire plays naturally in many of these ecosystems. Finally, we were struck by the dominant societal influences on wildland protection, utilization and restoration—influences ranging from wildfire ignitions to protests and litigation. An upper-division course that melded three aspects—fire occurrence, fire effects, and human dimensions—was needed for our natural resources

curricula in forestry, wildlife conservation, and range management.

At the same time we wanted to make this course available to a broad cross-section of clientele interested in the general topic of wildland fire. We were eager to reach off-campus students and professionals who might be unable to attend classes because of distance or work schedules. Conventional, campus-based courses are inconvenient for these nontraditional students, so we decided to explore other approaches to course delivery.

Distance education is becoming an important way of delivering college-level courses in a more flexible format (Murphy and Terry 1998; Tombaugh 1998). The nexus of videography and Web-based technology, coupled with

ubiquitous access to telecommunications and computer networks, is rapidly changing the world of higher education. This article describes the development and delivery of a contemporary course in wildland fire ecology through distance education technology at OSU.

### Approach

Undertaking a task of this complexity and magnitude required a careful assessment. First, we assembled an interdisciplinary group of faculty with expertise in forestry, rangeland ecology, wildlife management, fire science, sociology, and multimedia technology. After obtaining a commitment from each of them to participate, we jointly developed the goals and objectives for the course, target audience, level of instruction, number of credits, and other pedagogical parameters.

Concurrently, we explored various aspects of distance education delivery with OSU media experts and studied the literature (e.g., Miller 1997). Options ranged from “passive” Web-based instruction to “live” satellite lectures. We also evaluated the practicality of using emerging technologies, such as streamed video, DVD, and Pictel®. In the end, we opted for a combination of videotaped lectures (VHS and DVD formats) supplemented by a Web-

based platform (Blackboard®).

A final ingredient was financial support. We were warned that the development of high-quality, video-based distance education courses would be expensive. Funds to support the time involved in course development as well as the sophisticated technology were deemed crucial to the enterprise. Consequently, we submitted a grant proposal to the Higher Education Challenge Grants Program of the USDA Cooperative State Research, Education, and Extension Service. The grant was funded at the \$100,000 level for a three-year period. We received a comparable amount from OSU, including access to technical expertise and facilities.

### Course Preparation

Our interdisciplinary team began the process of outlining course content, structure, and sequence of topics (*table 1*). A syllabus was developed that included course goals, objectives, format, topics, and supporting information. We also enlisted several specialists both on and off campus in such areas as fire history, soils, regional ecology, and fire policy to augment our own expertise. We identified several prospective case studies that would provide tangible and relevant examples of wildland fire ecology topics. These ranged from illustrations of various vegetation fire types to management considerations involved in wildland fire protection and control. Finally, we developed a timeline for production and completion of the project. Deadlines were established for each phase, and periodic meetings were held to ensure progress and make adjustments as needed.

The next phase was largely one of individual responsibility. Designated lectures were prepared by subject matter experts, converted to PowerPoint presentations, and then taped in a studio. Given the photogenic nature of fire and wildland subjects, we incorporated slides and video footage of relevant scenes and events. Also, we included taped interviews with on-the-ground personnel, thereby depicting actual situations and conditions. These video segments provided powerful doses of

realism and variety to the lectures.

Graphs, charts, tables, and narrative slides were interspersed via PowerPoint to add depth and substance to the video lectures. Permission to use copyrighted material was obtained, and credits were acknowledged. Careful technical editing helped ensure high quality for each lecture and also facilitated integration and reinforcement of various topics throughout the course.

At the same time, we began developing a course website ([www.oregonstate.edu/instruct/dce/for446/index.htm](http://www.oregonstate.edu/instruct/dce/for446/index.htm)) with assistance from OSU's Extended Campus (Ecampus) staff. We adapted a template used by several other natural resources courses at OSU. Students access the website from within Blackboard. We made use of standard Blackboard features, such as periodic announcements, a calendar of assignments, discussion forums, and online testing. We also enriched the site with PowerPoint slides from each lecture, lecture outlines, learning objectives, supplemental readings, glossaries, and links to relevant external websites.

Once the course content was well in hand, our next task was to secure approval to offer the course from OSU's Curriculum Council. We arranged for it to be cross-listed within Forest Resources, Rangeland Resources, and Fisheries and Wildlife. We also made sure the course qualified as an elective in OSU's Natural Resources degree program (Jensen et al. 1998). In addition to our own contacts in the natural resources sector, we enlisted the services of OSU's Ecampus office in publicizing and marketing the course.

### Implementation

Before offering the distance education course, we did a pilot run. In winter term 2002 we offered the course to about 20 campus-based, upper-division students with a strong interest in wildland fire. We used a typical classroom setting to show the 30- to 50-minute video segments we had taped, followed by a half-hour of discussion and feedback during which students were asked to critique the video and attendant materials. We also asked them to evaluate

**Table 1. Topics covered in Wildland Fire Ecology.**

<i>Introductory information</i>
Importance of wildland fire in today's world
Role of fire in resource management, protection, and restoration
Scale of costs, acreage, and impacts of wildland fire
<i>Fire history</i>
Pre- and post-European settlement
Regional and temporal variations
Fire regimes and vegetation biomes
Emerging trends
<i>Fire behavior</i>
Fire intensity, severity, and frequency
Fuels and fuel management
Climate and weather
Aspect, elevation, and topography
<i>Fire effects</i>
Plants and secondary succession
Wildlife and habitat
Aquatic ecosystems
Microflora, microfauna, and microorganisms
Soil, water, and air
Watersheds and landscapes
Wildland-urban interface communities
<i>Social considerations</i>
Public trust and social acceptability
Communication and decisionmaking processes
Evolution of fire policy
<i>Case studies</i>
Low, moderate, and high fire severity regimes
Regional fire types and vegetation biomes
Prescribed fire
Environmental assessments

the website for utility and ease of use. To help assess learning, we asked students to prepare a set of true-or-false, multiple-choice, and short-answer essay questions surrounding each topic. This generated a pool of questions for quizzes and the final exam, which were refined and expanded by instructors.

We spent spring and summer 2002 doing final edits on the videos, website, study guides, case studies, and exam questions. We established grading criteria and a target schedule of assignments to keep students on track during the term. The Ecampus office began advertising the course, producing the video-

**Table 2. Results of the course reaction survey, fall term 2002.**

Question	Agree	Disagree	Neutral
1. Sincere effort was made to help me understand why the course is important.	100%	0%	0%
2. Course objectives were clear and helpful.	97	0	3
3. Course was effectively organized and administered.	97	0	3
4. Learning resources were helpful.	94	0	6
5. Learning activities were helpful.	94	0	6
6. Personal help was sufficient to meet my needs.	90	3	7
7. Climate was such that I felt free to ask questions and express thoughts.	97	0	3
8. Feedback was provided frequently.	90	0	10
9. Grading system was administered as specified in syllabus.	100	0	0
10. Sincere effort was made to stimulate my interest in the subject.	90	0	10

*Sample of unsolicited testimonials*

"I really like the way so many professors are included with all of their expertise to share."

"The objectives were very clear and were repeated in numerous places—on video, on website, in course materials, etc."

"The term project was good. It forced us to put together something practical rather than just reciting what's known in the literature."

"The on-line discussion forums really helped bring topics to life."

*NOTE: Percentages are based on 32 students who responded; five students who took the course did not respond.*

cassettes and attendant materials, and preparing for electronic registration.

The course was offered in distance

education format in fall term 2002. Tuition and related fees totaled about \$500 for this three-credit course. We limited enrollment to 40 students, and it quickly filled with registrants from 14 states. Many were place-bound professionals with fire-related jobs in their organizations. Their goals were to expand their knowledge of wildland fire, particularly its ecological aspects.

Video cassettes, a reference text (Walstad et al. 1990), contact information, and other materials were mailed to students prior to fall term. One of the team members became the lead instructor and took responsibility for interfacing with the students via e-mail and Web-based discussions. Students and faculty introduced themselves electronically, and the course was under way.

An important goal was keeping the students engaged and on task throughout the course. The lead instructor maintained daily contact with students and frequently enlisted other faculty and content specialists to help address the questions and issues they raised. Periodic practice quizzes, posted electronically, helped students stay abreast of the material and gauge their learning.

Students also were assigned a term project that would explore some aspect of wildland fire ecology. Examples, guidelines, and grading criteria were given for the project, and each student then pursued a topic of personal interest. Students appreciated the flexibility to choose their own topics, and this motivated many of them to explore their subjects in considerable depth. Each student submitted an outline during the third week of the course, and a draft report was expected by the eighth week. The final versions of the term project were due at the end of the course (10th week), and most were submitted electronically. A wide variety of topics were selected by the students (see "Examples of Students' Topics for Term Projects"), and they were encouraged to review what their colleagues had done.

Student learning was assessed using several methods. Three open-book quizzes were interspersed during the term, and a closed-book, proctored final exam was administered using protocols and procedures established by Ecampus. Student grades were a composite of scores on quizzes and the final exam, quality of the term project, and degree of participation in the online discussion forums.

At the end of the course we solicited feedback from the students (table 2). Although students had suggestions for improvement, all of them were enthusiastic in their assessments. Sample comments illustrate the utility and effectiveness of this approach to college education.

### Elements of Success

Based on our experience, we offer several suggestions for other instructors interested in offering distance education courses:

- Designate a lead instructor who has overall responsibility for course development and delivery. Ensure that other members of the faculty team have clear instructions and deadlines for their respective portions of the course.

- Obtain adequate funding to support course development. Initial investments on the order of \$100,000 or more may be required to provide the



time and expertise needed to develop the course, particularly if it is video-based. Once the course is up and running, the cost of delivery is quite economical. Institutional support in the form of returned tuition or other funds is essential to sustain the course and foster periodic updates.

- Comprehensive, multidisciplinary courses like Wildland Fire Ecology lend themselves to team teaching. However, considerable planning and thoughtful integration are required to avoid discontinuity or redundancy. Attention to course organization and logistics is essential to maximize efficiency.

- Specialists in media production and web page development are crucial to success. This allows faculty to focus on scope, content, organization, and delivery while the media experts handle the technology and facilitate effective presentation of the material.

- Allow ample time to develop the course and make appropriate adjustments and refinements. Students compare video-based distance education courses to network TV productions.

High quality is essential for such courses to be favorably received.

- Enlist instructors who convey passion for their subject areas. Holding the attention of a passive audience can be difficult unless the instructors are captivating and motivating. Occasional doses of humor, animation, and personal anecdotes help generate interest and increase retention.

- Incorporate video footage featuring outdoor scenes, special events, on-site interviews, "virtual" field trips, streamed video, and real-world situations, which can add a powerful dimension to this form of instruction. Such content helps illustrate important points and is essential for holding students' interest.

- Conduct a pilot test with a live audience of students. This important step provides valuable feedback and suggestions that can be incorporated into the finished product.

- Limit the class size to 40 students or fewer to ensure that each student receives adequate time and attention—crucial for retaining interest and com-

mitment among a dispersed population.

- Recognize that distance education students represent a different population than college residents. These students are often older, gainfully employed, have families, and are frequently taking courses for purposes other than a college degree. Understanding their goals, challenges, time constraints, and unique circumstances is important in establishing rapport. Frequent communication and online discussion boards help personalize the course and build constructive relationships.

- Ensure that assigned readings and supplemental information, such as journal articles, are easily accessible through online library sources.

- Allow students to select a term project that is of genuine interest to them. This will encourage commitment on their part and maximize the likelihood of high-quality research and writing. Adequate guidance, sideboards, and periodic feedback on progress are important prerequisites to successful results.

- Establish a firm schedule for the course and expect students to respond accordingly. Given the inevitable distractions they face, the lack of peer pressure to keep them on track, and the absence of a supportive campus community, it is easy for distance education students to procrastinate. Setting periodic deadlines and holding students accountable for meeting them will minimize the tendency to drift.

### Conclusions

Our experience indicates that video- and Web-based distance education courses are convenient and effective ways to reach motivated but place-bound students and professionals. These easy-to-use technologies are ideally suited for today's distance learner. They also provide a convenient alternative for campus-based students with scheduling difficulties. Finally, distance education courses delivered in this manner provide considerable flexibility to the instructor in his or her day-to-day commitments.

Topics like wildland fire ecology

that are both graphic and interesting lend themselves well to distance education. This format also provides an efficient way to capture a wealth of expertise and experience that can be shared worldwide. Although the front-end costs of developing such courses are substantial, we anticipate that they will pay for themselves as a result of the economies associated with repeated, widespread delivery. Periodic updating will be needed, but the basic infrastructure of the course should remain sound for many years. We encourage other faculty to explore this powerful medium.

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