

Teaching a Specialty Course at Three Land-Grant Universities Through Distance Education

Introduction

Biological control, using beneficial organisms to control insect or weed pests, is a specialty course offered in entomology departments at many Land-Grant institutions. As a specialty course – typically taught at the graduate level – the perspectives and topics taught tend to reflect the experience base or background of the instructor. Such courses often encounter low enrollments, limiting interactions among students or even precluding teaching the class, due to limits on minimum class size. One alternative is to offer a specialty topic as a non-credit summer short course. The Midwest Institute for Biological Control (MIBC) has offered non-credit, specialty summer short courses for more than 20 years. The courses have typically lasted 4 to 8 days, with enrollments of 12 to 25 students (mostly graduate students) and 3 to 6 instructors. Four of the authors (RNW, RJO, JJO, BB) participated in several MIBC courses, and recognized the value of broad perspectives from multiple instructors and the dynamic created by a critical mass of diverse students from different backgrounds and institutions.

The four authors (RNW, RJO, JJO, BB) have taught specialty courses on biological control for 8 to 20 years. The instructors recognized the benefits their experiences with MIBC courses, and sought to replicate those benefits in their own courses by teaching a combined course with multiple instructors at multiple sites, using distance-delivery.

We describe the development of a team-taught course, the logistics and methods used to deliver the jointly taught courses at three Midwestern, Land-Grant universities. The authors adapted their courses to teach a combined course with each instructor located at his or her home institution. The benefits and shortcomings of converting existing courses into a distance-course offered by multiple faculty members are discussed, as is an evaluation of the course conducted by an independent faculty member (RFB).

Distance-Education Course

In spring 2002, the principal instructors offered a course on biological control that linked 23 students enrolled for credit at Purdue University (PU), Iowa State University (ISU) and the University of Illinois (UI). In addition, two off-campus graduate students participated from a UI-extension education facility.

The semester-long class, taught twice weekly for 90-minute sessions, included both upper-level undergraduates and graduate students, as each institution typically attracted slightly different enrollees.

Planning involved deciding topical coverage and responsibility, the sequence of topics and activities, and materials needed to support each lecture or activity. One planning session included the course evaluator, who offered development of assessment materials for pre-course, mid-semester, and post-course student evaluations, as well as course evaluations and expectations to be offered by each instructor. The evaluator was not involved in teaching the course but only with the development of the evaluation materials and procedures. The evaluator was selected based upon his credentials as a university-level science educator and curriculum evaluator.

Attributes of Course

Commonalities Across Sites

The first class session was devoted to familiarizing students with the instructors and students at other locations, as well as course expectations. This session also included an introduction to “on-line etiquette” to make the interactions among students and sites more effective. Other resources to enhance the course included developing a chat group that allowed instructors to communicate common information to all students at all sites, and also gave students a chance to discuss those issues and topics that arose during class. The MIBC web site was used for background information and to augment readings, replacing a required text at each school.

The multimedia course used application sharing and video-conference sharing. Each site was equipped with a classroom with one or two video cameras, a document camera, a microphone located either centrally or at each student's chair, and multiple video displays. The UI site served as the course “home,” linking all sites and from which the lectures were sent or routed to other locations.

Normally, two lectures per week were presented, linking the sites. Course topics included ecological basis of biological control; methods and measures of biological control; biology of natural enemies; risks of biological control; microbial control; weed biological control; genetically altered natural enemies; and integrating biological control into other management approaches. Each instructor had responsibility for presenting approximately the same number of lectures, with topics taught by the instructor with a particular background or strength. The instructors also assigned articles from the primary literature on various topics and students were assigned to lead

discussions on the papers. Instructors attempted to involve students at all sites in discussions following lectures, summaries of papers and debates. Students at the different sites participated in debates on contemporary and controversial topics in biological control. Four teams of 5 to 6 students were formed, each one composed largely of students from one school. Each team was given a topic and a pro or con position.

Differences Among Sites

Because of different student audiences and different course credits, there were slight differences in the courses at each institution. Two instructors offered optional lab sessions. At one site (PU), these weekly lab sessions focused on identification of key taxa of natural enemies. The second site (UI) had 5 to 6 lab sessions to demonstrate living natural enemies and exercises derived from lectures.

Students enrolled at their home institutions, met the prerequisites and paid tuition and fees determined by their home school. Prerequisites varied among schools. One (PU) required a course in entomology or permission of the instructor; a second school (UI) had no prerequisites but encouraged students to have taken Integrated Pest Management, Ecology or Insect Ecology; the third university (ISU) allowed entry to any interested student of junior or senior standing.

The Instructors

Although located at different institutions and having different research programs, three of the four instructors had similar backgrounds. Three (JJO, RJO and RNW) were trained in biological control of insects, with the fourth instructor (BB) trained in insect pathology. One (RJO) had more of a background in quantitative ecology and modeling, also taught courses in Insect Ecology and Quantitative Insect Ecology. Two instructors (JJO, RNW) focused on the biology of predatory and parasitic natural enemies used against insect pests, and also had active programs in biological control of weeds. The fourth instructor (BB) is an insect pathologist and has taught insect pathology and co-taught biological control.

Instructors' Pre-Course Expectations

The instructors completed a pre-course survey concerning their expectations for the course. This was the first time they had taught an entire semester-long course using distance-education technology. Their pre-course expectations of benefits included:

- Multiple instructors with strong and varied areas of related expertise
- More student-student interaction
- Larger total enrollment with more sites
- More overall interaction on all levels
- Increased visibility for discipline of Biological Control

- Decreased individual preparation time for instructors

Disadvantages anticipated by the instructors:

- Lack of development of personal relationships
- Tendency for instructor to become "TV personality"

Instructors' Post-Course Evaluation

Instructors' post-course evaluations of benefits:

- Achieved the goal of having a critical mass of students, tripling class size
- Discussions, team activities and debates were more effective
- Technology worked well and forced each to be better a teacher
- Instructors were better prepared due to collaborative nature
- Successfully combined instructors' expertise
- Collaboration among three large research-based institutions
- Having the resources to try something new
- Students adapted well and quickly to new technology

Instructors' post-course negatives:

- Materials prepared before course initiation would have helped some students
- Need for fewer online lectures and more online discussions
- Some of the lectures and associated materials needed to be modified to accommodate course format.

Summary of Students' Responses to Questionnaires

Seventeen students responded to the post-course questionnaire, with responses summarized as:

- All respondents said that an instructor-prepared packet of course materials would have helped.
- 8 of 17 said that a textbook would have been helpful
- 14 of 17 said that readings were interesting and relevant
- 12 of 17 thought course achieved a good balance of theoretical and applied concepts
- 10 of 17 thought debates were helpful
- 8 of 17 said the course provided insight into the functioning of the scientific enterprise.
- 9 of 17 said they felt as though they were part of a learning community
- 9 of 17 mentioned that they did not get to know participants at the other sites.
- 8 of 17 said that getting instructors' different points of view on biological control was very beneficial

Teaching Tips

Summary

In their combined course, the instructors tried to maximize on-line interactions at individual sites and across sites. The course used evaluation methods to determine how the on-line version of the course compared with the individual, “traditionally taught” courses, to assess the success of distance-delivery. This course was an experiment in distance education with a specialty course taught by several instructors at multiple universities, each with students registered locally. The instructors decided to collaborate in teaching this course to use technology to reach more learners. In addition to expanding the number of students reached, the critical mass of students allowed more interactive activities than would have been possible for small enrollments in individual classes at single institutions. The goals of the four instructors to combine their areas of expertise and to use technology to connect students with similar interests were achieved, and have application for other similar specialty courses in other scientific disciplines.

Reference

O'Neil, R. J., and R. N. Wiedenmann. 2008. The Midwest Institute for Biological Control: 17 years of a different kind of distance education. *American Entomologist* 54 (1): 6-9

This paper is dedicated to the memory of Robert J. O'Neil, who passed away in February 2008.

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