Integrating Technology into Introductory Environmental Science for Prospective Teachers

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Abstract
Prospective teachers frequently enroll in introductory environmental science courses to fulfill general science requirements. These courses are often taught by diverse faculty. A range of technological teaching tools provide opportunities to develop teaching praxis, coordinate faculty, integrate on-line resources between lectures and course website, and encourage prospective teachers to learn through experience. This paper describes efforts to redesign an introductory environmental science course to achieve these goals. The experience provides lessons for other institutions who wish to integrate technology teaching tools into large introductory courses. Coordinating instructors in an on-line environment allows idea exchange, promotes course content development, and improves instructor facility with technology-intensive teaching tools. Instructors in technology rich environments provide education through immersion of integrated technology intensive teaching methods.

Proposal
Prospective teachers often enroll in introductory environmental science courses to fulfill part or all of their general science requirements. These courses are often taught by diverse faculty including full-time, part-time and graduate student instructors. A range of technological teaching tools are available to faculty; these provide an opportunity to
a) develop teaching praxis and tools
b) coordinate the different faculty
c) integrate on-line resources between lectures and course website, and
d) encourage prospective teachers to learn through experience.

This paper describes efforts at UNLV to redesign its introductory environmental science course to achieve these four goals. This experience provides implementation lessons for other institutions who wish to further the use of technology teaching tools into large introductory courses. It concludes that coordinating the efforts of all instructors in an on-line environment allows exchange of ideas, promotes the development of course content and teaching materials, and improves instructor comfort and facility with technology-intensive teaching tools. Instructors in this technology rich environment provide an example by immersion of integrated technology-intensive teaching methods to prospective teachers.

Examples of technology-intensive instruction tools that are particularly salient to introductory environmental science instruction include
- PowerPoint lectures that include links to information web sites, streaming video and audio links, and on-line models (e.g. air quality management) that can be manipulated in real time;
- Websites (internet or intranet resources such as WebCT and Blackboard) that contain links to the sites, multimedia and models presented in class. This allows students to interactively reinforce classroom presentations;
- Discussion boards and chat rooms where students can discuss environmental science topics and prepare for exams; and
- Assignments that require students to turn in multi-media assignments electronically, which can include hypertext submissions, PowerPoint presentations, websites at other locations, and student-generated video or audio materials;
- Logistics management tools, such as on-line grade records, assignment drop boxes for submission of a variety of media, access to course syllabus, links to textbook sites, and course calendars.

Instructors can also provide practical instruction to prospective teachers by allowing them to develop instructional tools as part of the class assignments. This can include
- Building topical webpages, including narratives and links;
- Building PowerPoint lectures, including lectures with links to informational sites, models, videos and streaming audio; and
- Developing digital audio and video resources for classroom use.

Some particularly compelling lessons from the UNLV experience include that
- It is unlikely that this project would have happened absent support for the faculty members involved. In the UNLV course, this took the form of a course redesign grant, but other mechanisms, such as a one-time course credit could serve;
- Graduate student instructors (who are simultaneously earning graduate teaching practicum credit) and full time faculty have been more willing to adopt technology-intensive teaching than have part-time instructors.
- Some students, surprisingly, continue to have trouble with or are resistant to accessing and even using computers. This can be overcome if it is attended to at the start of the semester.
- If anything, more extensive use of web-based interactions has further personalized courses, allowing students to communicate with instructors in and informal, time-independent format.

Most of these techniques and materials can be adapted to introductory and advanced courses in other disciplines.