Informal Life Science

Incorporating Service Learning Components into Biology Education

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In a course designed for students pursuing science careers in informal educational settings, students received training in environmental education programs and applied their training at a local nature center to fulfill the course's service learning requirements. Both university students and school children alike benefited from this partnership.

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Most undergraduate science majors enroll in courses designed to prepare them for research careers or professional schools (medical, dental, and veterinary) after earning a bachelor's degree. Coursework preparing students to enter careers in institutions of informal education, such as science museums, zoological parks, nature centers, and aquaria are generally lacking; nevertheless, many science majors find themselves working in these types of institutions.

Likewise, most students earning an education degree are extensively trained in formal classroom teaching methodology but receive little if any training in informal education. Therefore, a welcome addition to education curricula is a course in which traditional biology, environmental science, and nonscience majors (such as education majors) can develop the types of informal educational activities often used in aquaria, zoological parks, museums, and nature centers.

Such a course was offered for the first time at Towson University in the 2001–2002 academic year. Throughout the course, students were presented with concepts and theories, which were enhanced by hands-on applications as students completed the course's service learning aspect. Many educators have reported the positive effect of service learning in liberal arts courses (Battistoni 1995; Huckin 1997; Mettetal and De Bryant 1996), but service learning is not often associated with science courses. Nonetheless, service learning can be a powerful teaching method, especially in field settings. According to Fearn (2001), service learning was incorporated into a geography course in which students researched a local watershed and shared their findings with the community.

Both the students and community members benefited from the experience. Students learned to plan grade-appropriate activities outside of traditional classroom settings. Additionally, they learned about valuable and rewarding career alternatives that many had not considered before. The community benefited by having additional volunteers who had a good command of environmental and biological science concepts as well as a background in child development and learning.

Accounts of other successes linking service learning with college-level courses exist (Buckingham-Hatfield 1995; Mohan 1995). Service learning provides an excellent opportunity for students enrolled in science courses to see how their undergraduate coursework has direct applications to the real world and their future careers. The nature of the service learning component in this course was meant to raise student (both university and grade school) awareness of local environmental is-

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sues. Therefore, the use of the environment as an integrating context (Lieberman and Hoody 1998) was emphasized.

Course Description

The class met once weekly for three hours to allow site visits and time for travel and to accommodate more lengthy training periods than a traditional class period would. After covering such topics as the history of environmental education, local and national environmental education organizations, use of the environment as an integrating context in life science activities, and state and national science standards, students visited local science and nature centers that focused on informal biological science education for visitors.

At these centers, university students observed K–12 school groups being led through educational programs. The university students observed how these informal programs addressed the state and national science standards for the grade level taking part in the activities. Site visits where similar activities took place included a national wildlife refuge, science museum, and local nature center.

After the site visits, students began volunteer training at Irvine Nature Center, a small private park located outside of Baltimore. During three sessions of three hours each, students became acquainted with the center's school group procedures. Students observed nature center staff leading school groups through nature walks, and staff demonstrated to the university students proper use of supplies and equipment. After completing their training, students were required to lead a minimum of three school group nature walks at the nature center throughout the course of the semester.

The grade levels of most children served by the center ranges from preK to postsecondary. Students enrolled in the course led walks for schoolchildren who were predominantly in grades preK to 4. Nature walk topics included "Sensing Nature" (aimed at students in grades preK to 2), which focused on using one's senses to observe natural phenomena; "Wild Animal Survival" (aimed at students in grades 3 to 6), which focused on animal adaptations; "Changing Seasons" (aimed at students in grades 3 to 6), which focused on seasonal changes in the environment; and "Streams" (aimed at students in grades 3 to 6), which focused on stream health and macroinvertebrate sampling.

In addition to the site visits and service learning component, students earned certification in several nationally recognized environmental education curricula:

- Project Wet—an interdisciplinary water-based curriculum for grades K–12 (CEE 1995);
- Project Wild/Aquatic Wild—an interdisciplinary animal-based curriculum for grades K–12 (CEE 2000 and 2000a);
- Project Learning Tree—an interdisciplinary environmental education curriculum, with emphasis on plants, for grades K–8 (American Forest Foundation 2000);
- WOW! The Wonders of Wetlands—a wetlands education program for grades K–12 (CEE 1995); and
- the National Wildlife Federation's NatureScope Habitats program—for grades K–8 (2001).

Students used many of these curricular activities to complete the course's service learning requirement as they led school children through nature walks at Irvine Nature Center.

Other course requirements included a midterm examination based on Horton and Eichbaum's *Turning the Tide: Saving the Chesapeake Bay* (1991), a paper based on a current environmental education issue or a person who has made a significant contribution to environmental education in the United States, and a culminating project in which students find an informal biological science education site and design environmental education activities for students in a specified grade level visiting the site for a day. Students were required to include the state and national standards addressed by the activity.

Course Effectiveness

In light of the mutual success of this endeavor, the Irvine Nature Center asked to continue its partnership with Towson University for another year. Staff naturalists noted that students were enthusiastic and had a solid science background. It was sometimes evident that the university students did not have much experience managing groups of young children, but most students remarked that the service learning experience made them feel more comfortable in that role. Teachers and parent volunteers present during the walks were often surprised to learn that the university students were not regular nature center staff members; their degree of professionalism was deceiving.

As a further indication that the course was a success, the mean course evaluation score for the class as a whole was 4.8 out of a possible 5.0. Students wrote the following on their course evaluation forms:

- I enjoyed this experience so much that I am seriously considering exploring the possibility of working as a naturalist.
- Volunteering at Irvine was a really great opportunity for me to see how environmental education is taught in an informal environment. It helped me to see that this was a better career to pursue.
- I enjoyed your class. It opened me up to other job fields in my area.
- This course was more interesting than any other biology class. I thought the trips to Irvine were very helpful and will definitely help me later on in life, possibly with my career. It was great to deal with small children and get comfortable with their actions. The kids definitely learned a lot and had fun.
- Leading walks at Irvine helped me


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to relate information I learned in my other classes and explain it in a manner that is easily understood. I learned what young students like and dislike about learning.

- I have learned a lot about relating biology concepts to other people. This class was great because I could apply natural history and anything environmental I have learned.
- I learned how to relate biology to children.
- It broadened my perspective of my biology degree.

Final Thoughts

Incorporating a service learning component into an upper-level biology course can be an effective learning tool. Students were able to directly apply classroom learning and activities to real situations that they are likely to encounter if they choose careers in such settings as zoos, parks, and aquaria. Students gained career experience and explored options within the realm of biology that they may not have considered before, all while making a significant contribution to the community and its children—a winning situation for all. As students become more involved with educating our youngsters outside of the formal classroom, the nature center becomes a better place because of an increase in educated workers, the community benefits through our efforts to create a more environmentally conscious public, university students gain experience and a sense of civic pride, and the university's service learning programs become more enriched and diverse.

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