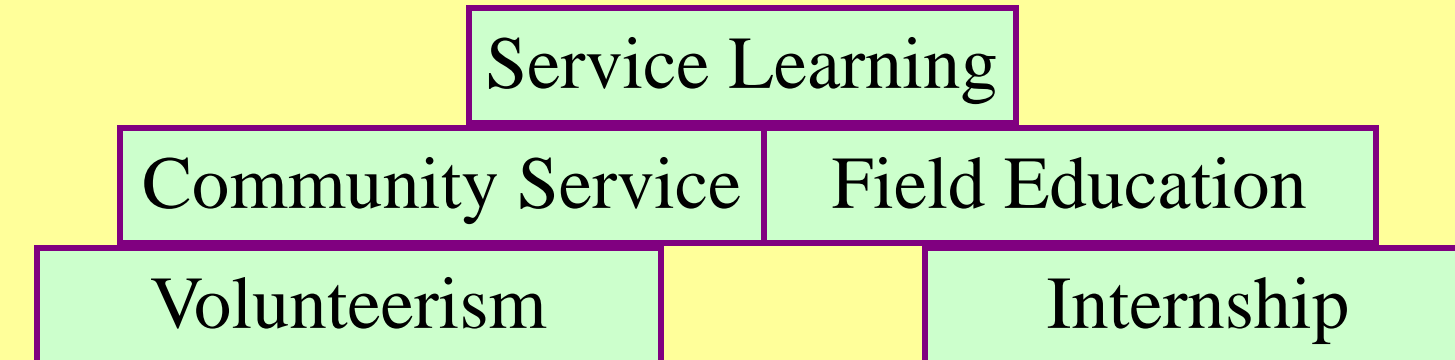


What is Service-Learning?

Delivering part of the traditional content of a course by having students address a problem posed to them by a community partner. The partnership is reciprocal and rests on the strengths of instructor and partner.

How do you distinguish between SL and other forms of experiential education or service?

Recipient ← Who is the Beneficiary? → Provider
Service ← What is the Focus? → Learning



Why Adopt Service Learning?

Gordon (1999) summarizes the work of Caine and Caine (1997) by saying,

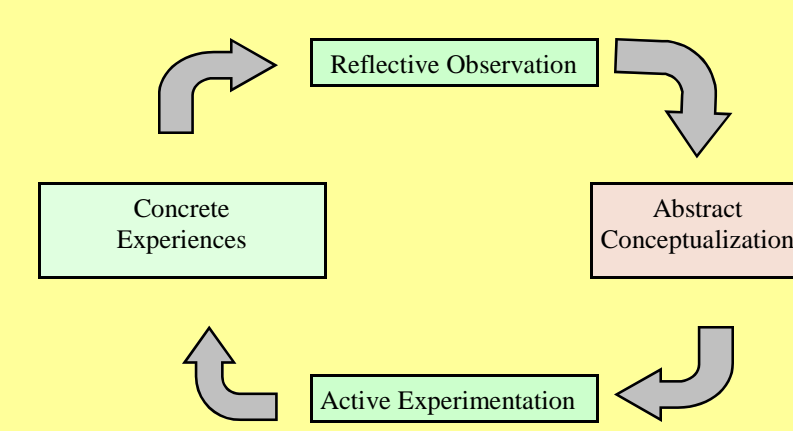
"...learning is enhanced by emotionally resonant, challenging situations involving a multiplicity of inputs that allow students to make connections among ideas and experiences."

Roots of Service Learning

Dewey(1938) outlined the process of inquiry in education.

Kolb Learning Cycle

Kolb (1984) presented a model based on Dewey a four-stage experiential learning cycle



Eight Step Model for Service Learning Courses

(Gordon, 1999)

- Community Partner
- Building Community in the Classroom
- Project Management
- Assessment
- Project Design
- Building Student Capacity
- Problem Statement from Community Partner
- Assessment

Caine, R.N. and Caine, G. (1997). *Education on the Edge of Possibility*. Alexandria, Va.: Association for Supervision and Curriculum Development.
Dewey, J. (1938). *Experience in Education*. New York: MacMillan Publishing Company
Gordon, R. (1999). *Problem Based Service Learning: A Fieldguide for Making a Difference in Higher Education*. Bedford, NH: Campus Compact for New Hampshire.
Kolb, D.A. (1984). *Experiential learning: Experience as a source of learning, and development*. Englewood Cliffs, NJ: Prentice-Hall.

Building Strong Departments by Emphasizing Pedagogy: Service Learning

Ed Laine Geology Dept., Bowdoin College Brunswick, ME 04011 edlaine@bowdoin.edu
February 25-26, 2005

One primary reason our department is valued by Bowdoin is because we have created three introductory courses that are viewed by our administration as *open, engaging, and challenging*. Each faculty member teaches an introductory course that can count towards the major, but is chiefly populated with students meeting the Inquiry in Natural Science Requirement. Each course has as its basis field research in the local area with themes of either bedrock geology, hydrology, or oceanography. Each course uses a field-based, hands-on approach to geoscience. Each has a lab course with regular field trips, and each has a project component in which students work in small groups on true research projects (i.e., the precise outcome is not known ahead of time, even to the instructors). Course enrollments are capped at 36 (two lab sections) and are well subscribed.

The course I teach is Marine Environmental Geology (Geo/ES103) and in this course I engage students in science through service learning. I deliver a part of the traditional content of this course by having teams of students work on projects in support of a community partner, a local environmental group. Students are posed with a problem by the partner and they design and carry out a research project to address the problem. Writing a report for the partner is treated as a structured writing exercise with feedback and several revisions. Students construct high quality posters and present their results in public to their community partner and the campus at a semester end service learning symposium. Enrollments of women in this course average 63% and have been as great as 74%. The administration views service learning as a pedagogy that introduces and interests women in science.

Community Partner



For fifteen years, Friends of Casco Bay has been the leading environmental organization working to improve and protect the environmental health of Casco Bay through advocacy, education, collaborative partnerships, and water quality monitoring. FOCB is the headquarters of the Casco Baykeeper, Joe Payne who uses a "work with" approach to resolve pollution issues that threaten the Bay. His balanced advocacy helps people understand that the region's economic health is dependent upon the Bay's environmental health.

Building Community in the Classroom

Key Questions

- Do students feel safe and valued in the classroom and lab?
- Do they feel comfortable trying new things?
- Will they work effectively in teams?
- Can they speak out in class and are they able to articulate their needs?

Approaches

- Getting to know one another exercises
- Team building exercises
- Check-ins to monitor student comfort levels
- Written reflection as a way of having something to say in class

Project Management

Project management by me and the laboratory instructor has been very time expensive, given the logistical and safety issues of students needing to get out to sea on boats in situations where both weather and the tides play a significant role. We have learned to keep things simple.

For each class

- One community partner
- Summer planning with community partner
- One body of water
- Each lab section constructed in parallel

Assessment in 2004

First Hourly Exam	20%
Second Hourly Exam	25%
Classroom Exercises	10%
Project	40%
• Selection Essay (2)	
• Proposal (4)	
• Annotated Biblio. (2)	
• Report (20)	
• Presentations (4)	
• Poster (4)	
• Notebooks (4)	
Other Laboratory Exercises 5%	
• Beach Profile Lab	
• Plate Tectonics Lab	
• GIS Lab	

Exams were given emphasizing the traditional content of the course

The project report was designed to be a structured writing exercise.

Feedback was given by:

- Laboratory Instructor
- Instructor
- The Writing Project (peer counseling)
- Friends of Casco Bay (community partner)

The notebooks were graded on only two of the assignments

Project Design

In consultation with faculty, laboratory instructors, and their community partners students draft and revise a project design document to address the problem posed by the community partner. Their design is a realistic plan that takes into account logistics, instrument/boat availability, tides (where applicable), and the time left in the semester. Bad weather and equipment failure contingencies are built in where possible.

Dissolved Oxygen (DO)

Data
•FOCB profiles
(7 stations, 2003 – 2004)



Techniques
Field
•YSI sonde
•Collect samples for lab

Lab
•Check DO calibration of YSI using Winkler titration

Analysis
•Examine changes with depth & season over N – S transect

Building Student Capacity

Traditional

- Lectures tailored in part to projects
- Extensive web resources
- Project selection essay
- September labs emphasize practicing field techniques

"Just in Time" training

- Excel
- GIS
- Publisher

Community Partner

- Visits to classroom, labs, and field
- Phone/email consultation

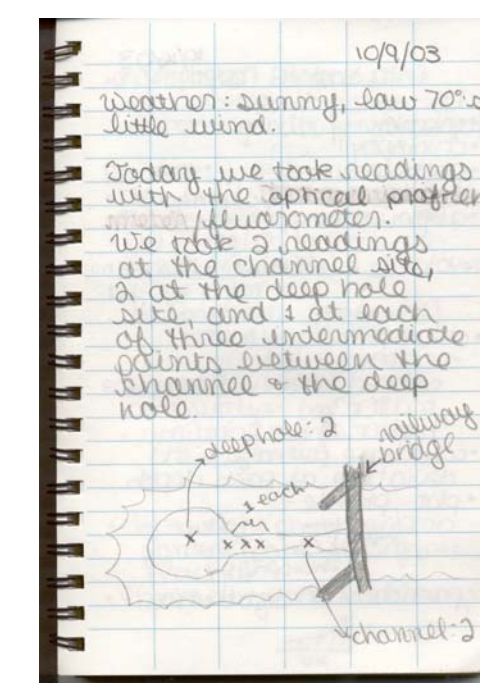
Problem Statement from a Community Partner



There are a series of data analysis and field projects that you can do to help Friends of Casco Bay understand how the oceanography of the Gulf of Maine and of Casco Bay may influence the health of Casco Bay. We are concerned about how events outside Casco Bay may influence water quality at specific locations within Casco Bay. We are also concerned about the influence of processes and events within the Casco Bay watershed may have on water quality.

Reflection is the essence of doing good science.

Field Notebooks required in class, lab, and field. Students are required to reflect on all aspects of their work.



An on-line survey at the end of the semester helps us assess the effectiveness of the SL component of a course.



Outcomes

Student reflections in "Rite in the Rain Field®" field notebooks

Jennifer, sophomore, undeclared major: *The best partwas that we had the opportunity to learn something outside of the classroom, and take advantage of going to school in Maine. Just being outdoors, out on the water - and learning something in the process - was a lot of fun, and I definitely brag about it to all my friends back home. It was really meaningful for me to know that what I was learning has applications in the real world, rather than just learning something in order to pass a test or get a good grade. It was a huge sense of accomplishment when the project was finally finished and I could finally explain what all the data meant because I knew that we had really learning something that would be of use to other members in the community.*

Nicole, M., sophomore, Environmental Studies major: *I enjoyed knowing that the work we were doing was going to aid Friends of Casco Bay.... I have learned to appreciate the work that scientists, lab assistants and science majors do, as it can be laborious, fascinating, and rewarding all at the same time. Lastly, my interest in service-learning has grown and I hope to take more service-learning courses in the future, as doing class/lab work that is practical for another (non-Bowdoin) group's cause is rewarding.*

Patrick, senior Econ major: *My favorite aspect of the project was actually going out to Card Cove to collect the data. Not only is this area beautiful, but I was experiencing something that I have not done since coming to Bowdoin.this was my first science class that I have taken. I learned that collecting data is not always easy. The first time out on the boat with Jay to collect our data, the YSI broke and our trip to Card Cove was "unsuccessful". While this was frustrating, it made me realize & appreciate the work that geologists and other scientists must do: data collection does not always go as smoothly as one hopes.*

Sam, senior gov & Latin American studies major: *My favorite aspect of the project was actually the analysis - taking the data we had collected and reviewing trends in comparison to the existing literature. It was satisfying to have gone through the whole process of designing, researching, and executing a new project personally relevant to the goals I was hoping to meet, I particularly liked being able to compare our Maine estuary to bays in Chile, China, and Australia, as well as to other marine areas in Maine, through scholarly and secondary literature.*

Paul, first year, undeclared major: *My favorite aspect of the project was knowing that our work can possibly benefit the Quahog Bay area. Usually in college we are given assignments that already have answers. The only goal of those assignments is to obtain a good mark, nothing more. Our service-learning project, however, will hopefully contribute some new and significant knowledge to the community. I am intrigued by the simple fact that the low dissolved oxygen in Quahog Bay is a yet unsolved mystery. I learned two main lessons from our service learning project. One, not everything is as cut and dry as I once thought. Our problem was very open ended and we ventured into uncharted territory. In high school and college we, as students, very rarely get an opportunity to try to figure out a problem that is yet unsolved.*

Nicole H., sophomore, undeclared major: *I enjoyed learning about water quality, a subject I knew nothing about, in a setting that I could relate to my own life. Now I can apply what I've learned to places in my own community.*

Jesse, junior, Physics major: *My favorite aspect of this project was that we got to do real, potentially useful research. This is the only course I've taken at Bowdoin where I have done anything that had a larger purpose than merely educating or evaluating me. I took a lot of satisfaction in doing something useful for once. I also really enjoyed reading the academic papers and articles that pertained to my project. It was very interesting to see what real oceanographers do and discuss.... I really liked being a part of a service learning project, and I think there should be more of them.*

Students were

- Excited by civic engagement
- Excited by realistic problem solving
- Understood the messy nature of scientific inquiry
- Liked in-depth work
- Enjoyed being outdoors on a boat and learning
- Proud of their accomplishments

In the past five years, 63% of students taking this course have been women.

The administration sees service learning as a pedagogy that attracts women to the sciences. They view courses such as these as "open, engaging, and challenging."