Service Learning and Sustainability

Students prepare environmental risk assessment reports for urban homeowners in Nashville

John C. Ayers, Professor, Department of Earth and Environmental Sciences, Vanderbilt University

Roni Christian, Program Manager, Center for Service Learning and Civic Engagement, Tennessee State University
Background on HUD-funded GGNN Project

• In 2010 the Center for Service Learning and Civic Engagement at Tennessee State University (TSU), a historically black college, presented a proposal to the federal Housing and Urban Development (HUD) agency to provide low-income homeowners in areas close to campus with energy efficiency upgrades.

• In addition, they proposed a service learning project in which Vanderbilt University students taking the course "Geochemistry" would collect soil and water samples, perform chemical analyses, and then prepare environmental risk assessment reports for each homeowner.

• The grant was awarded in spring 2011 ($789,000, 5/11-5/14), and the project was formalized by the creation of the group “Go Green Nashville” (http://gogreen-nashville.com/).
Service Learning Assignment Objectives

• Expose Vanderbilt students to the world outside of campus, and show how what they learn in class can be useful.
• Help homeowners in a low-income urban neighborhood identify environmental hazards and reduce their risks.
• Have Vanderbilt and TSU students spend a half-day working together on a common goal.
Preparing for the Field Trip:

- I will assign two property addresses to each of you.
- Use Google Earth to find your study site and locate streams to collect water samples from.
- Before beginning field work complete the EES 260 Field Trip Release and a travel form.
- Divvy up the Hach tests; review the procedures for your test and make sure we have sufficient supplies.

What you should bring:

- A small notebook and a pen to write notes.
- A camera if you have one: take photos of each site to include in your reports (you probably all have cameras on your phones).
- Lunch
What I need to do before the field trip

• Explain pedagogy to students.
• Have homeowners participate by telling us what environmental risks they are concerned about, then have students formulate a plan for assessing.
Plan for each site

- Have homeowner sign Homeowner Liability Waiver.
- Use GPS to record sample location.
- Use Hydrolab to measure water quality parameters.
- Collect water sample.
- Collect soil sample.
- Take photographs of site.
- Use portable XRF to analyze old paint for lead.
If the house has peeling paint, do an environmental analysis for lead using the portable XRF.
First year inefficient
Second year: work in groups
Field filtering water sample
LOI measurements
What students have produced
What I need to do after the field trip:

• Discuss results in class after they turn in reports.
• Give reports to TSU and homeowners.
• Arrange student-homeowner follow-up meetings?
• Follow-up the next year to see if any improvements (radon, etc.)?
What I’ve learned

• A project like this requires a lot of preparation.

• Give students total ownership. The 2011 group went into the field prepared because they did the preparation. The 2012 group was not because I did the preparation (I wanted it to go more smoothly, but it didn’t).

• Emphasize to students that they must keep their audience in mind, and be consistent. Example:

  “The limits for Copper, Lead, and Zinc exceed minimum health regulations... Ingestion of all three of these elements can cause serious health problems, and consequently this problem should be addressed as soon as possible.” From the same report: “From this data, no other action is needed for soil and water quality.”
Problems and challenges

• Work must be done on a weekend; hard to find a date that works for everyone.

• Accommodating students with disabilities.

• Benefits outweigh the costs.
Benefits

• Expose TSU and Vanderbilt students to practical field science.

• Inform homeowners: is their soil and water safe?

• Vanderbilt students:
  • Learn new lab skills
  • gain practice working in groups
  • Learn how to communicate scientific results to laypeople

• Collaboration between TSU and Vanderbilt has built social capital that is being used to make urban neighborhoods more resilient and sustainable.
Research Benefits

• Projects like this look great in the Broader Impacts sections of NSF grant proposals, which are now weighted equally with Intellectual Merit.

• Findings have led to an NSF grant proposal submitted in June 2013.