

Development of the *Environmental Forum*: An Integrative Approach

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Abstract

With the assistance of SENCER, Colleges of the Fenway (COF) faculty developed a unique course in 2005 titled *Environmental Forum*. The *Forum* provides a common ground for students at all COF institutions to learn about current issues in sustainability and environmental topics and interact with other COF students and faculty. This course promotes networking opportunities and service learning throughout the Boston community in various areas related to sustainability and the environment. Over the past six years, the *Forum* has addressed broadly engaging topics with a sharpened focus, increased both the extent and formality of student community engagement, and expanded the assessment toolbox. Students highly rated the *Forum* for its variety of invited expert speakers, the opportunity to engage in discussion and debate, the ability to become aware of a variety of career options, and the ability to participate in service-learning and community engagement projects.

Introduction

In 2003, with the help of the Science Education for New Civic Engagements and Responsibilities (SENCER) dissemination project, faculty members from the Colleges of the Fenway (COF) consortium created a cornerstone course as part of a newly developed Bachelor of Science Degree in Environmental Science. *Environmental Forum*, created to provide a common identity for all environmental science students at the COF institutions, brings together students, faculty and practicing professionals to discuss current issues, career planning, and civic engagement as well as to participate in service learning activities throughout the COF and greater Boston communities. An initial assessment of student learning outcomes was previously reported (Faszewski and Duggan, 2007). Since then, due to changing student interest, the COF initiative has transformed into the COF Center for Sustainability and the Environment, and, as a result, *Environmental Forum* has adapted to reflect these changes. Recognizing the broader audience participating in the *Forum*, faculty has used a more interdisciplinary and integrative approach with respect to community engagement, service-learning, and assessment. Table 1 is an overview of development of the *Forum*.

TABLE 1. Development of the *Environmental Forum*

	2005	2006	2007	2008	2009	2010	2011
Community Engagement	Environmental NGOs	Environmental NGOs	Environmental NGOs	Environmental NGOs	Environmental NGOs	Environmental NGOs	Environmental NGOs
	Earth Day Cleanup	Earth Day Cleanup	Earth Day Cleanup	Earth Day Cleanup	Earth Day Cleanup	Earth Day Cleanup	Earth Day Cleanup
			Muddy River Symposium	Muddy River Symposium	Muddy River Symposium	Muddy River Symposium	Muddy River Symposium
Theme	Current Issues	Current Issues	Muddy River	Climate Change	Climate Change	Climate Change	Climate Change
					Sustainability	Sustainability	Sustainability
						Environmental Health	Sustainable Energy
Assessment Tools	Reflections	Reflections	Reflections	Reflections	Reflections	Reflections	Reflections
	SALG	SALG	SALG	SALG	SALG	SALG	SALG
					Pre and Post Self Assessments	Pre and Post Self Assessments	Pre and Post Self Assessments
					Content Assessments	Content Assessments	Content Assessments
						Scott Ross Center Involvement	Scott Ross Center Involvement

Environmental Forum Content Themes

The *Environmental Forum* course was initially designed to provide an arena for multi-disciplinary investigation into current environmental topics. The course originally focused on a wide array of general environmental issues, covering five to ten topics per semester. In 2007, however, faculty decided that instead of covering a number of unrelated environmental topics dictated by the availability of expert speakers to present at the Forum, it would be more beneficial to focus on a specific thematic issue in greater depth. With this in mind, each of the following topics was covered, one per semester: Muddy River Restoration Project, Climate Change, Sustainability, Environmental Health, and Sustainable Energy.

A number of advantages of increasing a thematic focus were readily apparent: clarity in the marketing of the *Forum* course (easier for students to understand what the course would consist of if the title included the main topic, e.g., Environmental Health), a greater depth of content was achieved through the incorporation of readings and texts, etc. In addition, during this time, an administrative transition in the consortium from an Environmental Science Program to a Center for Sustainability and the Environment resulted in a broader

participation from other majors such as communication, child life, and architecture. As a result, participation in the *Forum* class increased in diversity – ranging from the colleges that were represented, the backgrounds of the students, and the expertise of the visiting speakers. The diversity of values and backgrounds of students fuels lively discussions in the *Forum*, around focusing on the most significant problems and the best solutions to those problems; this mirrors the complexity of real-world problems. In addition, using a one-theme per semester approach, students are able to enroll in the course multiple times.

Increased and Integrated Community Engagement

Over the last six years, not only has there been a deepening of community engagement in the *Forum* course (which directly correlates to our development of community partnerships) but its integration into the course has been more explicit. The COF's close proximity with a local natural resource (Muddy River) has spurred our collaboration with multiple community partners, ranging from NGOs, community groups,

businesses, and federally mandated oversight groups. For example, the Emerald Necklace Conservancy (an advocate for the restoration of the historic landscape of the Emerald Necklace Park System of which the Muddy River is a part) has become a community partner working with COF students to organize and host the annual Earth Day Cleanup; in return, the Conservancy has participated in our annual Green Jobs Fair and Muddy River Research Symposium.

Another collaboration that has increased community engagement, and which developed early in the history of the *Forum* course, is the COF's partnership with the Maintenance and Management Oversight Committee (MMOC) of the Muddy River Restoration Project, a federally mandated oversight group for the \$100 million restoration of the Muddy River. The excitement generated by this major environmental project naturally became the focus of the 2007 *Environmental Forum*. The integration of presentations by community experts on the special history and architecture of Fredrick Law Olmsted (the creator of the Emerald Park System) and on the water quality issues of the Muddy River enhanced student knowledge and interest in the topic. *Forum* students became engaged and conducted research projects on social and scientific aspects of the Muddy River, with the goal of providing their findings to the community partners. The Muddy River Research Symposium (MRRS) was created at this time to provide an annual opportunity for all stakeholders to share research, stories and opinions about this urban river. Over the last five years, this thoughtful use of community engagement has expanded student and community participation and involvement in the MRRS symposium, attracting students and faculty from the COF as well as local community partners (citizens, environmental groups, elected officials, etc.). Another way in which we have encouraged students to publicly present their community service projects with stakeholders is by matching the annual theme of the MRRS to that of the *Environmental Forum*.

Service-Learning

In addition to community engagement, *Forum* also integrates a service-learning component that encourages student and faculty interaction with local, regional, and national environmental advocates. As described by the Commission on National and Community Service (1990), service learning is a method that connects meaningful community service and

academic learning, providing students with opportunities to use their newly acquired skills and knowledge. The benefits of incorporating service learning into higher education include: higher academic performance, increased civic responsibility and leadership abilities, and an increased awareness of the world (Astin et. al 2000). There have been numerous examples of service learning successfully applied in science (NSTA 2009), with environmental science providing one of the greatest opportunities for the incorporation of service learning (Leege and Cawthorn 2008).

At the inception of the *Forum*, the service-learning component consisted of a one day activity in which students focused on environmental topics. For example, collaborating with the Urban Wilds Initiative, students traveled to parks that were within walking distance from COF campuses and collected information that was later developed into promotional educational material. Service learning comprises a significant component (25-30%) of the *Forum* course and, as a result, we have been able to emphasize its importance over the years. By using a foundation of conversation (e.g., class discussions) and contact (e.g., field trips), we have been able to increase the number and quality of application (e.g., service learning) and collaboration (categories based on the GLISTEN Project typology of civic engagement in higher education). In addition, and perhaps most importantly, in the last couple of years, student interest in service learning has expanded to outside of the *Forum* classroom (e.g., working with college facilities departments to support sustainability efforts) as well as upon completion of the course (e.g., summer work with NGOs). This enhancement of learning outcomes can be seen in Table 2.

An important factor in increasing the rigor of service-learning pedagogy in 2010 was the involvement of the Scott-Ross Center at Simmons College, whose role is to integrate service-learning into courses at Simmons College. The Scott Ross Center provided a formal process of documentation for students, faculty, and community partners, such as service-learning contacts, a schedule, training, coaching, and a process to follow for students and faculty to insure student commitment and reflection. A formal final presentation and written reflections by students were required as part of this process. The community relationships developed by the Scott Ross Center over many years facilitated meaningful connections of the *Forum* students with community partners.

TABLE 2. Examples of service learning projects

Environmental Forum Theme	Year	Service Learning Component	Learning Outcomes
Muddy River	2007	Students either worked in research teams to examine the Muddy River ecosystem (e.g., animal biodiversity, tree distribution, water chemistry, etc.) or they organized COF student involvement in the Muddy River clean-up.	Students either worked in research teams to examine the Muddy River ecosystem (e.g., animal biodiversity, tree distribution, water chemistry, etc.) or they organized COF student involvement in the Muddy River clean-up. Students participated in the 1st Annual MRRS as well as the Muddy River clean-up.
Climate Change	2008	Students either worked in research teams to examine the Muddy River ecosystem or they organized COF student involvement in the Muddy River clean-up.	Students participated in the 2nd Annual MRRS as well as the Muddy River clean-up.
Sustainability	2009	Based on trips to other colleges that highlighted sustainability and interviews on their own campus, students developed recommendations for the best way to incorporate sustainability into their college.	Minor in Sustainability was adopted by Simmons College. Campus sustainability efforts presented by students in Forum. Continued participation in MMRS.
Environmental Health	2010	Students worked in teams on a number of community projects with public health officials (City of Boston), non-government organizations (YMCA), and local hospitals to apply what they learned in the Forum lecture/discussion in the real world.	Presentations in the Forum and MMRS, as well as reflection essays. In addition, several students continued to volunteer after the completion of the course at NGOs during the summer break.
Sustainable Energy	2011	Students worked on a variety of projects related to sustainability: such as participating in the "Power shift" march in Washington D.C., assisting an environmental film festival and fundraiser, teaching 6th graders about sustainable energy, and assisting Climate Change Brookline in a door-to-door green energy awareness campaign for the homeowner.	Several students presented on a sustainability panel as well as in breakout sessions at MRRS 2011. In addition, one student aided her college to gather information for an "environmental scan" of what options were preferred for the pursuit of sustainability for faculty and students.

Increasing variety of assessment tools

Initially, the only assessment tools repeatedly used in the *Forum* course program to measure learning outcomes for both content and personal engagement was the SENCER-SALG (Student Assessment of Learning Gains) survey and self reflections (Table 1). Because of the creation of this course using the SENCER vision, it was deemed critical that we focus on students' assessment and reflection of their own learning. A comparison of results for the SALG test showed that as a result of taking this course, students had greater personal confidence (Faszewski and Duggan, 2007). For example, students in the 2007 *Forum* had greater confidence in thinking critically and understanding scientific processes behind important scientific issues in the media (Table 3).

Over the years, depending on the faculty member, additional assessment tools (not noted in Table 1) may also have been used (e.g., standardized course evaluation questionnaires

developed by their college). Although valuable feedback was obtained from these tools, faculty felt that the random addition of this variety of assessment tools did not provide a cohesive look at student learning in the *Forum* course over the years. For example, a tool to assess whether or not the students actually learned fundamental science concepts covered in the course was not required. To address this need, beginning in 2009, pre and post content assessments (e.g., quizzes) were implemented to assess these lower order learning outcomes. We also felt that it was important to assess the students' own self confidence and understanding of these terms in attempt to determine if they would feel comfortable enough with their newly acquired knowledge to actually apply it both in and outside of the *Forum* course. With this in mind, students were also given pre and post self assessments that listed the scientific terms and asked them to rate their understanding, from 0% ("never heard of it") to 100% ("I could explain that term

TABLE 3. SALG pre and post data on student personal confidence

	Pre-Test (N=16)	Post-Test (N=15)
Think critically about scientific findings I read about in the media	3.19 (1.05)	3.93 (0.8)
Determine what is—and is not—valid scientific evidence	3.19 (0.98)	3.79 (0.70)
Make an argument using scientific evidence	3.31 (0.79)	3.93 (0.59)
Understand scientific processes behind important scientific issues in the media	3.06 (1.06)	3.80 (0.77)

Values reported are the averages and standard deviations for student responses using a five-point scale where 5="Extremely confident" and 1="Not confident".

correctly to the class.”). Analysis of the pre- and post- self assessments for *Environmental Forum* “Sustainable Energy” shows large increases in confidence in several topics current in the energy debate: especially, fracturing for natural gas, shale gas, photovoltaic, peak oil and carbon sequestration (Table 4). Overall, student confidence increased from 41% to 74% on an average of all topics.

In 2010, through the use of the Scott Ross Center, enhancements were made to service-learning reflections. For example, “Guidance” questions prepared by the Scott Ross Center for Community Service at Simmons College helped students think more critically about their service learning experiences (Table 5). Student reflections indicated a high degree of engagement with the community partner and an appreciation of how service learning facilitated desired learning outcomes for the *Forum*. During the *Forum* that focused on Environmental Health, students worked with a wide spectrum of community partners: at Earthworks students worked to green urban spaces and primary schools in Boston; students worked with the City of Boston during lead paint inspections; at the Jamaica Plain Asthma/Environmental Initiative, students worked with children on asthma control; at the YMCA students interviewed immigrant families about different food options; students conducted the analysis of contaminated sediment in the Muddy River; and other students worked with the Bright Horizons Family Center to “green” a low income daycare center. Assessment of these activities included peer presentations and written reflections. It is believed that with the addition of these specific assessment tools, faculty is provided with a more comprehensive

TABLE 4. Pre and post self assessment of content (*Forum* Course focusing on sustainable energy)

Pre-assess	Post-assess	Change	Term
1	83	82	Fracking
6	84	78	Shale Gas
35	91	56	Photovoltaic
30	84	54	Peak Oil
13	66	53	Carbon Sequestration
10	62	52	Life Cycle Assessment
34	83	49	Cap and Trade
32	76	44	Decarbonize
42	86	44	Clean Coal
40	80	40	Externalities
7	46	39	Stabilization Wedge
19	57	38	IPCC
24	61	37	LEED
8	44	36	Precautionary Principle
41	76	35	Fuel Cell
52	84	32	Biomass
17	42	25	R value
73	98	25	Sustainability
61	85	24	BioFuel
28	50	22	Hat Pump
71	89	18	Sustainable Development
66	84	18	Carbon Cycle
73	88	15	Carrying Capacity
39	54	15	Anthropogenic
85	99	14	Renewable Energy
86	99	13	Greenhouse Gas
87	96	9	Ecosystem
19	23	4	Blackbody Radiation
86	88	2	Biodiversity

look, not only on students own self assessment, but also in regards to assessing content gained during the course relating to environmental topics.

Future Directions

Assessment of student learning has become an integral part of the *Forum* and will continue to be important as the student population and environmental topics change. We will include other assessment tools and metrics, such as those used by NSSE to measure engagement. In 2012, we look to increase

TABLE 5. Student reflections on service learning experiences

Guidance Questions	Reflection
Was this your first service-learning experience?	"This was the first service-learning project of this nature that I have participated in and I was very pleasantly surprised. Working with young children was a simple yet profound way to employ my developing knowledge and understanding of environmental sustainability."
How was this experience for you?	
How did the work you did with the community partner contribute to your learning in this class?	
What did you notice about the communities that you were working with for this project?	
What skills did you learn that you think you will be able to use in the future?	"I would definitely do another service-learning project. The project taught me how to use ingenuity in order to find workable and non-costly solutions. One cannot really learn about environmental health without seeing it firsthand."
Would you do another service-learning project for another class after this experience?	
Why do you think service learning is used with this course?	
Did anything surprise you about your placement?	"What I have learned from my project could definitely have been learned without a service-learning component, but I think that enhanced my learning. My service-learning project greatly enhanced my understanding of Environmental Health."
Do you think you could have gained the learning from your project in another way besides service-learning?	

TABLE 6. Forum Success Factors (Students' Point of View)

Success Factor	Students Comment
A variety of expert speakers bring their own and differing opinions to the Forum, exposing students to an authentic exposition of a complex problem.	"I liked hearing other peoples opinions because it gives insight and different perspectives on what we should be doing in terms of energy."
Students give presentations throughout the semester, formally debate issues, and are encouraged to participate.	"The [liked the] overall laidback atmosphere and encouragement to discuss, considering I came into the class not knowing much about sustainability."
Service-learning and community involvement projects were presented with clear rubrics for participation, assessment, and reflection.	"With service learning projects we were able to work hands-on with community leaders in promoting sustainability"
Speakers from different disciplines expose students to many different career options related to the Forum theme.	"I now am more aware of careers and direction I can take after graduation."
Encourage student engagement.	"Class discussions solidified and deconstructed arguments."

student engagement with community partners by arranging external co-op experiences and internships. Engagement of students with content, visiting speakers, other students, their college, and the community will continue to be an important goal. Those factors (Table 6) that have made the course a success for students will continue to be incorporated in the future. In addition, in order to maximize the relevance of the Forum to students, the focus each semester, although continuing to have an underlying theme of sustainability, will remain flexible enough to permit continued variety in environmental topics and formats not currently envisioned.

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