From Polyps to Politics: Using a Coral Reef Living Laboratory in a Politics of Sustainability course

Adam Lusk, Assistant Professor of Political Science, Rosemont College
Lauren Profitt, Undergraduate Student, Rosemont College
John Ullrich, Assistant Professor of Chemistry, Rosemont College

Abstract:

To address the unique challenges of teaching Global Environmental Politics to non-science students and improve student learning, a faculty-student team integrated a coral reef living laboratory into a Politics of Sustainability course which focuses on Global Environmental Politics. This study provides empirical evidence of improved student learning outcomes by using pre/post assessment tools, student surveys, and faculty journals.

Research Design and Assessing Student Learning:

To assess student learning, we used:

- The College Sustainability rubric
- An initial paper assignment and a final paper assignment scores
- A pre/post assessment tool
  - Completed on second day of class and again on the last day of class
- A survey after finishing experiments
  - Open ended section and a twelve question 5-point Likert scale survey
- Faculty-student team's journals
- Comparison of the essays from the Spring 2013 version of the course to Spring 2014

Coral Reef Lab Description :

Experiments dealt with environmental issues such as climate control, pollution, and acid rain. Students degraded the ecological system, which mimicked human interferences, monitored the natural responses, recorded data, took photographic evidence, and drew conclusions. A control system was utilized to give students a reference on the natural state of coral reefs and demonstrate the importance of variable controls and experimental standard

A group of four honors students were selected to learn propagation techniques in order to build a coral reef system only by taking live species from the existing systems maintained at the college.

The Honors Propagation Tank

Data and Results :

Tables 1, 2, and 3 show the significant improvements in student learning using the College rubric. In addition, the average total score on the multiple choice section of the pre/post assessment improved from 11.13/25 (44.52% correct) to 15/25 (60%).

There were significant improved scores on a number of questions, including the questions dealing directly with the coral reef experiments that were not in the readings.

Students working in the lab

The Pollution Tank

Table 1 lists the descriptive statistics for the first paper assignment (pre-assessment)

Essay 1	Know (Obj1)	Research (Obj2)	Analysis (Obj3)	Application (Obj4)	Total Score
Mean	1.4444	1.1667	1.2222	1.2222	5.0556
Std. dev.	0.5113	0.3835	0.6468	0.4278	1.6618
Count (n)	18	18	18	18	18

Table 2 list the final paper assignment (final assessment) for the Spring 2014 course

Essay 2	Know (Obj1)	Research (Obj2)	Analysis (Obj3)	Application (Obj4)	Total Score
Mean	2.947	2.4737	2.5790	2.5263	10.5263
Std. dev.	0.9112	1.1239	1.0706	1.1239	4.0739
Count (n)	19	19	19	19	19

Table 3 notes the percentage change from 2013 to 2014

	Spring 2013			Spring 2014		
	Essay 1	Essay 2	Percent Change	Essay 1	Essay 2	Percent Change
Knowledge	1.93	2.75	42.5	1.44	2.94	104.2
Research	1.57	2.55	62.4	1.17	2.47	111.1
Analysis	1.53	2.51	64.7	1.22	2.57	110.7
Application	1.60	2.53	58.0	1.22	2.53	107.4

Discussion/Conclusions

This coral reef project required students to extrapolate their knowledge about global environmental politics to their experiments. These experiments were fairly easy to set up at a relatively low cost, but significantly increased student engagement and learning, even with a "hands-off" faculty approach. Students realized on their own about the problems of keeping measurements, working in a team based environment, and questioning the ethics of the environment.

Acknowledgements:

Southeastern Pennsylvania Consortium of Higher Education (SEPCHE)
The Teagle Foundation
Aquarium Specialties & Research
Rosemont College