Enhancing Graduate School Experience through Participation in Place-Based Education: A Case Study of the Cape Eleuthera Island School/Cape Eleuthera Institute

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In a graduate school setting, there often seems to be only a handful of ways to give back to science. These opportunities may include presenting findings in publications or at conferences, delivering a guest lecture, or acting as a teaching assistant for a class or laboratory. One can also become involved in outreach activities through professional societies such as AFS, but sometimes there are other opportunities out there that are not so apparent. For example, imagine the rewards involved in guiding a research team composed of junior and sophomore high school students through the scientific process in a semester-long experiential education program. The purpose of this article is to provide graduate students with an example of how they can enhance their grad school experience by teaching research at a place-based educational institution.

The Cape Eleuthera Island School and Cape Eleuthera Institute

The Island School (IS) was founded in 1998 to immerse international and local students into the environment and culture of South Eleuthera, The Bahamas. While the curriculum includes standard classes such as science, math, English, history, and art, non-traditional classes, like research, focus on the application of science-based knowledge to real world problems. To support and enhance the semester-long place-based experiential program, as well as successfully address relevant environmental issues facing The Bahamas and the Caribbean, the Cape Eleuthera Institute (CEI) was officially opened in 2005. With a 5,000 ft² flow-through seawater facility, dry laboratories, dormitories, and administrative office, the capacity to facilitate formal collaborations with universities was expanded. With CEI, graduate students now have the opportunity to conduct their own thesis research as well as teach the scientific process to high school students from the IS.

The Island School Research Program

Research projects driven by in-house researchers and graduate students are often focused on ecology, anthropology, sustainable food production, and waste management. Each IS class consists of 48 students divided among eight specific research teams that range in topics from flats ecology, shark biology, archaeology, aquaculture, and aquaponics. Each team is led by one or two research advisors who guide the students through the scientific process. Students learn how to synthesize scientific literature, form a research question, design and execute an experiment, and communicate their findings through oral and poster presentations. Data management and basic statistical skills are taught and applied to the collected data, putting the students well ahead of most of their peers entering universities. Research advisors assess their students on all of the above assignments as well as a final oral assessment, which is of similar design to an oral defense for graduate programs. A symposium is held at the end of every semester (June and December) to showcase the research through poster presentations. During this event, the high school students present to their peers, locals, government officials, and visiting scientists. Graduate students can expect to meet scientists from their field of study and from other disciplines, which in turn can result in collaborative projects from universities throughout the world. In addition, the research symposium puts scientists in direct contact with Bahamian nongovernmental organizations and government officials that often use information collected by researchers to make management decisions.

Field work includes learning how to use a seine net.
Students learn to sample blood from a bonefish.

WHAT TO EXPECT

Since research is a flagship portion of the curriculum at the IS, a significant amount of time (up to nine hours of class time per week) are devoted to the program. This does not include marking and lecture preparation, and thus typically exceeds the usual teaching assistantship time requirements which one would normally encounter at a home institution. However, the extra time commitment is balanced by the enhanced teaching skills (e.g., lesson planning, student evaluation) developed by the grad student. An additional challenge for participating graduate students is teaching the high school-aged demographic. The benefit to this situation, however, is that your classroom is in a hands-on environment where it is much easier to connect the significance of the project to the young researcher. Also, graduate students have the opportunity to share their enthusiasm for research with the class. Instilling excitement and interest in students prior to university enrollment is more likely to encourage youth to pursue the sciences. Alumni of the IS often note that their research experience assisted them in choosing a major in a science-related field.

The flexibility of the research curriculum is a great advantage in the teaching environment at the IS, such that the individual project can be tailored to compliment or be a part of graduate thesis work. The ability to have additional help in the field can be particularly advantageous as graduate students sent to remote locales often lack field assistants due to the cost of lodging, etc. In fact, not only can students act as great technicians, but the involvement in the IS semester through teaching could help offset the expense of your individual research time at the field station. Stretching research funds a little further can only be a good thing (i.e., more conferences, field time, gear for your study, etc.). Perhaps the biggest challenges to the graduate student are reduced access to their supervisor and colleagues at their home institution for support, as well as financial considerations such as maintaining housing while away, missing teaching assistantships at home, and the inability to work in a foreign country for extra money. That being said, the benefits still outweigh the challenges.

HOW TO PARTICIPATE

Coupling primary research with the opportunity to mentor students in the scientific method can be an invaluable learning experience regardless of where the interactions occur. If you are going to be starting a graduate degree where your field research could take place in the sub-tropics, it might be worth considering CEI as your home base. Carleton University in Canada, the University of Illinois in the United States, and the University of Plymouth in the United Kingdom have all established a strong relationship with CEI by either sending graduate students from the home institution or supporting current research associates at CEI to conduct their graduate studies. If staying an entire semester is not feasible, you can still plug into the IS semester by conducting evening lectures, having students participate with research during their free time, or possibly as part of their science class. No matter how you get involved, interacting with high school-aged students and getting them excited about research in a hands-on environment is a rewarding experience any graduate student can appreciate. Check out www.ceibahamas.org for information on the institute and its facilities, and www.islandschool.org for more details on the IS program.

OTHER OPPORTUNITIES

Although we used a case study which focused on a single institution, there are many other opportunities in which graduate students can participate to enhance their educational experience and give back to the scientific community. These opportunities range from mini-courses or day-camps organized on university campuses to field expeditions. For example, many universities hold mini-courses (e.g., 5 days) during the summer semester where high school students can participate in focused programs run by graduate students and supervised by faculty. This is a great opportunity to inspire youth awareness in fisheries research and conservation by designing a course that will not only be stimulating to the students, but can tap into your area of interest and expertise. Another great way to pass on your fisheries knowledge to high school students is by mentoring a Hutton Junior Fisheries Program participant. Additional information of the Hutton program can be obtained at www.fisheries.org/afs/hutton.htm. Consider as well the possibility of becoming a teaching assistant on a university field course. These typically short (e.g., two week) courses are a great opportunity to work with undergraduates in place-based learning environments, and they often have research components where graduate student input is invaluable. Regardless of what avenue you may choose to enhance your graduate school experience, the rewards are endless! So get out there and get involved!

ACKNOWLEDGMENTS

The authors thank Steven Cooke (Carleton University) and Andy Danylchuk (University of Massachusetts Amherst) for their guidance and feedback on this article.