Teaching Statement: Ariana E. Sutton-Grier

Effective learning is a joint exercise between the teacher and students, and I enjoy learning from and with my students. This process of continual learning is very similar to an approach for managing ecosystems called adaptive management (Holling 1978). Applying concepts from the theory of adaptive management of ecosystems to my teaching, I have developed a teaching approach I call "Adaptive Teaching" that has three primary principles.

I. Create a dynamic classroom; focus on student involvement and development.
Ecosystem management is effective when the environmental conditions of the site support a flourishing plant, animal, and microbial community. Similarly, an effective classroom is a dynamic and interactive place where students thrive and enjoy learning. In my interactive classroom, I don't give a lecture but I lead class. I motivate and guide student participation in their own learning using activities such as "think-pair-share," clicker questions, as well as longer-term activities including group projects and presentations. Participation enables students to practice critical thinking and leads to a deeper understanding of the course material. Overwhelmingly statements from class evaluations support this conclusion such as these three comments: (1)" [Group activities] helped me look at the material in a different way;" (2)"[Group activities] allowed us to combine all knowledge to gain a better understanding;" and (3)"By being able to collaborate, more full and balanced ideas and conclusions could be reached."

II. Make it real and personal.
Ecosystem management works well when share-holders are invested in the outcome. In the same way, successful learning occurs when students connect with the topic and want to learn. Thus, I use class activities, labs, and field trips, to connect science to the real-world and students' lives. For example, when studying global carbon cycles, students calculate their personal carbon footprint to see how their own activities relate to the global carbon budget. These activities provide a context for the course material to help students retain the knowledge well after the course has ended.

III. Involve students in the scientific process.
Ecosystem management is most successful when all share-holders have the opportunity to actively participate in the development of the management plan. In the same way, it is very important that student have the opportunity to participate in the scientific process. Therefore, a fundamental student learning objectives in every class I teach is for students to develop as scientists and to learn to think like a scientist. Class activities frequently involve developing hypotheses, designing research projects to test those hypotheses, interpreting data, and discussing effective ways to present different types of scientific data. When possible, I also use primary literature instead of textbooks to expose students to current scientific thinking and debates. These discussions help students recognize science as a body of knowledge that is continually evolving and encourage students to take an active role in the scientific process even if the course does not have an accompanying lab section.

One of the criticisms about ecosystem management, particularly restored ecosystem management, is that there is not adequate monitoring or published reporting detailing the outcomes of projects. The same can be said about research on teaching. Teachers often experiment in the classroom but rarely share the results with colleagues. As a result, one of my

teaching and research goals is to share what I learn with the community of scholars through both presentations and publications (see, for example, Sutton-Grier and Kenney, 2005). Recently I was selected to be part of the NSF-sponsored "Faculty Institutes for Reforming Science Teaching (FIRST IV)" program (2009-2011). This two-year program aims to improve undergraduate science education by teaching postdocs and early career faculty how students learn, how to design a course based on student learning objectives, and best-practice teaching approaches to achieve these learning objectives. As part of the program, participants develop a complete biology course which they will teach while enrolled in the program. To assist other faculty across the country, all the material for these courses will be posted online at the FIRST repository. In addition, with several FIRST colleagues, I am planning a workshop for the Ecological Society of America conference in 2010. The workshop will model how to develop course materials using "backwards design" in which student learning objectives determine course activities and will also focus on how to use higher order critical thinking skills to engage students in science learning.

Mentoring: The Intersection of Teaching and Research

One of my life-long pursuits is to mentor others as they develop their scientific interests. I have already had many positive experiences mentoring high school students, undergraduates, and graduate students at Duke and at the Smithsonian Environmental Research Center including an NSF REU student this past summer. I enjoy teaching lab methods and discussing the hypotheses motivating our research. I am particularly interested in mentoring as a way of increasing gender and cultural diversity in the sciences. In 2006, I had the unique opportunity to mentor three female 8th graders as part of a special episode of the PBS kids' science show DragonflyTV featuring N.C. wetlands that focused on promoting young women scientists ("SciGirls"). In addition I have participated in mentoring programs including the "Expanding Your Horizons" event at N.C. State University which introduces 8th grade girls to science and math careers, and the Durham Women and Math (WAM) mentoring program for middle school girls. Mentoring scientists needs to start at an early age and continue through one's career. I look forward to mentoring students in my own lab, encouraging and cultivating future scientific leaders.

Courses

I have experience assisting in teaching graduate courses in Wetlands Ecology and Management and Wetland Restoration. In addition, as a graduate student I co-designed and co-taught an undergraduate course that was cross-listed in the Nicholas School of the Environment and the Women's Studies departments called "Feminism and Ecology" (syllabus available at www.suttongrier.org/teaching.html). I also was an adjunct faculty member at Goucher College in Baltimore, MD, last fall where I team-taught "Bio 240: Ecology and Evolution." I was the lead instructor for the section focusing on ecosystem ecology in which we studied biogeochemical cycling of nutrients as well as energy flow, trophic dynamics, and ecosystem restoration. Additionally, I welcome the opportunity to develop courses in topics including biogeochemistry, biodiversity, ecosystem restoration, environmental science, and ecology. I would also enjoy the opportunity to teach interdisciplinary courses and to team teach. Just as students learn well from each other, I learn a great deal from other instructors when I get to work with and observe my colleagues in the classroom. No matter what course I teach, I am guided by two student learning goals. I desire that students understand: 1) the importance and relevance of science to their daily lives, and 2) the creative and exciting nature of scientific discovery.

References

Holling, C. S. 1978. Adaptive Environmental Assessment and Management. Wiley, Chichester.

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