

RACHEL E. BOWES: TEACHING STATEMENT

Teaching experience

My most valuable teaching experiences include: (1) Course Instructor of Laboratory and Field Methods in Ecology at the University of Kansas (KU), (2) Course Instructor of Tropical Forest and Marine Ecology in Dominica, (3) Graduate Teaching Assistant for the Introductory Biology courses and labs at KU, and (4) one-on-one undergraduate mentorship.

I taught Laboratory and Field Methods in Ecology at (KU) for 3 semesters, where I was responsible for developing the entire course content, running labs, creating assessments, and grading. I found that repeated redesign of the course, an activity necessary for any successful teaching program, helped me to improve the course every semester. For example, after the first year teaching the course, I designed all the assignments to build up students' research skills throughout the semester. They became free-thinking, open-ended assignments all formatted similar to the independent research project/paper (same 6 questions each assignment, just pertaining to the different topics covered in that lab period: 1. Background, 2. Questions/Hypotheses, 3. Methods, 4. Assumptions, 5. Results, 6. Discussion), culminating finally at the end of the semester in an Independent Research project, paper, and presentation. This course gave students the opportunity to learn basic methods for studying ecology, both in the field and the laboratory. After taking this course, students were better prepared to think critically about many ecological issues and examine data sets in a statistically rigorous manner.

Another amazing and life changing teaching experience was the development of a study abroad course through KU, Tropical Forest and Marine Ecology in Dominica. During the summer of 2016, I designed a course and led a trip to the island of Dominica. Students had the chance to delve deeply into the world of tropical ecology with the best of both worlds: exploring Dominica's colorful underwater world during fascinating scuba dives while also experiencing the natural and cultural wonders of the island with land excursions. I had students that were of drastically different backgrounds, levels of interest, and knowledge, and I had to bring together these different people into a cohesive community. I did this, by having everyone participate in fun "get-to-know" you exercises and assigning easily understood background material prior to the trip. The course consisted of short lectures, discussion groups, excursions to a tropical rainforest, scuba diving on a coral reef, and short independent projects.

My teaching experiences as a Graduate Teaching Assistant (GTA) have also been very rewarding. While much of the curriculum had been developed in these courses by professors, I believe that this allowed me to focus on my teaching method and developing a teaching style. In my Introductory Biology Laboratories I was responsible for teaching a lab that involved classes of less than ~25 students, with students working through problems in a group setting. For these classes I was able to develop a relationship with each student and give them the appropriate amount of attention for them to succeed, something I feel is very important. On the other hand, my team-taught classes of Introductory Biology Lectures at KU have had enrollments from 700-900. I was in charge of the technology, conducting review sessions (attendance of ~150), office hours (attendance <10 each time), occasionally lectured in front of the entire course, prepared the online activities, and answered emails from hundreds of students throughout the semester. These experiences have taught me that preparation is of ultimate importance. When something goes wrong, having 800 students anxiously waiting for you is never a good thing. We used "clickers", a device that allows for polling of students in real time, and I have found that creating a well-thought-out question allows for pertinent discussion among the students and instructors



with me. Technology can be difficult to use, but is sometimes the only way to interact with more than a couple students in a class this large. While I do not believe this size of course to be the best way to teach, I realize that in large universities, classes of this size are often necessary. The experiences teaching in this course have made me comfortable teaching in a class of any size.

I am dedicated to helping others learn and training the next generation of scientists. I work tirelessly, mentoring undergraduates and trying to spark the same passion for research and science that I have in others. I have successfully mentored eleven undergraduate students, and received the Undergraduate Research Mentor Award from the Center for Undergraduate Research at KU. Many of the students I have mentored have applied for and been granted funding for their independent projects, presented at international conferences, received awards for presentations and outstanding research, and published in renowned journals. Five of the undergraduates I have mentored have gone on to graduate programs. I work closely with the undergraduates that I mentor in all areas: writing a personal statement and curriculum vitae; reading and discussing primary literature; teaching field and laboratory techniques; and exploring and applying to graduate schools, grants, and internships. I emphasize the development of writing skills, scientific inquiry frameworks, fundamental research techniques, and dissemination abilities.

Teaching objectives

Discussion

I believe that discussion is important for any course, and can be done in any class setting. I find that students are often unwilling to speak up during class, but I do not want to force them to speak. One way I get around this is if students are unwilling to talk, I will ask an obvious question. If we are looking at skulls, and I bring in a wolf or lion skull, I could ask “Would you hug this animal”? One of them instantly scoffs a no, and I immediately ask “Why not”? Right away they start talking about the large teeth and mention that it is a predator. Then we can start discussing the function of the large canines. Most of the information is then actually being given by the students, but guided to the right answer and interpreted by me. I have used this method of discussion with a variety of organisms and classes.

Instructional Strategies

No two students learn the same way, so I believe that using a diversity of strategies is central to creating a successful course. During my time at KU I used interactive lectures, discussions, labs, homework, short writing assignments, and short review sessions to achieve my learning objectives set out in the syllabus. My lectures were interactive, and in the relaxed atmosphere in the classroom, students could interrupt me (something I wanted) when they did not understand something. I use several technologies in my lectures including PowerPoint, short videos for emphasis or explanation of a process or organism, and Excel or online simulations for demonstrating processes such as logistic growth or statistical methods. My labs are designed in a way that simple following directions and noting results are not all that is needed to complete the lab. I design them so that questions interspersed throughout the lab require actual critical thinking about the subject. My homework and writing assignments are built the same way in that simply looking the answer up in their textbook will only give students half credit. I believe that students must find the answer to the question, interpret it, and make it their own to go beyond what the textbook says. These types of higher learning are only possible if I first give them a solid background during the in-class portion of the course. While this may not be as easy as simple multiple choice tests, it is certainly much more rewarding for the student and teacher.



Assessments

I believe that assessment in teaching is a two-way activity. To assess my teaching effectiveness, I use anonymous (online survey) and non-anonymous feedback opportunities (at the end of tests or quizzes) throughout the course where students can relate problems, give suggestions, and critique my teaching. This allows me to adjust my courses in real time, not just after I get my course evaluations after the semester is completed. To assess student learning, I use a combination of quizzes, homework, laboratory reports, and tests, which I try to make them learning opportunities in themselves. To accomplish this, I write questions from scenarios and problems that make students think in new ways from the base of what they studied. If they are prepared for the test, each time they come out of the test they will feel that they will not only have achieved the learning goals of the class, but actually learned something useful.

Courses

I consider myself a community ecologist, and my diverse training allows me to be very flexible in what I could teach. I have taught undergraduate courses in Laboratory and Field Methods in Ecology, Introductory Organismal Biology, and Introductory Cell Biology, both lectures and laboratories. I have also taught study abroad courses in Tropical Forest and Marine Ecology in Dominica and Marine Biology in Bonaire. I would feel comfortable teaching any type of biology, ecology, or freshwater ecology course, along with many invertebrate related courses, and ichthyology. I also have a strong background in statistics and would feel comfortable teaching an undergraduate level statistics course.

Conclusion

Overall, I try to teach *with* the students rather than *at*. I have had too many professors that were hired solely for their ability to bring in grant money for the university, who simply read off of yellowed notes that they have had since they were in graduate school. While I want to have an active research program, I also desire to be the professor whose classes fill up on the first day of enrollment, not because I act ridiculous in class, but because the students know it will be a rewarding course. I hope that I will be able mentor students to find an appreciation for whatever topic I end up teaching.

