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Author: Musante, Susan

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Making Biology Relevant to Undergraduates

SUSAN MUSANTE

Terry R. McGuire always assumed that his students understood the relevance of their biology coursework to their lives outside the classroom, and he expected their grades to fall along a normal bell curve. But when he returned from a professional-development experience in 2002, his life as a professor was forever changed.

McGuire, who teaches genetics at Rutgers University, had attended a Science Education for New Civic Engagements and Responsibilities (SENCER; www.sencer.net) Summer Institute. On his return, he began to make small shifts in his teaching approach, sharing course-relevant current events and assigning “one-minute papers” at the end of each class.

As a result, more of his students began earning As and Bs, and they were connecting science to their lives and to society as a whole. Impressed and reinvigorated, McGuire returned to the SENCER Summer Institute in subsequent years, bringing colleagues to also benefit from the experience.

The SENCER program, which began formally in 2001, was the vision of David Burns; Karen Oates, currently Peterson Family Dean of Arts and Sciences at Worcester Polytechnic Institute; and Ric Wiebl, currently director of the American Association for Advancement of Science’s (AAAS) Center for Careers in Science and Technology; among others. “We didn’t invent anything; we gave a name to it. Aristotle was doing the same kind of thing,” said Burns, now the principal investigator of SENCER. With initial funding from the National Science Foundation (NSF), SENCER fostered a community of faculty members who recognized the power of giving students a stake in their own learning. “Students need to have clear vision of what is done in the field of biology, why it matters, and what it has to do with the human condition,” explained Burns.

Myles Boylan, a program director at the NSF, where he has been a member of the Division of Undergraduate Education since 1984, was attracted to SENCER’s team approach and its focus on engaging science students civically in issues of national importance. Prior to joining the NSF, Boylan had worked with students who had the opportunity to connect a service learning experience with courses. “I realized they would remember this for the rest of their lives, because what they are doing matters,” said Boylan. To counteract a strong antiscience movement, he added, scientists realize that students need to become informed citizens.

SENCER, now a project of the National Center for Science and Civic Engagement at the Harrisburg University of Science and Technology, has reached over 1300 faculty members. The program hosts annual institutes, organizes symposia, facilitates regional groups, publishes a journal, develops model courses, and connects faculty members with SENCER faculty mentors to provide inspiration and support. “We start where the student is, and through the study of a matter of civic consequence and interest to the learner, we get deep[er] and deeper into the core of disciplinary knowledge. Hence we teach ‘through’ the issue ‘to’ the basic science, making it relevant,” explained Burns. The faculty members benefit greatly from the experience too, as McGuire described in *Reinventing Myself as a Professor: The Catalytic Role of SENCER* (www.sencer.net/Resources/pdfs/Backgrounders/McGuireBackgrounderFINAL.pdf): “SENCER reconnected us with our students. We want to share our excitement about science, and we want them to do well.”

Penny Bernstein, associate professor of biological sciences at Kent State University at Stark, had always worked to make her courses inquiry based and relevant to students’ lives.

After attending a SENCER Summer Institute in 2010, she found a new way to apply the SENCER principles. “I realized that I could put together a course to actively engage students in local environmental issues,” she said. The goal of the 2011 “Environmental Media” class was not to have students simply learn about and describe local water-quality problems but to have them actually work with community partners to identify and communicate solutions to the public.

The project evolved into a living network focused on the regional watershed, connecting Bernstein’s Stark Campus students, colleagues in other departments, four other institutions in the area, and local community agencies and citizen groups. The course—a collaboration with another biology colleague and three colleagues from the Department of Journalism and Mass Communication at both the Stark and Kent campuses—will be offered again in 2012, and Bernstein and colleagues hope to develop an environmental media minor.

Examples such as this are just what SENCER’s founders envisioned. Still, one of the top suggestions made by undergraduate students in 2007, as reported in *Vision and Change in Undergraduate Biology: A Call to Action*, was for the opportunity to participate in discussions “about how biology [affects] our lives” and for “courses designed around real-world issues.” McGuire, now a full professor and master teacher at Rutgers, and a SENCER senior associate, acknowledged that the program has a long way to go: “It would be wonderful if in 10 years, we had transformed the entire academic world, but we are just getting started.”

Susan Musante (smusante@aibs.org) is the AIBS education programs manager.

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