Creating a New Breed of Biology Education Researchers

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Creating a New Breed of Biology Education Researchers

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Introductory undergraduate biology courses often fail to truly engage students in the subject matter, a problem that sometimes causes students to switch out of biology majors. The traditional, lecture-only curriculum has already been shunned in middle-school and high-school science classrooms, but this lesson structure persists in the postsecondary domain. Although some professors are using innovative teaching methods in college biology classrooms, they may lack the knowledge, skills, and support to research other promising learning methods, write up their findings, and create a culture on their campuses that emphasizes evidence-based learning in the classroom. The inability of biology faculty to share successful teaching methods inhibits the spread of effective practices and impedes the change in campus culture that undergraduate biology education requires if students in the field are to be retained.

Many biology faculty members are committed to the use of effective and proven teaching methods, but they lack a strong background in education research. These educators have little extra time because of their professional obligations, yet they still want to create a successful learning environment for students in their classrooms. In an effort to improve teaching in the microbiology classroom, the American Society of Microbiology (ASM) created the Scholars-in-Residence program in 2005 to introduce biology faculty to the scholarship of teaching and learning. The scholarship of teaching and learning is a broad term describing the professional responsibility of faculty to conduct rigorous evaluations of their own teaching practices and to publicly share their findings to develop a community of practice. The ASM program, which employs both online and in-person components, uses unique approaches for connecting and educating biology faculty in this field.

The Scholars-in-Residence program trains microbiologists to use educational research to improve their teaching. The year-long program seeks to develop faculty members' ability to devise a research question about their classroom practices, collect meaningful data, and share their findings through publication in scholarly journals. The goal of this residency is to help faculty members who are already committed to innovative teaching practices to better understand the outcomes of their efforts, and then to share their successes with the larger biology education community. The ASM program has served as a successful test pilot, demonstrating that this type of professional development can improve the educational research skills of biology faculty. Three cohorts have completed the program, with promising results: scholars used the skills they gained during the residency to write and publish their biology education research in peer-reviewed education journals.

Building on the success of the Scholars-in-Residence program, the ASM created the Biology Scholars Program, which is open to the larger community of biology educators. The Biology Scholars Program offers three independent "virtual" residencies that allow faculty to explore biology education in greater depth and to obtain a better understanding of the scholarship of teaching and learning.

The research residency focuses on helping faculty develop research questions, use existing educational research, and analyze data collected from classrooms. These skills enable faculty to determine whether experimental practices are actually having an impact on student learning, and to ensure that educational research has validity and can be used by the larger education community.

The writing residency is designed to assist faculty in writing manuscripts for peer-reviewed education journals and in communicating effectively in the language of educators. Because writing for scientific journals is different from writing for education journals, it is critical that faculty be trained to convey their findings in the education sphere of research.

The third component of the Biology Scholars Program is the leadership residency, which is concerned with developing the scholars' capacity to be advocates for biology education reform. Building leaders in biology education is crucial to effecting change at the institutional level. By strengthening their leadership skills, the faculty scholars will be able not only to mentor colleagues who want to improve their teaching practices but also to help change the way biology is taught in their departments. Such changes in the practices and the priorities of biology departments are integral to education reform that seeks to foster a more collaborative environment for the improvement of undergraduate instruction.

The Biology Scholars Program is a novel approach for addressing the issues that face undergraduate education. By providing in-depth and focused professional development for biology faculty in research, writing, and leadership, the program will train the next generation of undergraduate educators and add to knowledge about biology education. Faculty who graduate from the program will be catalysts for future change in biology teaching and in the research of biology education. For more information about the Biology Scholars Program, visit *http://bsp.berkeley.edu.*

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