

## Editorial—2011 Highlights Issue

# The Blossoming of Biology Education Research

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Welcome to the 2011 Highlights issue of *CBE—Life Sciences Education (CBE-LSE)*! This special issue is printed annually and circulated widely with multiple aims, including attracting a broader readership, prompting new authors to consider *CBE-LSE* as a venue for sharing their work, and providing exemplar articles for those who are new to the scholarship of teaching and learning. This year's Highlights is a compilation of articles from the Spring, Summer, and Fall issues; articles from Winter 2011 will be considered for inclusion in the 2012 Highlights.

As we assembled this issue, I was prompted to reflect on the collective experiences of the journal, which has achieved several notable milestones in recent years. The journal's name was changed from *Cell Biology Education* to *CBE—Life Sciences Education* to more accurately reflect its wider scope. The editorial board was expanded to represent more life science disciplines and a greater diversity of educational environments and expertise. *CBE-LSE* has published work by authors from 12 countries and, in the United States, 43 states and the District of Columbia. Readership has grown such that almost 8000 people are registered to receive electronic Table of Contents alerts for each new issue.

The discipline of biology education research has also grown in recent years. I am proud that *CBE-LSE* has been an integral part of this trend. The National Research Council (NRC) and the Board on Science Education commissioned a systematic review of the literature, revealing that the number of undergraduate biology education research publications increased substantially in the past decade (Dirks, 2011). Of the 195 articles identified, 50 were published in *CBE-LSE* (26% of the total), three times more than any other journal. *CBE-LSE*'s impact is probably an important reason the Howard Hughes Medical Institute

awarded another 3-yr grant to the American Society for Cell Biology (ASCB) to partially support publication of the journal.

The accomplishments of the journal are the result of time, energy, and resources invested by many stakeholders, including authors, reviewers, ASCB staff, and editorial board members. I especially thank Brad Kincaid and Gary Reiness, who will end their terms on the editorial board this year. I also thank editorial board members Bruce Alberts (University of California, San Francisco), Diane Ebert-May (Michigan State University), John Jungck (Beloit College), Jay Labov (NRC), and Vivian Siegel (Broad Institute), all of whom have agreed to serve on the board for another term. I am pleased to welcome editorial board members who will start their terms in 2012: Linnea Fletcher (Austin Community College), Graham Hatfull (University of Pittsburgh), José Herrera (Truman State University, currently at the National Science Foundation), James Hewlett (Finger Lakes Community College), Nancy Pelaez (Purdue University), Maria Ruiz-Primo (University of Colorado, Denver), Hannah Sevia (University of Massachusetts, Boston), and José Vázquez (New York University). These individuals will increase the diversity of institutional and methodological perspectives on the editorial board.

Several professional development efforts are also supporting the growth of biology education research. For example, *CBE-LSE* is a partner in the Biology Scholars Program of the American Society for Microbiology. Through a series of residencies, Biology Scholars prepares biologists to identify problems of importance in biology education research, design appropriate studies, and craft clear and compelling manuscripts. In addition, the broader biology education research community is uniting through the recently established Society for the Advancement of Biology Education Research (SABER). SABER supports networking among biology education researchers through a member listserv, a wiki, and in-person meetings, the next of which is tentatively scheduled for July 12–15, 2012. *CBE-LSE* continues to employ a constructive review process as a form of professional development. Rather than simply rejecting manuscripts, editors and reviewers at *CBE-LSE* help authors refine their manuscripts or suggest alternative venues in which authors can publish their work.

Not surprisingly, the biology education research community is experiencing some "growing pains." We are learning

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that our biology jargon has different meaning in the context of biology education research. We are also learning that methods with which we are facile in the lab are not so easily translated to the classroom. For example, in the lab, we are able to control most aspects of our investigations. We use controls as standards for comparison to make inferences about the causal relationships between variables. In most educational settings, such as college classrooms, K–12 schools, and science centers, we are not able to control the myriad factors that may affect learner outcomes, including student backgrounds, motivations, interests, and prior knowledge. When we want to identify trends that indicate causal relationships, we are often limited to other research designs. Those of us who conduct quasi-experimental studies identify a treatment group that experiences an intervention and a comparison group that experiences a different intervention, but not a “no intervention” group (i.e., a control group). To make inferences from the resulting data, we need to think carefully about other variables that may be affecting the outcomes we are studying. I encourage readers to explore Shavelson and Towne (2002) and Slater and colleagues (2011) for more in-depth treatments of this issue.

Another source of “growing pains” in biology education research is the elevated expectation of reviewers regarding the nature of evidence. Although *CBE-LSE* and other journals have published self-reports of knowledge and skills gains, biology education research as a discipline is moving beyond this methodology. Several studies have shown that people typically overestimate their performance on intellectual tasks (e.g., Mabe and West, 1982; Kruger and Dunning, 1999; Dunning *et al.*, 2003). Now reviewers want more direct measures of student learning. Student reports of knowledge and skills gains can be included as a complement to more direct measures of student learning, such as systematic collection and analysis of student work. Assignment or exam scores are also not sufficient, unless they are accompanied by examples of student work or rubrics that indicate how scores were assigned (Allen and Tanner, 2006).

Finally, I would like to offer some advice for authors on the difference between an essay and an article. Many manuscripts submitted to *CBE-LSE* describe the implementation and evaluation of an educational innovation. As outlined in the Instructions for Authors, these manuscripts fit the article category. Essays more often resemble a scholarly review or position piece, which can be framed by personal experience or include data from one’s own work (e.g., Hue *et al.*,

2010; Klymkowsky, 2010; Fuhrmann *et al.*, 2011). Essays can also illustrate the translation of research into practice (e.g., Marbach-Ad *et al.*, 2010). I encourage future authors to read these and other recent examples to determine which category is the best fit for their manuscripts.

As I begin my second year as Editor-In-Chief of *CBE-LSE*, I hope readers will continue to consider this journal their home for biology education research. Furthermore, I hope more biologists will utilize *CBE-LSE* as a mechanism for getting involved in biology education research: a source for potential collaborators and for professional development in a discipline that affects all of our students.

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