Enriching Science through Diversity

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Unity through diversity is the only true and enduring unity.
UN Secretary-General Boutros Boutros-Ghali

Diversity abounds in the living world, and in The Diversity of Life, Edward O. Wilson (1992) presents a thrilling account of the evolution of diverse species and how humans are destroying that diversity. The AIDS virus has affected people all over the world, regardless of race, color, or ethnicity. Scientists from many different countries continue to search for new drugs and strive to find a cure for the disease. The hope for AIDS patients provided by Dr. David Ho, using antiviral “cocktails” including protease inhibitors, follows the pioneering work of scientists like Robert Gallo and Luc Montagnier. Science classrooms abound in opportunities to empower teachers and students from diverse backgrounds to explore the problems that affect mankind.

Science-related issues provide a platform to unite students regardless of their ethnic differences. Dwindling supplies of fossil fuels and the need for new energy sources, food supplies to feed the ever-burgeoning masses of humanity, and the disposal of radioactive and hazardous wastes—these are some topics that can be discussed to excite young people to seek ways to understand the problems and to work together to find solutions. Sheila Tobias (1990) in “They’re Not Dumb, They’re Different: Stalking the Second Tier” cites the experience of Stephanie Lipscomb: “... I was certainly not given the belief that I could give something back to science and that it could give something back to me.” Scientific issues can be discussed and debated in small classes, while group assignments encouraging diversity in the group can be worked into large classes. Discussion of these issues are beneficial to both the instructor and the students, and emphasize the need for interdisciplinary action as well as international cooperation to attack global problems.

In the science classroom, the instructor is challenged to use a variety of teaching styles to accommodate the needs of students with different learning styles. In physics and chemistry, mathematical models are used quite extensively and many abstract concepts are discussed. The instructor must strive to present the information at a level that most students feel comfortable, and be prepared to review basic concepts. It is a misconception that Asian students have excellent math abilities, and that female students cannot grasp mathematical concepts as quickly as their male peers. An educator strives to bring out the best in each student while passing the torch of knowledge to the next generation.

International teaching assistants can play a very important role in heightening the awareness of diversity in the classroom. They must be trained to create an educational environment that is enhanced by the creativity and richness resulting from increased diversity.

The laboratory situation provides excellent opportunities for students to cooperate and to bring out the best in each other as they work towards shared, common goals. Students should be encouraged to share ideas, to respect other points of view, and to work as a team to find the best solution to the assigned problem.

Laboratory work is a very essential part of any science course, and instructors face a great challenge in accommodating the needs of disabled students in the laboratory. In our chemistry laboratory, we were very successful in working with a wheelchair-bound student, but most of the credit should go to the young man who worked very well with his peers and was a positive influence on them. However, it has been difficult to accommodate the needs of blind students in the chemistry laboratory. Many efforts are currently underway at the national level to use computers to provide laboratory experience for students with special needs. Stephen Hawking, a renowned British physicist, is a paraplegic who has continued to amaze the scientific community with his stellar contributions in physics.
Teaching tips

1. Remind students that science is a human endeavor and requires contributions from many different people to solve problems that could affect all of us. Incorporate scientific issues that affect society at the local, national, and global level.

2. Make a special effort to emphasize the contributions of a diverse group of scientists.

3. Treat all students with respect, show that you really care about their learning, and strive to provide an atmosphere where all students feel comfortable to ask questions.

4. When calling on students in class, try to include as many different students as possible. Be sensitive to cultural differences.

5. Use a variety of teaching styles and instructional technology to address the different learning styles in the diverse classroom.

6. Encourage study groups which bring together students from diverse backgrounds, to foster mutual respect and cooperation.

7. As part of TA training, encourage teaching assistants to embrace diversity and facilitate interactions in the laboratory that are beneficial to the learning process.

8. Address the special needs of women, minority and disabled students by providing information on resources such as the Minority Arts and Sciences Program or Disabled Student Services.

9. Encourage students with special needs to see you during office hours, and offer to visit dormitories to facilitate informal interactions with your students.

10. Offer review sessions, especially welcoming those students who are shy or intimidated to approach you in a large group.

References


Margaret Asirvatham

Biography

Margaret Asirvatham teaches in the Department of Chemistry and Biochemistry. She is the director of General Chemistry. In 1996, she was awarded Boulder Faculty Assembly Teaching Excellence award.

Professor Asirvatham's main teaching interests are the training of graduate teaching assistants and the application of multimedia instructional technology to the teaching of general chemistry.