Accountable Educators, Accountable Students: Practicing What We Teach

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When I first learned of the title for the 1998 Association of College and University Biology Educators (ACUBE) conference ("Are We Preparing Global Citizens: Aware, Active, and Accountable?"), I was intrigued. What a good question, I thought to myself. Are we? Is that possible? What does it mean to be a global citizen? And are we - as scientific investigators and educators - practicing what we are teaching? Very likely, the term "global citizen" has different meanings for different people. In this article, I have defined the concept, attempted to explain various methods that may help accomplish this goal, and outlined my thoughts on the subject as a result of interactions at the ACUBE conference. As a result, I propose teaching various methods for students to become global citizens is not enough. Educators must teach awareness and understanding of global as opposed to parochial issues coupled with discussions of scientific ethics, thus providing an ethical compass by which a global citizen can make informed decisions.

Being a global citizen can have many meanings, but in essence it signifies a person who thinks in a global context and has an ethical compass that guides actions. A global citizen can be defined as a person who views obligations to humanity at large, not just to a particular race, tribe, religion, or nation. Thinking in a global context requires realizing how one person’s actions can affect the entire world, not just the immediate surroundings. An ethical compass is a set of learned ethical guidelines that directs actions and choices; a global citizen's ethical compass should take into account long-term and far-ranging impacts, emphasizing those actions that minimize harm to the environment and the people, animals, and plants living within it.

As a second-year Ph.D. student in ethnobotany, I am focusing my dissertation field research in the Ecuadorian Amazon, yet I am also dedicated to teaching at the university level. Currently, I teach the lecture and lab for an undergraduate biology course titled "Plants and People" at Lehman College, part of the City University of New York's 22-campus system. I tried to keep this course in mind as I listened to the various perspectives on global citizenship at the conference. It is easy to get caught up with the daily requirements of just teaching the information necessary to complete a course, let alone trying to incorporate mechanisms to help mold global citizens. At the conference, participants discussed many ideas on how to raise student awareness concerning global issues and integrate these goals into the natural course of teaching. For example, a workshop focusing on an outdoor classroom revealed that those instructors had great success in bringing the students to a permanent lab set in a woodland. Students saw a variety of invertebrate animals, insects, and plants in their natural habitat instead of just reading about them in a book or seeing them in a video.

Another workshop dealt with case-based learning, which outlined methods to encourage students to think of their own scientific question and then helped them figure out how to answer it. In case-based learning, students are given a written description of a particular scenario, a "case", which is left open-ended. Students have to think about the information presented and develop questions to solve the problems presented. Case-based learning could be particularly useful in teaching students about ethics in science, because educators can choose specific cases that highlight particular ethical issues. For example, students could examine conflicts of interest in working with indigenous people to develop ethnobotanical knowledge into marketable pharmaceuticals. Cases touching on issues of a global nature, either directly or indirectly, will eventually bring up ethics, raise a student's awareness, and hone their ethical compass.

In addition to hands-on learning and case-based learning, the Internet and the World Wide Web are excellent for raising global awareness because students easily see the interconnectedness of cultures and information. Encouraging independent scientific research is perhaps one of the best ways to prepare students to become global citizens. This teaching method may seem more advanced - it contains elements of all the methods previously discussed - yet it can be employed at all levels of education. For
example, students in a high school or undergraduate biology class may perform experiments throughout the year, may take field trips to various locations to learn about the environment, and may now even have access to the WWW via increasing computer access in public schools. Why not combine all these excellent teaching methods and ask our students to turn in independent research projects that require not only book and computer research, but also independent interviews of local people with a knowledge of their subject?

High school students taking a field trip might expand on this project by choosing a plant that they had observed in the field. They could collect it, conduct independent research on the specimen using scientific journals and the WWW, and then discuss in a research paper any conservation or medicinal applications that it may have or has had in the past.

Undergraduate students could do a similar project, or they could choose a plant they encounter on a field trip and conduct a simple experiment on it in a class lab. The experiment might be chemical, biological, or strictly taxonomical. A lab report or research paper discussing results and relevant applications should accompany the experimental write-ups.

I always encourage my students to include in their ethnobotanical papers, uses by Native Americans and other cultures. This approach seems to make the plant more real to them and adds another dimension to the clinical experiment or research angle.

For graduate students in biology, their dissertation is usually some experiment or series of experiments that prove or disprove a hypothesis; however the ethical issues of biological or cultural conservation should be addressed. Graduate students do this on a more advanced level to earn their degree.

These kinds of projects could be appropriately scaled down and integrated at all levels of education so students are thinking critically at an earlier age and are more aware of the global context of actions. Students must make decisions and choices, ask themselves questions in order to develop the analytical framework necessary to complete the final paper or project, and deal directly with issues as opposed to passively learning in a classroom.

In conclusion, I would like to emphasize that teaching awareness of the environment is not enough. It is a first step and once students learn different world perspectives they begin thinking globally. However, we must teach these methods in tandem with teaching the ethics. We can use the methods to teach the ethics.

There is a growing awareness of the need to incorporate a global perspective to scientific ethics; organizations such as the Union of Concerned Scientists personify this. Teaching ethics is a difficult task, but one that must be faced and can be, by raising daily issues in the classroom as related to lecture topics and assigning more complex questions as essays on exams. Old-school scientists believed in distancing themselves from their subjects, whether they were plants, people, or animals. Although that was an effective approach at the time, modern scientists must realize that they cannot step away from their science and be absolved from the effects it may have on cultures or the environment.

Dr. Robert Oppenheimer, father of the atomic bomb, at one point hoped his research in nuclear fission would help end World War II in favor of the United States and its allies. That team of scientists did not consider the global impacts of their actions. Once the bomb was dropped, Oppenheimer knew the world would not be the same. At that point, it was too late for him to ask himself and his colleagues “What have we done?” They saw the global outcome of their actions after thousands of people died. Fifty years later, we are still faced with global crises.

Now we are more aware of our actions and society increasingly demands accountability for actions that have global consequences. Personally, I do not believe we as educators are truly preparing global citizens out of the students we teach. We want to prepare global citizens and I think that students as a whole want to be global citizens, too. There is definitely a greater awareness of the environment and its problems. There is definitely a greater awareness of the environment and its problems in part due to media coverage of climate change, disappearing rainforests, shrinking bio-diversity, and the world’s burgeoning population growth. These issues, and more, have commanded and demanded our attention. The coming of the computer age and the WWW has linked up the world in ways that as a child, I never imagined. We have the desire and the tools to mold ourselves and our students - into global citizens. We need to focus on methods and ethics in our classrooms, encourage more professional discussions like the ones held at ACUBE 98, and not forget to practice what we teach.

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