The Global STEM Imperative

By Karen A. Holbrook

The connection between technology and global citizenship is clear and has been especially enabled by the Internet, which has allowed people to work across vast differences in real time. Every reader of this article likely understands what is meant by the “flat world”—a brilliant concept that crystallizes how countries and people have coalesced through technology in virtually every sector of activity.1

U.S. higher education has long focused on global citizenship: in 1919 the Institute of International Education (IIE) was established to support U.S. diplomacy through student and scholar exchanges; in 1946 the Fulbright Program was created to promote exchange study and research in order to prepare world leaders; and in 1958 the National Defense Education Act was passed to train, through the Title VI foreign studies and language development programs, the international experts that were so needed after World War II. Colleges and universities have also been working for many years to internationalize their campuses and prepare students to work in a global community. It has been asserted that “internationalization . . . is the single most important leadership challenge of the new century.”2

Countless recommendations, ideas, best practices, and guidelines for developing international programs have been designed. This effort has escalated with both private and public colleges and universities reaching beyond the traditional partnerships with foreign higher education institutions to create their own signature programs in other countries, either independently or in cooperation with a consortium of U.S. and/or international institutions. Today, more and more universities are defining themselves as “global universities,” and the college experience often includes some form of study or work outside of the United States. The Lincoln Commission / Senator Paul Simon Study Abroad Foundation Act of 2007 sets stretch goals for the number of students traveling abroad over the next ten years.

In January 2006, President George W. Bush welcomed university and college presidents to the U.S. University Presidents Summit on International Education, hosted by Secretary of Education Margaret Spellings and Secretary of State Condoleezza Rice to reinvigorate the partnership between government and higher education in international education. Later that year, delegations of university and college presidents joined government officials on visits to foreign countries to send the strong message that the United States is committed, through collaboration and cooperation, to two-way exchange programs for students.

The more recent goals—to internationalize colleges and universities and promote global citizenship for students—have occurred coincidentally with the realization that U.S. students are becoming less interested in preparing for careers in the STEM (science, technology, engineering, and mathematics) fields. Just as there is a plethora of documents devoted to the education of students to work in a global world, there is an equivalent number of reports addressing the needs to create a broader pipeline of students interested in STEM fields, to enhance the number of well-qualified teachers in the STEM disciplines, and to promote a greater understanding of how essential these fields are to the future of society and to the national and global economies.

Advances in science and technology underpin economic growth, and local and regional economies are merging into a global economic system. The contributions of students in making such advances are important. Thus, there is concern that the United States could find itself challenged and perhaps outcompeted by those nations that also understand the strength and dominance of preparing students in the STEM disciplines and that are focusing on capacity-building in the STEM workforce through education.

It is often stated that it is essential for the United States to attract the best and the brightest from other nations to study in U.S. colleges and universities and, once educated, to stay and work in our country. In my view, if we in the United States are to truly become a global system of scientific innovation that connects researchers from developed and emerging countries,1 we will need to share students and workers bidirectionally so that our economic futures are not one-sided or grossly imbalanced and so that we strengthen bonds between nations through educated citizenry in critical fields. Our goal should not be simply to win in a competition of accumulating the best students from around the world for our benefit only; we need to consider what is best for peace and prosperity for society at large. Students can promote this goal.

Students engaged in STEM disciplines are readily drawn together through the common bond of knowledge and the understanding of the principles, values, and processes of their fields. They share ideas and experiences from their disparate backgrounds to work on problems of global
concern, and as they work together across borders, what is gained in new relationships and understanding will have a lasting value that may transcend the results of the projects being studied. Students are often the catalyst that brings people together to promote new interaction and are often the glue that sustains the relationship well beyond the initial purpose for working together.

It is the responsibility of higher education to prepare the next generation of scholars. By engaging in this opportunity through education, students can better understand the people and dynamics of the world around them through firsthand experiences and can become global citizens who will find new ways to create a more understanding and peaceful world. The tagline of the Solutions for Our Future project, led by the American Council on Education, states that U.S. colleges and universities must “prepare the people who solve the problems and teach the people who change the world.” Why not link technology and STEM education and work toward a global STEM initiative? A global STEM initiative is logical, sensible, and essential in the preparation of students to become citizens of “an interdependent and volatile world” of “daunting complexity”—citizens informed by global perspectives, uninhibited by global boundaries, prepared to deal with unfamiliar cultures, and willing to be receptive to the contributions that others can make.

In January 2000, a conference convened by the Carnegie Corporation of New York emphasized the need for internationalization to take full advantage of technology. Scores of examples can be used to highlight how this has occurred in practical and innovative ways for the purposes of education and research through long-distance collaboration. One of the most cogent of these examples is the Megaconference (http://digitalunion.osu.edu/megaconference/), first held in 1999 with the goal of getting “everyone in the world to talk together via videoconferencing.” Megaconference, the largest Internet videoconference in the world, is hosted by the Ohio State University (OSU). The symbol of the conference is the “Flag of Earth.” A parchment with the words “World Love,” written in Chinese calligraphy, was prepared online for the organizers in 2006 by an artist in China. Megaconference IX, “Breaking Down the Barriers: Global Connections,” was held on November 8, 2007, with thousands of people participating from 400 sites in 25 countries and on 5 continents.

Though Megaconference began as a means to introduce Internet videoconferencing technology, and though it can be billed as a significant technological feat (with some sites adding high-definition video in 2007), it is also a cultural exchange, a means of connecting people. Contributors from collaborating sites offer fifteen-minute segments, preferably interactive, which have ranged in scope from an underwater presentation from the Great Barrier Reef, to a display of national culture through long-distance collaboration. One of the most cogent of these examples is the Megaconference (http://digitalunion.osu.edu/megaconference/), first held in 1999 with the goal of getting “everyone in the world to talk together via videoconferencing.” Megaconference, the largest Internet videoconference in the world, is hosted by the Ohio State University (OSU). The symbol of the conference is the “Flag of Earth.” A parchment with the words “World Love,” written in Chinese calligraphy, was prepared online for the organizers in 2006 by an artist in China.7 Megaconference IX, “Breaking Down the Barriers: Global Connections,” was held on November 8, 2007, with thousands of people participating from 400 sites in 25 countries and on 5 continents.

Though Megaconference began as a means to introduce Internet videoconferencing technology, and though it can be billed as a significant technological feat (with some sites adding high-definition video in 2007), it is also a cultural exchange, a means of connecting people. Contributors from collaborating sites offer fifteen-minute segments, preferably interactive, which have ranged in scope from an underwater presentation from the Great Barrier Reef, to a display of national culture through long-distance collaboration. One of the most cogent of these examples is the Megaconference (http://digitalunion.osu.edu/megaconference/), first held in 1999 with the goal of getting “everyone in the world to talk together via videoconferencing.” Megaconference, the largest Internet videoconference in the world, is hosted by the Ohio State University (OSU). The symbol of the conference is the “Flag of Earth.” A parchment with the words “World Love,” written in Chinese calligraphy, was prepared online for the organizers in 2006 by an artist in China.7 Megaconference IX, “Breaking Down the Barriers: Global Connections,” was held on November 8, 2007, with thousands of people participating from 400 sites in 25 countries and on 5 continents.

Notes
7. While Cao Wencai, who has only stumps for arms, painted the parchment in China, thousands of people watched during Megaconference VIII. See ibid.