President's Message

A Flattening World

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In the current bestseller *The World Is Flat*, *New York Times* columnist Thomas L. Friedman proposes the notion that the world is flattening—that around the world the competitive playing field is being leveled, especially with respect to jobs. With the increasing availability of technology, it is no longer necessary for societies to rely on hierarchical structures for access to information. Today, information flows horizontally, producing competitors and connecting colleagues from around the world. An international company can have offices in India, China, Malaysia, or any one of a growing number of nations that can offer well-educated, cost-effective workers. With the spread of this phenomenon, the international talent pool of professionals such as computer programmers and other technology specialists is expanding. As mathematics educators, our responsibility must be to equip our students with the skills and abilities not only to survive but to thrive in this global village.

More Math

For some time, those of us involved in mathematics education have joined with the business sector to advocate for a more mathematically literate population and for programs that prepare more students for careers in science, technology, engineering and mathematics. Suppose we succeed. Suppose we create a generation of citizens who know mathematics well, with many who can conduct basic research or work in programming or design. Even then, it is possible that citizens prepared in these areas may not be employable in the United States or Canada—their salary requirements may price them out of jobs. Professionals in India and China now indicate their interest in moving beyond basic programming and technical jobs into higher-level jobs in research and innovation. Last year, China produced approximately one million engineers. And countries like India, Korea, Turkey, and Iran have invested heavily in scientific research.

The United States prides itself on having an edge in creativity and innovation. But how long can we maintain this edge in an environment where a commitment born of sheer national will can bring a developing nation into economic prominence?

If scientific and engineering jobs are likely to be outsourced, should we abandon the goal of a high-quality mathematics education for every student? On the contrary. If we are looking toward a global future, we must redouble our efforts to equip our citizens with a working knowledge of mathematics, along with the scientific and economic knowledge that builds on that mathematics. An important element of this kind of education is a commitment to go beyond teaching basic skills, beyond requiring students to know how to perform procedures, beyond offering recipes for solving problems that look alike. To limit our students to such low-level mathematics is to barely equip them for the bottom tier of jobs the United States now outsources. We need to expect much more of all our students if they are to compete for the kinds of jobs that help businesses solve the problems they face every day—problems they don't yet know how to solve.

The Edge

American citizens can still have a competitive edge. That edge will come, in part, from the advantage of traditional American ingenuity, creativity, and innovation. But the value of this advantage may diminish as other nations increase their investment in basic scientific research and their commitment to become more innovative. However, Americans have another advantage that has been cited by those who do business internationally. We have the ability to see the big picture, understand connections, and build on relationships among individuals and ideas. These qualities should be nurtured and developed in our schools, in addition to mathematical knowledge, to prepare students to solve problems that no one has ever seen before and to push the barriers of science, technology, and invention.

Going One Step Better

Our educator colleagues in Japan and other countries often teach with far less *telling* than we do. Observations from TIMSS studies show that it is far more customary for these mathematics teachers than for American teachers to present students with a problem without first telling them all the steps they should follow to solve it. Our tendency in the United States is to spoon-feed our students—telling them exactly how to solve a certain type of problem and then asking them to practice solving similar problems.

In more and more mathematics classrooms on this side of the globe, teachers are beginning to realize that they can guide students' learning without doing all the work for them. They are beginning to see the power of letting students struggle a bit to determine how to solve a problem before helping them find the best or most efficient approach(es) to the problem. I am convinced that we have the ability to adapt successful strategies from other countries and improve on them at least one notch by tapping into our uniquely American tendencies toward connecting ideas and understanding relationships.

This is no small task. How have you been able to help your students go beyond a basic mathematics education to one where they can both ask and answer good questions? In thinking globally, what barriers do you face—among teachers, students, or the broader community? Join me on Monday, October 24, at 4:00 p.m. ET for a chat where we can exchange ideas about how we can best equip our students for a bright future in a global environment. Please submit your comments and questions online at www.nctm.org/news/chat.htm. Ω

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