Quantitative literacy (QL) is not just about mathematics and should not be viewed as such. Quantitative literacy is a much more inclusive term than mathematics and specifically includes working and reasoning with numbers and data in a contextual framework. Most people would argue that our society needs to be quantitatively literate, but because QL is generally undefined, each person has a different notion of what it may mean. Similarly, mathematics as a discipline is viewed differently by those who use it in occupations, those who study it, and those who simply use calculation skills often associated with school mathematics. To look at policy issues in the context of these ill-defined goals, I pose and partially answer three key questions.

How do we create an environment that supports quantitative literacy education in a way that does not recreate the “math wars” at another level?

Part of the answer comes from Zalman Usiskin in Mathematics and Democracy: The Case for Quantitative Literacy, “We may be able to obtain public support for attention to quantitative literacy if we emphasize that quantitative literacy is an essential part of literacy itself” (Usiskin 2001, 85). Literacy, of course, is the responsibility of many others besides mathematics teachers and mathematicians; so too is quantitative literacy. (If this looks like the new, new, new mathematics, we are doomed before we start.)

How do we provide for quantitative literacy education in an already full curriculum in high schools and colleges, both in mathematics and in other courses?

The answer to this question, I believe, is different if you are talking about high school students than if you are talking about college students. For high school students, to say that quantitative literacy education goes beyond mathematics education does not imply any neglect of quantitative literacy in mathematics curricula. Most of the topics suggested for quantitative literacy are topics listed in the National Council of Teachers of Mathematics (NCTM) Principles and Standards for School Mathematics (NCTM 2000). Newer instructional materials all include extensive treatment of data analysis and provide for mathematical problem solving using real-world problems (that is, mathematics in context).

To engage teachers in particular, we need to build on what we have. Fortunately, the NCTM standards and newer curricular materials provide this foundation, as do some very good quantitative literacy materials produced by the American Statistical Association. Teachers should not be expected to launch into new professional development efforts for quantitative literacy, especially since many have just begun to understand how to implement the standards through professional development opportunities. Teaching quantitative literacy across the high school curriculum is not possible in an already full curriculum in which teachers traditionally know little about anything but their major discipline. Reinvention takes too long and is too costly; however, universities and colleges directly control expectations for students through their admissions and placement activities.
College students select the courses they take to complete major, minor, and general education requirements. Quantitative literacy is not currently a part of the common core in most higher education institutions. A few liberal arts colleges do have such a requirement and some, such as Dartmouth, and Trinity in Connecticut, operate Quantitative Literacy Centers. When there is a college mathematics requirement it is most often satisfied by college algebra, a repeat of second-year high school algebra. Statistics is usually allowed, but it is typically taken only by those who are required to complete a statistics course for their major.

Thus, an opportunity exists in higher education to institute quantitative literacy across the curriculum, similar to writing across the curriculum. Better yet, quantitative literacy can become part of the core or general education requirements, satisfied by courses in numerous departments. Faculty in the social, natural, and applied sciences will have less difficulty defining quantitative literacy in their courses than those in the arts and humanities and will need less help. But even these latter fields offer some opportunities. Students will then see their course work in many areas through a quantitative lens. Mathematics and statistics departments usually will have to take the lead in such an endeavor, but development of such a program should include faculty from many departments.

How do we engage the stakeholders: teachers, faculty, other disciplines, administrators, business and industry, and parents?

Engaging stakeholders is the hardest and most critical step in developing a quantitative literacy initiative, and it must begin now. We live in an increasingly quantitative world but quantitative literacy, as important as it is, will still be competing with other areas of the curriculum in both high schools and colleges. Even with teachers, faculty, and administrators aligned on the goals of quantitative literacy, if parents and political figures are not on the same page nothing will happen, or worse, if it does, it will be stopped dead never to be revived.

It is critical for this latter group that we define quantitative literacy well and show what it is and what it is not, why it is necessary, and how it can be accomplished without diminishing other valuable parts of the curriculum. Parents in particular, when confronted by something they do not understand, revert to what they themselves learned in school.

Business and industry leaders are our greatest allies. They do not like what education systems currently provide to students at all levels in the areas of problem solving and working with data, and most are very willing to get behind a campaign to change the paradigms. Clear, concise messages are essential. To create a shared definition and vision is going to require the best minds in the country working together with representatives of the stakeholder groups to test this definition and vision.

This Forum moves in the right direction but we are a long way from even getting the definition right. It will require a small group of people working long hours and on many weekends before we can begin to have the type of national discourse necessary to effect change.

References