

From the Editor

Scenarios for the “Technology Standard”

“Technology for all Americans” is no longer the battle cry of a few, but rather the expectation of many—an expectation that every girl and boy formally study about our technological world throughout their schooling years. Even as I write this, innovative administrators and curriculum specialists may be beginning to look for ways to teach technological concepts and activities in every grade from kindergarten through high school. Why might this be so? Because “technology” appears as one of the Content Standards in the new *National Science Education Standards*, published by the National Academy of Sciences this past December.

Some will find reasons to be less optimistic about this new Standard. First, though the *National Science Education Standards* represent consensus, their use isn’t legislated. Nevertheless, while no school is *required* to implement these new *Standards*, it is likely that, along with the *Benchmarks for Science Literacy*, the *National Science Education Standards* will serve as a driving force behind curriculum revision and school reform for decades to come.

Second, this “technology” Standard could be overlooked among the list of other *Science Standards*. That doesn’t seem likely to me, however. It is one of only seven general Content Standards that comprise the entire list. The others are Inquiry, Physical Science, Life Science, Earth and Space Science, Science in Personal and Social Perspectives, and the History and Nature of Science. So, “technology” may be no more likely to be left out of the future science curriculum than is Physical or Life Science.

Finally, those who currently call themselves “technology educators”—particularly those who dirtied their aprons at lathes and offset presses, then graduated to communication, production, and transportation systems, and now subscribe to the design and technology approach—are prone to think, “Yes, but *they* don’t mean technology the way *we* mean technology!” On the contrary. . . despite the fact I did not recognize *a single person* from “our field” among the more than 150 contributors listed in the Appendix, *National Science Education Standards* does a stellar job of articulating technology as we have come to know and teach it. Here, for example, is the “Science and Technology” Content Standard identified for grades 9–12:

SCIENCE AND TECHNOLOGY: CONTENT STANDARD E:

As a result of activities in grades 9-12, all students should develop

- Abilities of technological design
- Understanding about science and technology

Guide to the Content Standard:

Fundamental abilities and concepts that underlie this standard include:

Identify a problem or design an opportunity. Students should be able to identify new problems or needs and to change and improve current technological designs.

Propose designs and choose between alternative solutions. Students should demonstrate thoughtful planning for a piece of technology or technique. Students should be introduced to the roles of models and simulations in these processes.

Implement a proposed solution. A variety of skills can be needed in proposing a solution depending on the type of technology that is involved. The construction of artifacts can require the skills of cutting, shaping, treating, and joining common materials—such as wood, metal, plastics, and textiles. Solutions can also be implemented using computer software.

Evaluate the solution and its consequences. Students should test any solution against the needs and criteria it was designed to meet. At this stage, new criteria not originally considered may be reviewed.

Communicate the problem, process, and solution. Students should present their results to students, teachers, and others in a variety of ways, such as orally, in writing, and in other forms—including models, diagrams, and demonstrations.

Doesn't this sound remarkably like "technology education" as we have come to know it? Moreover, the Science and Technology Content Standards for grades K-4 and 5-8 use the same "steps" indicated by the italicized statements in the 9-12 Standard above, though the activities recommended are developmentally appropriate for those other grade levels.

So, as technology educators, we may have reason to celebrate. Throughout our careers, we have worked to convince our fellow educators, administrators, friends in the community, and (less frequently) educational policy makers that every boy and girl would benefit from a well articulated K-12 program of technology education. After reading the *National Science Education Standards*, I am more optimistic than ever regarding the likelihood of "technology for all Americans" coming to fruition in my lifetime. Though neither of my middle school-aged daughters will benefit from more technology education than I received three decades ago, it is beginning to look like my *grandchildren* may have the opportunity to learn about our technological world throughout their school years!

Technology teachers reading the Science and Technology Content Standard above for the first time might not see it in the positive light I've tried to paint it.

It may look, instead, like *they* (science educators) are subsuming *our* (technology education) role in the schools. That may be so, but I prefer to think of it as a friendly merger rather than a leveraged buyout. If we really care about technology for all Americans, then this new Science and Technology Content Standard might be viewed as a giant leap forward, rather than as a threat to our future.

The fact is, the science education establishment has *no real idea* how they might actually operationalize this Science and Technology Content Standard in their classrooms and curriculum. As I see it, science teachers have neither the time in their curriculum, the facilities, nor the background to address technology in meaningful ways. So it is plausible that they may ultimately rely upon technology teachers to supplement their work *at every grade level*.

Here is how it could shake down: Technology teachers might be employed in the elementary schools the same way that art, music, and physical education teachers are currently utilized. At the middle school level, one part of each year of science might be dedicated to a technology education class. *All* students would enroll in these classes for a 6, 9 or 18 week block—as *some* now do. This strategy, of course, would require more technology teachers than currently employed in the middle school. In high school, technology might just be added to the traditional list of science subjects: biology, chemistry, physics, *and technology*—and/or the middle school model might be modified so that all students enroll in some technology education during each of their high school years.

The new *National Science Education Standards* could result in several substantive changes for technology education as we now know it. First, technology education could become a required subject at each grade level from K-12. This, in turn, would force us to develop new models for preparing technology teachers. Finally, technology teachers might be administered within the science department rather than the vocational education department, thereby placing technology education within the “general education core.”

To be sure, there are no guarantees it will work out this neatly for technology education in America. In a darker scenario, science education could ignore our expertise and end up with a watered-down version of technology education (for example, one which involved limited use of tools, materials, and processes). Despite its shortcomings, this diluted approach to technology education might be acceptable to education decision-makers, thereby relegating our more robust approach to lesser distinction/possible extinction.

If this latter scenario seems more plausible than those noted earlier, then it's time to “get political.”

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