

Technical Literacy – Industry’s Case

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My testimony begins with reflections about the 33 years I have spent with the DuPont Company. This career has afforded me with opportunities to touch the entire technology supply chain – from fundamental science to the customer interface. In each move I was required to develop understanding and skills of new technology in some cases far distant from my past experiences. Each step built on the past and, upon integration, led to systemic problem-solving capability orders of magnitude more sophisticated than the capability I entered the company with as a newly bred university scientist. Essentially, each step served to build a new competency from which to draw in order to create long-lived solutions to the resident problems. This development was enabled by a framework of science literacy with roots planted more than 50 years ago through the infusion of beliefs, principles, skills, knowledge, the joy of discovery and steady encouragement that learning is a never ending process.

Upon entering industry, it became immediately apparent, that efficacious execution against the problems of the time would require, in addition to individual excellence, application of multiple disciplines from teams whose members carried competencies built on a foundation of science literacy. I learned quickly that the best teams were scientifically, technically and culturally diverse and functioned so that members’ input was challenged and tested in ways that not only led to solving the problem but also to the creation of a multitude of ideas for further pursuit. The need for such multi-disciplinary efforts has only strengthened over the past several decades driven by the increasing sophistication of science and technology.

The importance of the connection between science and technology cannot be underestimated -- each profoundly influences the other. To be successful -- as nations or as companies -- we must be able to bring knowledge created by science to society efficiently. How well we do that is manifest in our quality of life. New knowledge fuels new ideas for technological exploitation. New technology expands the capability of science to see and to do and therefore conceptualize and create. There’s little doubt that the translation of science into technological advances positively impacts people's lives and the sustainability of industry if such is done with a clear understanding of societal needs. And it is the speed with which this translation is accomplished that ultimately defines the relative competitive position of an enterprise.

The binding of science and technology is self serving and meaningless without commensurate consideration of the needs of society. We must excel in execution – recognizing, anticipating and responding rapidly to societal needs as well as excel in grasping the implications of new science. In this context, I believe it has become increasingly important that individual scientific and technical competencies become more united. It is becoming clearer that the areas of overlap are where the most valuable knowledge with the most systemic impact is being created.

No part of the technical community is immune to the need for more sophistication in understanding and response, whether the person is an operator or engineer at a plant, is in daily contact with scientific institutions at one end of the technology supply chain or markets and customers at the other end, or has responsibility to interact with management to interpret

complex information. A sophisticated, responsive workforce demands the building of science literacy early and the employment of such literacy to build competencies continuously.

The advancing pace of globalization fuels a sense of urgency around the need for greater and greater sophistication in our collective grasp of technology. In his new book, "The Lexus and the Olive Tree," NY Times correspondent for foreign affairs Thomas Friedman says globalization is much more than a mere descriptive term for a trend in society. He defines globalization as THE system that has replaced the old Cold War system -- the organizing principle for every state, every nation, every company, every institution and entity down to the individuals in a society.

Friedman's sports analogy for the Cold War system is Sumo wrestling, with the U.S. and USSR as the combatants, while the analogy for globalization is the hundred meter dash -- run every day, and winning simply means you get to run again tomorrow. In the previous order, the advantage was weight; in the new order, the advantage is speed. Turbo-charged speed. It's not "how big is my missile" but "how fast is my modem" coupled with an important corollary -- "who am I connected to?"

In what is, to my mind, his most telling comment, Friedman notes that the new technologies that underpin globalization -- information and communications technology and, most importantly, the Internet -- provide *access without guidance*. As he says, "every modem should be packaged with a Surgeon General's warning - "does not include judgment." Technology does not replace fundamentals -- reading, writing, math & science, and values that instill a love of learning.

I have raised concerns that I believe every member of the education community -- parents, legislators, educators, administrators, and industry should be connected to -- and should feel tremendous pressure to address now. Without a firm foundation of science literacy, our ability to be leaders in the world will diminish rapidly. Most especially, our industrial well being -- the foundation of wealth creation and global security -- will dwindle.

I have a final concern that must be part of any discussion on science literacy. As I indicated at the beginning of my remarks, it has been clear to me for some time that cultural diversity aids and abets the freedom and ability to create and innovate. It is the interaction of many diverse cultures and ways of thinking that enable unique and inspired solutions. But if science literacy doesn't receive the prominence it deserves among the collective educational community, then the pursuit of science will become elitist. Large parts of our society will be left behind, and the richness of our scientific pursuits and technological innovations will be diminished.

This issue of "elitism" relates squarely to the reform efforts currently underway and supported at many levels of government -- local, state and federal -- for K-12 education. The building of an understanding of what science is and what scientists do can't be the sole province of private education. Our democracy and economic well being has always depended on an informed citizenry and literate workforce, and never more so than in today's increasingly sophisticated and complex world. We have guarded our freedoms by upholding this concept of equal access.

All Americans deserve an education that expands their facility with language -- to read, write and communicate and to perform mathematical operations and to understand the concepts within science. We cannot allow the efforts to build literacy to be compromised at the K-12 level or beyond. And so, I appeal for your collective and inspired support for a reform effort that benefits all of America's children.