Technological Illiteracy–How Do You Measure Up?

Jack W. Dini
1537 Desoto Way
Livermore, CA 94550
E-mail: jdini@comcast.net

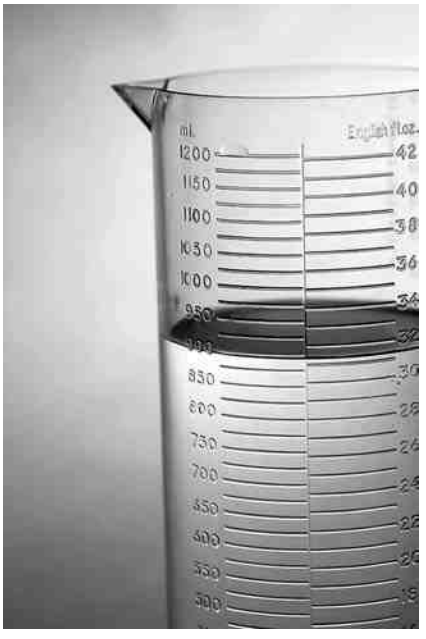
"Scientific debates often deal with issues that are too complex and technical for many people to grasp. When these debates touch on public policy, the problem of educating the public is compounded because partisan special-interest groups often mischaracterize or disregard the best available evidence in order to further their agendas. Obviously, this can often result in the enactment of ineffective - or counterproductive - laws or government programs."[1]

Serious concerns about the general public's lack of technological knowledge have been highlighted by a National Academy of Engineering report which states: "Although the United States is increasingly defined by and dependent on technology and is adopting new technologies at a breathtaking pace, its citizens are not equipped to make well-considered decisions or to think critically about technology. As a society, we are not even fully aware of or conversant with the technologies we use every day. In short, we are not 'technologically literate."[2]

Some folks have used the word *nescience* to describe this condition. Nescience, lack of knowledge or awareness, is from the Latin "not to know."

The report goes on to note, "The idea that all Americans should be better prepared to navigate our highly technological world has been advocated by many individuals and groups for years. Nevertheless, the issue of technological literacy is virtually invisible on the national agenda. This is especially disturbing in a time when technology is a dominant force in society."

"Technology has become so user friendly it is largely 'invisible.' Americans use technology with a minimal comprehension of how or why it works or the implications of its use or even where it comes from. We drive high-tech cars but know little more than how to operate the steering wheel, gas pedal and brake pedal. We fill shopping carts with highly processed foods but are largely ignorant of their content, or how they are developed, grown, packaged or delivered. We click on a mouse and transmit data over thousands of miles without understanding how this is possible or who might have access to the information."



Available evidence shows that American adults and children have a poor understanding of the essential characteristics of technology, how it influences society and how people can and do affect its development. Neither the educational system nor the policy-making apparatus in the United States has recognized the importance of technological literacy.

This is the paradox: Even as technology has become increasingly important in our lives, it has receded from view. Americans are poorly equipped to recognize, let alone ponder or address, the challenges technology poses or the problems it could solve.[2]

Let's look at some numbers:

Estimates by science educators suggest that only five percent of Americans are scientifically literate.[3]

Almost one-fifth of U.S. high school teachers who teach science do not even have a minor in science.[4]

Only 24 members, or slightly more than four percent, of the 107th Congress have educational backgrounds in medicine, science, or engineering.[5]

Burkhard Bilger observes, "The magazine rack in any large American bookstore is one of the wonders of the age; its titles multitudinous, its covers seductive, its contents perpetually renewed, revised, edited, fact-checked and copyedited." He adds, "For every *Harper's* or *Atlantic Monthly* there are three dog-grooming magazines out there. For every *Scientific American* there are a dozen devoted to UFOs and the healing power of magnets. The true wonder of the newsstand, a cynic could say, is of so much effort lavished on such trivialities; so many unhealthy appetites catered to so assiduously; so many hours, forests, dollars and minds wasted so casually."[6]

Michael Shermer asks, "If we are living in the Age of Science, then why do so many pseudoscientific and nonscientific beliefs abound? Religion, myths, superstitions, mysticism, cults, new age ideas and nonsense of all sorts have penetrated every nook and cranny of both popular and high culture." A Gallup poll of 1,236 adult Americans showed percentages of belief in the paranormal that are alarming: astrology 52%, extrasensory perception 46%, witches 19%, aliens have landed on Earth 22%, the lost continent of Atlantis 33%, dinosaurs and humans lived simultaneously 41%, Noah's flood 65%, communication with the dead 42%, ghosts 35% and actually had a psychic experience 67%.[7]

What about the media?

Most public communication about science is channeled through daily newspapers, special-interest magazines and television.

Wallace Kaufman notes, "Popular horse-racing tabloids are much more scientific than the environmental press. People who write the racing sheets know the uncertainty and risk in their predictions. News on the environment features experts who claim to be entirely certain about their predictions. Claiming to be certain, especially about a future disaster, can sell books and raise funds. The purpose of environmental

journalism is not to convey the truth about nature or the impact of civilization. Rather, its goal is to sell myths of the movement."[8]

Cass Sunstein reports, "Few people realize the extent to which reporters use slanted press releases and strategic leaks. The typical citizen has no time to investigate whether a story about an environmental hazard or an industrial safety problem has come from a trade association, a fundraising operation or a regional group that stands to benefit disproportionately from resources allocated to solving the problem. When we watch film clips on television, read statistics in the newspaper or hear an interview over the radio, we frequently presume that the information reflects the findings of disinterested journalists. But far more often than is generally known, the media are simply using videotapes, audiotapes and reports prepared by a party driven to enhance the availability of certain perceptions and viewpoints and expecting this transformation to start a cascade."[9]

One example from a previous column on science by press release:[10] Tammy Bruce describes in detail her efforts as a publicist in helping a firm who was having a "product brand anniversary coming up and wanted the news media to cover it not as a corporate event but as news." Every television news station in the country was sent a fax that made a pitch about the event along with information for downlinking video footage. This was followed by a personal call to the assignment editor at each network station in the top 50 television markets. The project was a success. The video aired in almost everyone of the top 50 markets in the nation. Here's the important point that Bruce drives home. "This may seem to you especially blatant - pitching a product as news. But consider the way protests and demonstrations by special-interest groups are arranged exclusively to receive media coverage. What is pitched is different - a product versus an issue - but the method is the same. In each case, the critical thing is not to let the public know how it is done."[11]

Summary

Without some knowledge of the scientific process, people tend to be whipsawed by speculation, pseudo-science and preliminary hints, many of which are contradictory.[12] If we responded to science, environmental and medical news stories more critically, we would not be as vulnerable as we are to recurrent, often baseless scares. How should we respond? With a large dose of skepticism. If, for example, there is a report that some food or habit or device is dangerous, people should ask themselves whether the news comes from a usually reliable source, whether it comes from one source or many, whether the alleged danger is large or small, and whether it is consistent with everything else we know about the subject. What was the sample size? Did some blue ribbon committee change some rules? Have better analytical techniques meant that the scaremongers are talking about mindbendingly small amounts?

Melvin Benarde sums it up nicely: "Too many of us can be told almost anything and accept it. The spinners manipulate this incomprehension for their own ends. They link environmental degradation - however it may be defined - with human health, serving the agenda of those who believe that if the public knew they were healthy and getting healthier - as the charts and tables clearly show they are - interest in things environmental would evaporate, along with financial contributions. Consequently, environmental pollution and health were inextricably linked, and the people were made to believe they were time bombs, ready to succumb to illness. Nothing could be further from the truth, yet a compliant public not only bought the sorry message, but clasped it to its breast."[13] P&SF

References

1. "State of Fear: Science or Politics?" Independent Institute Policy Forum, Oakland, CA, November 15, 2005.
2. G. Pearson & A.T. Young, Eds., *Technically Speaking: Why all Americans Need to Know More About Technology*, National Academy Press, Washington, DC, 2002; p. 1.
3. M. Morrone & T.W. Lohner, *Sound Science, Junk Policy*, Auburn House, Westport, CT, 2002; p. 7.
4. G. Pearson & A.T. Young, Eds., *Technically Speaking: Why all Americans Need to Know More About Technology*, National Academy Press, Washington, DC, 2002; p. 87.
5. G. Pearson & A.T. Young, Eds., *Technically Speaking: Why all Americans Need to Know More About Technology*, National Academy Press, Washington, DC, 2002; p. 60.
6. B. Bilger, "Foreword," in *The Best American Science and Nature Writing 2001*, E.O. Wilson, Ed., Houghton Mifflin Company, New York, NY, 2001; p. *ix*.
7. M. Shermer, *Why People Believe Weird Things*, W.H. Freeman & Co., New York, NY, 1997; p. 26.
8. Wallace Kaufman, *No Turning Back*, BasicBooks, New York, NY, 1994; p. 71.
9. C.R. Sunstein, *Risk and Reason*, Cambridge University Press, Cambridge, UK, 2002; p. 95.
10. J.W. Dini, "Science by Press Release," *Plating & Surface Finishing*, **91** (1), 30 (2004).
11. T. Bruce, *The New Thought Police*, Prima Publishing, Roseville, CA, 2001; p. 196.
12. M. Angell, *Science on Trial*, W.W. Norton & Co., New York, NY, 1997; p. 91.
13. M.A. Benarde, *You've Been Had*, Rutgers University Press, New Brunswick, NJ, 2002; p. *xi*.

Test Your Plating I.Q. #431

By Dr. James H. Lindsay

Definitions

1. Define **emulsion** and give an example.
2. Define **flocculation**.
3. Define **inhibitor**.
4. Define **activation**.
5. Define **pickling.**

Answers on page 50