

Dead Poets and Engineers

The year 1989 saw the debut of the feature film *The Dead Poet's Society*. This critically acclaimed movie is a story of inspiration: English teacher John Keating (played by Robin Williams) motivates and inspires his students to a love of poetry and to seize the day.

That same year, I began as a young assistant professor of engineering at the University of Connecticut. As luck would have it, Professor Samuel Pickering, the true-life inspiration for the Keating character and founder of the Dead Poet's Society, was on the English faculty at Connecticut. Because I was so inspired by the movie, I contacted Professor Pickering and asked him to deliver a seminar to the School of Engineering, hoping that his vision and excitement for the importance of poetry in enhancing the human condition would have relevance to engineering – a profession also ostensibly committed to the enhancement of human society.

His reaction to my request was astonishing. He felt that he had nothing to say that would interest engineers and respectfully declined my invitation. I was not only unprepared for this response, but incredibly disappointed at this latter-day manifestation of C.P. Snow's "Two Cultures."

The discontinuity in communication between sciences and the humanities (the "two cultures") and how this chasm can be an obstacle to solving the world's complex and integrated problems was the subject of Snow's Rede Lecture delivered at Cambridge University in 1959. Indeed, this rift in our sensibilities led Robert Pirsig, the author of *Zen and the Art of Motorcycle Maintenance*, to observe that what is "wrong with technology is that it's not connected in any real way with matters of the spirit and of the heart. And so it does blind, ugly things quite by accident and gets hated for that."

My encounter with Professor Pickering left me dismayed but undeterred in my search for a bridge con-

necting the two cultures. I eventually left Connecticut and moved on to Smith College where I became the founding director of the first engineering program at a women's college in the United States and, just as significantly, one of the few engineering programs at a liberal arts college in the United States.

What I have discovered since my interactions with Professor Pickering is that many engineers, in fact, *do* want to hear what poets have to say, dead or otherwise. And indeed there is a bridge being built to connect the two cultures, the humanities/arts and sciences/engineering. But, in my experience, the construction appears to be proceeding at a much faster pace from the science/engineering shoreline. In fact, the overarching philosophy of both the Smith College and the University of Vermont (my current affiliation) engineering programs is to achieve a true unity of knowledge rather than the factious paradigm characterized by Snow's "Two Cultures."

From an academic or intellectual perspective, the "Two Cultures" is an interesting concept to contemplate and debate. However, the implications of this concept can be pernicious when played out in a profession such as engineering, a profession that is dedicated to harnessing the powers of nature to benefit humanity. In preparation for this profession with such noble goals, students have unfortunately devoted the vast majority of their studies to understanding and manipulating the natural world and have often paid scant attention to understanding the motivations and intentions of the human spirit or of our connection to the natural world. This has been the state of engineering through most of the 20th century, a century that has seen meteoric growth in the role that technology plays in our everyday lives. A testament to the power of engineering thought and action.

My former colleague from Smith College, writer Kurt Vonnegut (who studied engineering), thought that this bias in many an engineer's intellect was wor-

thy of comment in his first novel, *Player Piano*. In that novel, one of his characters laments, “If it weren’t for the people, the god-damn people always getting tangled up in the machinery...the world would be an engineer’s paradise.”

To what has this cultural schism led? A “developed-world,” where between one-half and three-quarters of our industrial inputs or feed stocks are returned to the environment as waste within one year. While engineers are instrumental in designing life-saving technologies and have taken men to the moon, we have also constructed enough dams in the northern hemisphere to—in one estimate—actually change the earth’s center of gravity and hence the length of a day. This estimate was made before the largest dam in the history of humankind, the Three Gorges Dam in China, even came on line. We have also been able to develop energy and transportation technologies that have warmed our planet by increasing the CO₂ in our atmosphere with an annual influx of 3.2 billion metric tons of carbon. To be sure, the power of engineers is truly remarkable.

All too often decisions makers, with a superficial knowledge of science and technology, assign to engineers, who have only a passing exposure to the humanities and the arts, the tasks of providing the detailed designs for the life support systems that are the scaffolding for our civilization.

To better prepare engineers for a century that Peter Senge describes as having problems that come from yesterday’s solutions, a recent National Academy of Engineering (United States) report entitled *Educating the Engineer of 2020* called for universities to revise their engineering curricula. The report is aimed at creating a more holistic engineering profession to better prepare engineers for the complex challenges of the 21st century, from climate change to cyber security. Higher education’s goal, they argued, should be to create “technically proficient engineers who are broadly educated, see themselves as global citizens, can be leaders in business and public service, and who are ethically grounded” where “learning disciplinary technical subjects to the exclusion of a selection of humanities, economics, political science, language, and/or interdisciplinary technical subjects is not in the best interest of producing engineers able to communicate with the public, able to engage in a global engineering marketplace, or trained to be lifelong learners.”

While there are few universities that have embraced fully this thinking, the rhetoric makes us hopeful that, at least in the United States, engineers are moving toward a more holistic perspective regarding their design products.

If we are to transcend the engineering thought of the twentieth century, the successful technological designs and solutions of the future must be ever more dependent on creative, imaginative, and intuitive skills. Daniel Pink, in his provocative book, *A Whole New Mind*, argues that “the era of left brain dominance is giving way to a new world in which artistic and holistic right-brain abilities mark the fault-line between who gets ahead and who falls behind.” Not surprisingly, ambidextrous thinkers will be the best poised for success. Two centuries after the industrial revolution, we are starting to bridge the two cultures and develop both sides of the American engineer’s brain.

Regrettably, the progress in integrated thinking that is unfolding in the United States is not necessarily being shared by the majority of engineers around the globe. Much is said of the earth being flat and the global economy that has been created by the new Information Age. This economy has seen much of the United States’ manufacturing and a significant portion of our engineering services outsourced. As we recognize the need for more holistically trained engineers and move forward to re-form our engineering education, we continue to allow major portions of our products to be designed and manufactured by overseas engineers that have been trained (albeit technically rigorously) in a model that has been shown to have significant shortcomings and result in less than holistically sustainable solutions.

If leaders in the United States and overseas continue to proffer education strategies for aspiring engineers, the designers of our collective future, that are solely focused on science, technology, engineering, and mathematics disciplines to the exclusion of the humanities, social sciences, and the arts, we will not realize the full potential of 21st century innovation and global sustainability.

We have a responsibility to ensure that holistic approaches are the norm of engineering’s global future. U.S. leadership concepts of “sustainability,” “environmental justice,” “holistic design,” or “service systems engineering,” cannot be economically supported or justified if our overseas colleagues are not our collaborators. A world in which global engineers designing exciting technologies, but disconnected from the richness of the human condition, society, and the natural environment, is a world in which we are all the poorer.

Perhaps Tsinghua University in Beijing should invite a “John Keating” to inspire its engineering students with poetry. This time, I hope he accepts.

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