

English, STEM, and Salmon Fishing in the Yemen

Mohamed Gad-el-Hak

Science, technology, engineering, and mathematics have been a front-and-center pedagogic issue for at least a decade, with the promise that STEM education from kindergarten through college will improve the nation's security, competitiveness, health, and standard of living. Better paying jobs will be awaiting the fortunate few who graduate with majors in one of the STEM fields. All of that is more or less true. In 2006, the National Academies expressed concern about the declining state of STEM education in the United States. The Department of Education, NASA, NSF, and other federal agencies chipped in to help alleviate the concern. In 2012, President Obama asked for an additional billion dollars to beef up STEM instruction via a Master Teachers Corps. Select states, corporations, and philanthropists have been dashing around cash and resources. Several universities are planning to double the number of graduates in science and engineering over the next decade. The race is on and is just as intense as the one that followed Sputnik's launch in 1957, except that this time the U.S. is not competing with another superpower.

But there is a downside to any good thing. The number of students, the resources, and even the number of courses taken to graduate are all finite. So, something's gotta give. The likely casualty may be the humanities and particularly communication skills. Both young and experienced engineers/scientists need to communicate, and the lack of adequate skills can even be a career showstopper. Professors of humanities have been sounding the alarm. For example, Michael Levenson, a professor of English at the University of Virginia, lamented in an OpEd published 8 April 2013 by the *Richmond Times-Dispatch*, "The humanities will not go quietly. They won't disappear unless and until we agree to be machines instead of persons." In an earlier article appearing 29 August 2012, Thomas Peyser, professor of English at Randolph-Macon College, wrote "... and we can be confident that the abandonment of instruction in grammar is robbing us not just of future writers but of future scientists, physicians and engineers as well."

Communication Skills

As a professor of engineering, I would like to add a lone voice to those who teach humanities. An intelligent, overachieving engineering senior recently wrote the following opening sentence of a report about lotus leaves and the engineer's desire to mimic their biochemical processes: "This paper discusses an interesting topic, biomimetic, that engineering could benefit greatly by paying more attention to developed structures on animals that are highly successful in environments with similar conditions under which an engineering design is meant to operate." Who could make sense of such non-sense? As Peyser earlier commented on a different mangled sentence, "[This is] a complicated assertion [that] is just a jumble of phrases whose connection to one another is a mystery; the words might as well be alphabetized."

After witnessing our engineering students' declining ability to communicate effectively, I decided to take matters in my own hands. Last fall, I offered to seniors and graduate engineering students an elective course on the art of writing. My colleagues in the English department enthusiastically supported the endeavor, and some even volunteered to deliver guest lectures. In the *effective technical writing* class, there are no exams, but only weekly reading and writing

assignments. I challenge the students to improve upon the writings of famed novelists and newspaper columnists as well as well-written technical papers, all of which I carefully select. I also ask the pupils to write original essays on select technical as well as non-technical topics. The class time is split between open discussions and structured lectures on the beauty and pitfalls of the language. Judging from the students' evaluations as well as the quantifiable improvement in their writing skills throughout the 14-week semester, the experiment has been a resounding success. The course is now part of the permanent curriculum.

Salmon Fishing in the U.S.

Because of its very nature and inadequate teaching resources, the elective course is limited to a small percentage (about 1.5%) of the engineering graduate and undergraduate students in one university. This is but a drop in the ocean and I feel like a fish swimming against the current. In Paul Torday's 2007 novel "Salmon Fishing in the Yemen", which was made into a successful film in 2011, a Scottish ichthyologist is recruited to help realize a wealthy sheik's vision of bringing fly fishing to the not so fish-friendly desert. The farm salmon, airlifted from Scotland, instinctively swim upstream, the radicals fight the dream of enriching the lives of the Yemenis, the two protagonists are in other relations but fall in love nevertheless, and the entire absurd and unachievable project is an upstream journey of faith to make the impossible possible.

Tilting at Windmills

Exacerbating Don Quixote's academic quest are three unsettling instigations. First, several universities have recently attempted to implement a business model to replace the traditional academic model. Some university's presidents wrote doctoral theses on how to administer an academy. Such heads rarely go through the ranks of becoming teachers/scholars; they are 'born' presidents. They typically hire a plethora of public-relation assistants, generate sexy albeit empty brands such as "Quest for Distinction" or "Make It Real", and try to lead an unconvinced faculty. If the president looks behind, he/she would find no cats to herd.

Second, tuition's inflation far exceeds general inflation. Few schools charge additional tuition for each credit a student attempts above an arbitrarily defined threshold, so-called market-based tuition pricing structure. Faculty and staff salaries have been frozen for the last few years, while administrators' compensations are hitting the stratosphere. The average student-to-faculty ratio has been stagnant for decades, while student-to-administrator ratio has been reaching new lows every year.

Third, recent visions of the Tea-party-supported governors of Florida, Texas, and Wisconsin foretell a future of public higher education in which a teacher's worth is measured by how much tuition income he/she generates relative to the cost of retaining that teacher. Research does not enter the Excel-sheet equation. And of course teaching sparsely attended classes on Socrates, Descartes, or Rembrandt is an unforgivable sin.

In all three instigations, "productivity" is no longer used to cut through academic inefficiency in order to lower costs, but is rather a code for replacing the nuanced work of nurturing young minds with crude, assembly-line widget-making (Justin Pope, *The Huffington Post*, 3 February 2013). In this environment, securing the resources to inject a heavier dose of the humanities into STEM programs is salmon fishing in the Yemen.

Losing Our Humanities in a STEM World

Just as we cannot prosper without STEM, we shouldn't diminish the humanities either. Students can learn a great deal during their formative years, and we shouldn't miss the opportunity to broadly educate them. Some STEM students gravitated there to minimize their exposure to the "drudgery" of the humanities, but it is the academe's duty to show the young minds how studying the humanities can enrich their lives. I am reminded with a quip often attributed (but not verified) to Mark Twain: "When I was a boy of 14, my father was so ignorant I could hardly stand to have the old man around. But when I got to be 21, I was astonished at how much the old man had learned in seven years."

Mohamed Gad-el-Hak, PhD, is the Inez Caudill Eminent Professor of mechanical and nuclear engineering at Virginia Commonwealth University in Richmond. Contact him at gadelhak@vcu.edu.

The opinion piece above appeared in different forms, titles, and lengths in the magazines *Physics Today* (16 July 2013) and *Mechanical Engineering* (October 2013); in the newspapers *Free Lance-Star* (30 June 2013) and *Richmond Times-Dispatch* (17 July 2013); in the blogs VCU's *Across the Spectrum* (29 July 2013) and PBS's *Science Matters* (31 July 2013); and in the radio program NPR's *With Good Reason* (7 September 2013). The respective URLs for the articles are:

http://www.physicstoday.org/daily_edition/points_of_view/english_stem_and_em_salmon_fishing_in_the_yemen_em

<http://www.memagazinedigital.org/memagazine/201310#pg10>

<http://fredericksburg.com/News/FLS/2013/062013/06302013/779367>

http://www.timesdispatch.com/opinion/their-opinion/columnists-blogs/guest-columnists/stem-english-and-salmon-fishing-in-the-yemen/article_7c06946a-f037-5f88-a141-dac5529f1ca5.html

<http://www.spectrum.vcu.edu/insight/opinion-english-stem-and-salmon-fishing-in-the-yemen/#.UffM01N1EvZ>

<http://ideastations.org/articles/english-stem-and-salmon-fishing-in-yemen-2013-07-31>

<http://withgoodreasonradio.org/2013/09/stem-vs-the-humanities/>

