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THE ROLE OF LIBERAL ARTS IN A TECHNOLOGICAL EDUCATION

THE LIBERAL ARTS are often seen as nonessential to a technological education. Are they? At NJIT we are in the business of training young people for positions in a professional technological landscape of increasing complexity. They must be trained to understand and manipulate the details of the science and technology that they undertake. But what else might they need to be successful, responsible, fulfilled adults? Do the liberal arts have anything to offer them? If so, what?

The liberal arts often fail to appreciate the scientific underpinnings of society. One striking example of the interplay of science and technology with cultural development has been spotlighted in recent months by the presidential approval of the limited use of human embryonic stem cells for research. The potential for novel approaches to dis-

ease remission and cure have been widely touted, promising technological miracles ahead. But most people had no idea what stem cells are or why they were important.

Social Consequences

The mountainous ethical concerns that have accompanied the stem cell debate have also driven home the fact that science and technology must be alloyed with concerns that are beyond the simply factual or technical. In this instance, the ethical considerations share the spotlight with the technical ones. So, while the scientific underpinnings of society are often lost in the liberal arts, the human underpinnings of science are generally underrepresented in a technological education, leaving it too often divorced from the human community that

it serves. One of the important roles for the liberal arts, then, is to help young scientists and engineers understand that their work holds social consequences.

Questions of the Ages

There are also more subtle regions of the intellect that the liberal arts address. Our students hunger for more than facts. They harbor in the disorder of their adolescent minds a nascent understanding that there is more to life than lasers and pentium processors. They are young men and women who have now, in their late teens and early twenties, arrived at questions that have haunted the ages. Each new generation needs to know how great minds before it have addressed great issues. Moreover, students need to be exposed to the quality of great minds in many disciplines on the off-chance that they recognize themselves among them. And if they are not among them, they must, at the very least, be given the wherewithal to understand and appreciate the habits of mind that have informed those disciplines. They should have the chance to experience the beauty of literary construction or the elegance of a reasoned argument so that they recognize it – or the lack of it – in their own work or the work of others. Exposure to greatness, while not necessarily breeding greatness (a commodity difficult to come by), may at least be one hedge against descent into mediocrity.

Basic Intellectual Habits

Young people also need to have their somewhat inchoate talents channeled into appropriately disciplined modes of thought, not just in the sciences, but in other fields as well. Dennis Hutchinson, in a speech to University of Chicago freshmen on the aims of education, suggested that “The heart of what we do here...has less to do with the number of courses or the precise configuration of subject matter than with the *premises and standards of deliberation that inform our enterprise.*” (Emphasis added.) These premises and standards should establish an intellectual background upon which students can draw for the rest of their lives. University of Chicago scholar Ronald Crane suggests what these “basic intellectual habits” should look like:

“The ability to see problems, to define terms accurately and clearly, to analyze a question into its significant elements, to become aware of general assumptions and preconceptions upon which one’s own thinking and that of others rests, to make rele-

vant and useful distinctions, to weigh probabilities, to organize the results of one’s own reflections and research, to read a book of whatever sort reflectively, analytically, critically, to write one’s native language with clarity and distinction – the development of these powers...would seem to me to be no less the business of “General Education” than the communication and testing of knowledge” (John W. Boyer, *Three Views of Continuity and Change at the University of Chicago* [Chicago: The University of Chicago, 1999], 52).

Mental Flexibility

While these are all noble goals of education, there is yet another “basic intellectual habit” that seems necessary, but is the most difficult to teach. It falls under the heading of something like Mental Flexibility. The terrorist attacks in New York and Washington should alert us to at least three truths: first, despite our efforts to expose ourselves and our students to multicultural points of view, we in the Western world do not have as sophisticated an understanding of the whole world as we might have thought; second, technology can deliver to us both the greatest good and greatest evil that the world can know; and third, and here is the point, the world can throw us fiery curve balls even on crisp, sparkling mornings in late summer. How are we to prepare students (and ourselves) to handle such dizzying, often instantaneous changes?

In her inaugural address as the new president of Princeton University, Shirley Tilghman sought to address the challenges that face academicians in what she labeled our “uncertain future.” She noted that “[the] search for new ideas and knowledge... depends on the ability to think in new and creative ways, to challenge prevailing orthodoxies, to depart from the status quo. We must,” she continued, “continually strive to preserve the freedom of our students and our scholars to pursue ideas that conflict with what we believe or what we would like to believe, and to explore deep problems.”

A great part of what we do, or should be doing, is to provide to our students and to develop in ourselves the ability to deal creatively and critically with a constantly fluctuating world. We must demonstrate to students a flexibility of mind and provide them the tools for appropriately critical analysis of novel situations. In the parlance of the scientist, we must teach them to deal with novel data in creative and rational ways – not an easy task, but one, I believe, that is well worth the effort. ■