

Science as a Matter of

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MY
VIEW

The natural sciences can be quintessential liberal arts

I TEACH BIOLOGY at a college of art and design. When people hear this, the inevitable response is one of two: “Really? I didn’t know they even taught science at art schools” or, just as commonly, “Well, I suppose someone needs teach anatomy of the human figure.” After all, what business does science have at an art school otherwise? In the case of my field, the proverbial short answer can be quite long, given all the ways biology is now a focal point for engaging with fundamental questions of form, function, and even aesthetics. Genetic modification, biomimetic design, eco-art, neuroperception, sustainable systems theory—it is no exaggeration to say that the list of biological topics that have come to populate art museums, gallery exhibitions, and popular media has exploded in the last fifteen years. The surprise over art students learning science says more about outdated notions of art and design than about science education’s proper place within them.

Still, it is conspicuously the case that my other liberal arts colleagues who teach literature, anthropology, or philosophy rarely meet the same kind of skepticism about their role at art school that I face as a scientist. This may be because the “humanistic” fields are considered a natural part of the liberal education that an art and design undergraduate should receive. Plato, Freud, and Derrida? Most certainly. Name-dropping Da Vinci? Perhaps. But Darwin, much less Newton? As far as the foundational education of artists and designers is concerned, there is a sense that the natural sciences are of marginal importance, that they deal primarily with matters of material fact rather than the concerns of critical thought or cultural discourse.

Interestingly, it is among other professors, rather than my students, that I most commonly find this notion of scientific knowledge. For example, a recent informal poll of academic faculty at my institution asked what constitutes the liberal arts; over 20 percent of respondents provided definitions that explicitly excluded the natural sciences. If my own colleagues don’t recognize science as part of the liberal arts, then perhaps it is little wonder that the role of science within the education of artists and designers seems curious to so many.

Academic inheritance may be partly to blame. The distinctions often asserted between the natural sciences and the humanities today almost seem like a caricature of C. P. Snow’s influential “two cultures” argument of fifty years ago, perhaps with a touch of 1990s academic “culture wars” thrown in. Yet, the way we discuss disciplines still often serves to reinforce a sense of fundamental divide, albeit with varying degrees of nuance. In his essay “Dehumanized,” Mark Slouka (2009) asserts that, “to put it simply, science addresses the outer world; the humanities, the inner one. Science explains how the material world is now for all men; the humanities, in their

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indirect, slippery way, offer the raw materials from which the individual constructs a self.” This may appear so categorical as to be simply hyperbole, but distinctions that are just as sharp can be found among the premises of more tempered commentaries as well.

Take, for example, Stanley Fish’s discussion of the controversial curricular standards published in 2009 by the American Council of Trustees and Alumni (ACTA). In considering

the validity of the standards across different disciplines, Fish grouped the natural sciences together with composition, math, and foreign languages and readily endorsed ACTA’s vision for these fields. In contrast, when it came to literature and history, he strongly opposed the “stringent and narrow” criteria as “an effort to shape the discipline from the outside according to a political vision.” For Fish, this difference seems to come down to the cultural and

intellectual engagement of the disciplines. “You can tell when you are being taught a mathematical function or a scientific procedure or a foreign language or the uses of the subjunctive and when you are being taught something else,” he argued. “Things are not so clear when it comes to literature and history” (Fish 2009). Why aren’t the problems with ACTA’s strict criteria just as apparent when it comes to the natural sciences?

Science and liberal education

The Association of American Colleges and Universities (2012) describes liberal education as “an approach to learning that empowers individuals and prepares them to deal with complexity, diversity, and change.” This approach is “characterized by challenging encounters with important issues, and more a way of studying than a specific course or field of study”; it “helps students develop a sense of social responsibility.” Given these characteristics of liberal education, it is hard not to feel that both Fish and ACTA sorely underestimate the cultural and critical relevance of scientific understanding and science education. While rightly pointing out the need for literacy and core education, the “hard science” criteria of the ACTA standards throw out the

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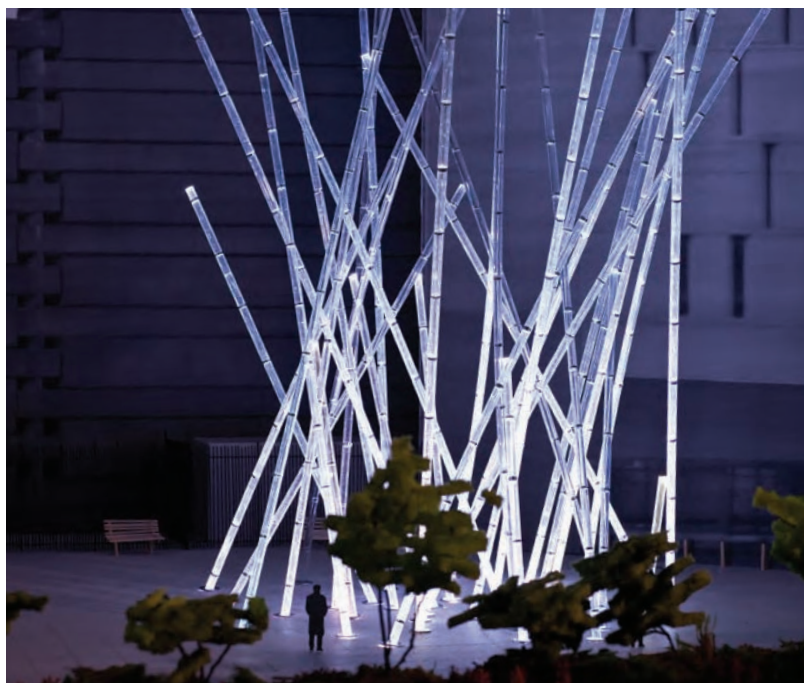
baby with the bathwater by rejecting courses that engage crucial social or philosophical contexts central to contemporary science. By claiming that courses such as “The Tropics: Biology and Social Issues” or “Genetics, Law, and Social Policy” don’t count as science courses, the ACTA criteria

risk reinforcing a problematic, status quo view of science as simply problem solving around known facts, rather than an epistemologically complex means to understanding and engaging with the world. The overall effect is essentially to exclude the natural sciences as serious liberal arts, almost by definition.

Although it may be tempting to brush it off as just a semantic quibble, the question of whether science education is truly liberal education—and ought properly to be recognized as such—is of real consequence. Take, for example, *Kitzmiller v. Dover*. In that 2005 trial over the teaching of evolution in the public schools, the well-known philosopher and sociologist Steve Fuller testified for the creationist defense, claiming that he was more qualified than a scientist to expertly assess the scientific status of intelligent design. Fuller’s rationale was that, given the narrow scope of “ordinary science education” in the United States, scientists are not capable of effectively analyzing the issue the way a philosopher-sociologist is. “I think the key thing is that... the kinds of things that are, as it were, relevant to know about science aren’t necessarily the things that would be in a science curriculum,” Fuller testified, “especially if we’re talking about people who are being professionally trained to be scientists” (2005, 32).

While it is hard not to take umbrage with his claim, I also worry that Fuller could turn out to be right. A study by Marra and Palmer in the *Journal of General Education* (2008), for example, found that liberal arts undergraduates tend to view the epistemology of the humanities or the social sciences as more complex than that of the natural sciences, perceiving knowledge in the sciences as primarily factual and involving less of the evaluative thinking found in the humanities and the social sciences. If we continue to rely on antiquated taxonomies of the disciplines and on traditional ways of teaching within them,

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it is not certain that education will necessarily succeed in meeting the aims of a truly liberal education. Views like Fuller's should also motivate us to examine seriously the almost complete absence of history or philosophy of science requirements at both the undergraduate and graduate levels for students who major in science. Such educational gaps make it more likely that future scientists will lack the integrative skills necessary to connect the culturally complicated dots between science and society.

For these very reasons, it is precisely courses like "The Tropics: Biology and Social Issues" and "Genetics, Law, and Social Policy" that need to be included in college curricula if we want students to develop a mature perspective on science as a dynamic process of inquiry, discovery, and reason that addresses real-world uncertainties. Innovative approaches to science pedagogy place a premium on active, evaluative thinking about real-world scenarios, and the development of curricula that engage the critical and civic questions of sustainability, public health, evolution education, and climate change are being actively promoted as a matter of best practice in science teaching.

The natural sciences can be quintessential liberal arts. As science teachers, it is up to us to create curricula, instruct undergraduates, and mentor graduate students in ways that cultivate engagement with science that is intellectually critical and culturally crucial. In the process, we will have to confront a number of institutionalized norms, including outdated notions of the nature and role of science education within the academy. We will

also have to confront the contradictions in how science faculty are professionally evaluated and the strong tendency to prioritize grants and research prowess over teaching. Reimagining the intellectual and civic value of the natural sciences, how they are best taught, and the significance of scientific fluency—for artists, designers, scientists, humanists, and social scientists alike—will contribute to reclaiming the fundamental relevance of a liberal education today. □

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