STEM VS. THE HUMANITIES

In his article, "STEM, Revisited," in the March issue, Hal Berghel appears to have gotten things backward about where to learn critical thinking skills. I learned how to think critically in STEM, not humanities courses.

The primary critical thinking tool in the humanities is the debate. In a debate, the person with the most convincing argument is the one who wins. This is a subjective judgment, and it can be influenced by factors unrelated to the subject (Nixon's physical appearance during his presidential debate with Kennedy, for example). It is also the practice in debate competitions to assign positions arbitrarily. The debater is expected to be able to make a convincing argument for either side of an issue.

In contrast, STEM areas have several approaches. Perhaps the oldest critical thinking skill is the mathematical proof. In a proof, the mathematician starts from agreed upon postulates and uses logic to extend these postulates to show that, if the postulates are true, then so is the theorem he is trying to prove. The rules of logic are themselves defined precisely so that observers can spot errors in the proof.

A second form of critical thinking is experimentation. In this, the experimenter proposes a series of actions and measurements, the experiment, to test a hypothesis. The experiment is designed to produce one result if the hypothesis is true and a different one if it is false.

Additional methods for testing hypotheses have been developed for situations where experimentation is not feasible. When these tests do not provide definitive answers—as with statistics—the degree of uncertainty is quantified.

To summarize, the humanities have a limited number of tools for critical thinking, and these tools can be used to produce a convincing argument for any number of answers to a particular question. STEM has a more varied set of tools, and these tools are designed to show when an answer is wrong, not just when it is right.

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The author's response:
I agree with Mr. Skowronski about the value of formal proofs and scientific experimentation. However, I believe that he has the relationship between STEM and humanities backwards. Humanities offers the broader palette for critical thinking. STEM tools are much more prescribed, formalized, limited in use, and, hence, uncontroversial. We can prove to any reasonable person that one batch of concrete has greater compression strength than another. We cannot prove that the suspension of habeas corpus, roving wiretaps, and mass surveillance is inconsistent with a constitutional democracy worthy of the name.

We need to be careful not to deify STEM disciplines. Although they represent civilization's crowning achievements as viewed through the lens of the quantifiable, causal, and practical, they do little to give our lives meaning or prepare us for the vaudeville of modern politics. It is worth noting that the NSA's surveillance code was created by our professional peers in computing who, at the time of creation, had apparently little concern for the constitutional implications and risk to public interests. And was there critical thinking when our STEM-educated high-tech corporate leaders were asked by the NSA to participate in the mass surveillance and warrantless eavesdropping of their customers? It appears that the only CEO who failed to go along with the idea was Steve Jobs whose short-lived college background was in humanities.

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