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Rethinking the Numerate Citizen: Quantitative Literacy and Public Issues – Discussion

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Abstract

I dispute Erickson's claim in *Numeracy* 9(2), Article 4 (2016), that quantitative literacy is neither necessary nor appropriate for informed citizenship, and explore his suggestion that Hardwig's notion of epistemic dependence is more suited to the task.

Keywords

quantitative literacy, epistemic dependence, numeracy

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Cover Page Footnote

Kira Hamman teaches both mathematics and quantitative literacy at Penn State Mont Alto. She truly believes that bringing quantitative information to bear on public problems can save the world.

In the Summer 2016 issue of this journal, Ander Erickson considers the role of quantitative literacy in addressing what he calls “*public problems*: questions that are publicly argued, consequential, and relevant to the citizen” (Erickson 2016, 1). Quantitative literacy, he argues, “has no purchase on these issues and it is misleading to imply otherwise;” it will not help citizens either to understand public problems or to evaluate the arguments surrounding them. Indeed, “a small amount of disciplinary knowledge will, at best, only confound this activity.” As support for this implausible assertion he offers John Hardwig’s work on the notion of *epistemic dependence*, “the layman’s appeal to the intellectual authority of the expert” (Hardwig 1985, 338). No one can be an expert on every topic, Hardwig explains, and therefore we all necessarily rely on the knowledge and judgement of experts in matters in which they are expert and we are not. On the face of it, this is an unproblematic claim: most of us do not attempt to do our own medical research, for example, or even to read the peer-reviewed literature on it. We discuss our medical needs with our doctors, and by and large, we take their advice. Someone who feels unable to take her doctor’s advice should probably find a new doctor. As Hardwig presents it, epistemic dependence is a necessary condition for rational belief. It is not, however, a sufficient one, and this is where Erickson’s argument fails.

Not only are quantitative literacy and epistemic dependence not mutually exclusive, as Erickson argues, they are inextricably intertwined. Indeed, intellectually healthy epistemic dependence in mathematics *requires* quantitative literacy, which Erickson has mistakenly conflated with what he calls “disciplinary knowledge.” The misunderstanding seems almost willful at times – contrary to the very definition he quotes at the start of the paper – and ignores the fact that a major goal of quantitative literacy is to avoid requiring that everyone possess such knowledge. Advocates of quantitative literacy are frequently at pains to explain that it is different from disciplinary knowledge; that it seeks to give students the tools and confidence to function in quantitative situations *without actually doing the math themselves*. Quantitative literacy for citizenship, which is what Erickson is concerned with, teaches students to be savvy consumers of mathematics, not to be creators of it.

In fairness, many in the quantitative literacy community have also made this error. Being able to quote the compound interest formula from memory is neither a necessary nor a sufficient condition for financial literacy, yet it is often taught as if it were both. That said, a student who does not have a sense of the difference between linear and exponential growth is unlikely to possess the same level of financial literacy as one who does. Similarly, a citizen for whom a million, a billion, and a trillion all feel like basically the same huge number cannot participate meaningfully in a discussion of the cost of the wars in Iraq and Afghanistan. Erickson argues that because any reasonable piece of journalism on the cost of the wars will include those numbers, there is no need for the reader to calculate them

herself. This is certainly true, but it is also irrelevant. Calculating the numbers is not the issue – *understanding* them is.

In reading Erickson's article I was reminded of a road trip last summer during which my car started vibrating when I applied the brakes at high speed. "Yikes," I thought, "I should probably get that checked out." I didn't know exactly what the problem was, and I certainly didn't know how to fix it. Nevertheless, nearly 30 years' driving experience, combined with the available evidence, led me to believe that (a) something was wrong, (b) it probably had to do with the brakes, and (c) because brakes are not something to mess around with, I should have an expert take a look at it. I didn't need to know how to check the brakes, but I did need to know that vibration when braking is not normal. I also needed to be able to judge the credibility of the expert whose opinion I sought; if my mechanic had told me that the problem was in the electrical system, I would have been skeptical.

Quantitative literacy is the ability to notice that the car is vibrating and hypothesize that it might be the brakes. Epistemic dependence is knowing that you ought to take the car to a mechanic. Quantitative literacy is taking it sooner rather than later. Epistemic dependence is not trying to pull and machine the rotors yourself. Erickson is imagining a situation in which I feel the car vibrate, I guess that the problem is with the brakes, and, vaguely remembering that the brakes are somewhere in the wheels, I take off the wheels and try to fix the brakes. I do it wrong, of course, because I don't know what I'm doing, so the next day my brakes fail and I die in a fiery ball of disciplinary knowledge failure. The alternative, as he proposes it, is that I pay no attention to what I notice or think, because I don't really know much about cars, and instead simply get the brakes checked regularly. His faith in the intellect of the average citizen is underwhelming, though he makes a point of claiming otherwise.

The current state of public discourse offers a compelling cautionary tale about the perils of excessive epistemic dependence. When a population ceases to be able to judge for itself what is true and what is not, truth itself is threatened. At the same time, it would be foolish to pursue what Hardwig (1985, 340) calls "epistemic autonomy across the board." A citizen need not (indeed, probably should not) try to collect her own data, but she had better be able to tell the difference between data and lies. This is what quantitative literacy teaches her to do.

The failings of his particular argument aside, in identifying Hardwig's notion of epistemic dependence and relating it to quantitative literacy Erickson has done us a great service. Much of Hardwig's work could be usefully brought to bear on understanding the role of quantitative literacy in a post-truth culture, and I would welcome a more nuanced evaluation of that bearing.

References

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