Review of: "In the doing of science, what is the place for naturalistic philosophy? Implications for the teaching of science"

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I agree that incorporating more natural philosophy into science education is important. However, as someone from the social sciences, I think the paper may be confusing for those who are doing and teaching science, which I assume is the target readership. I provide some examples below to illustrate the confusion that may need to be addressed.

The natural philosophy vs. science distinction

The paper sets up the distinction between natural philosophy and science by citing Robinson's work, but it would be helpful to provide a brief survey of the literature and a justification for why this work is particularly important. The distinction between natural philosophy and science seems to be a weak strawman, and it raises the kind of the definitional questions below.

On page 3, the statement that "The constitutive a priori are the terms and concepts in natural language that bind statements about the world into a coherent whole; that render them meaningful in various ways that cannot be expressed directly in statements of science based on experimentation" raises questions about where theoretical science stands. Is it a posteriori science or natural philosophy? If it is both, what is the paper's argument?

Similarly, the Section “The existential dimension of naturalistic philosophy in doing science” makes a connection between natural language and science, but it again makes readers wonder that, in this framework, where does things like math and probability stand? In *the Empire of Chance: How Probability Changed Science and Everyday Life*, Gigerenzer and colleagues (1989) demonstrate the unnaturalness of the concept of probability and the long process through which it became part of our “natural language”. Even today, mathematicians and statisticians still disagree about what probability means. A lot of this work is based on a priori arguments, but does that make probability and statistics exclusively natural philosophy? Do the kind of counting that statisticians and probability researchers do count as experiments? It seems hard to answer these questions with your framework without ad hoc adjustments, and that makes a blurry picture of this natural philosophy vs. science distinction, which at times sounds more like a theoretical vs. applied sciences distinction.

Examples

The examples used for illustration may also need more justification. For instance, it is unclear whether Feynman was doing natural philosophy when he talked about atoms being the fundamental building blocks of biology. Such a case may

need more than one quote to substantiate.

On pp. 9-10: “In Bohr’s view, the phenomenon*is* the experiment as a whole (entailing the entanglement of the measuring device and the object of interest); it is all of what happens and is revealed in the *doing* of the experiment. The emphasis shifts from *being* (concerning the existence of entities) to *doing (i.e. measuring the changes in a system)*” This is confusing to people who are in the sciences. When is one doing natural philosophy and when is she doing science? Many of the physicists you mentioned are theorists who debate *about* the interpretations of experiments (rather than doing experiments themselves). Does this make them natural philosophers or scientists? I feel like I’m nit-picking, but the research seems to beg this question when I try to follow your line of reasoning.

Implications

The implications of the study are not clear and leave much to the reader's interpretation. The statement about the loss of a sense of reality among the wider population in the section on “Hannah Arendt and the existential consequences of doing science” is confusing and needs further explanation. Does it mean that I lose a sense of reality when I operate a black-box such as a machine that has a quantum aspect to its operation? Should I feel so and see that as a problem? It would be helpful to explicitly spell out the implications of the research.

Similarly, it is not clear what makes the debate on quantum mechanics political. Because the general public needs to know what quantum mechanics really says? Would that make the public more informed when making decisions on issues like nuclear proliferation (which seems more straight-forwardly political)? A clearer explanation would be very helpful.