Epistemic Iteration Revisited: The Achievement of Precision in Concepts and Methods,

A Distinguished Lecture by Hasok Chang

Abstract:

Rigor in science is usually conceived in a static way, in terms of precise measurement, formal reasoning, and mathematical theories and models. While not negating such characterizations, I want to highlight the dynamical dimension of rigor, offering ways of understanding its development and enhancement as a historical phenomenon. Central to this perspective is the notion of epistemic iteration, the process in which we conduct an inquiry on the basis of an imperfect starting point, and use the process and outcome of that inquiry in order to improve its own starting point. Epistemic iteration is a notion that I articulated at first in the context of trying to understand how new measurement standards could be established in the absence of pre-existing standards that one can use to validate them. Since then I have come to see epistemic iteration as a very widespread feature of scientific progress. Iterative self-correction and refinement are key to the development of rigor in scientific practices. This development involves the improvements of concepts and methods equally. I will illustrate iterative concept-development through two cases: conceptions of electrical circuits from Volta to Ohm, and the periodic arrangement of chemical elements (as discussed by Eric Scerri among others). The iterative development of methods harks back to the pragmatist view (advanced especially by John Dewey and Clarence Irving Lewis) that all methods are learned empirically, right down to the rules of logic. I will illustrate iterative method-development by revisiting my work on temperature measurement, and through a historical study of early analytical chemistry.

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