Other Presentations

Fall 12-12-2014

Some Observations on Scientific Epistemology with Applications to Conflict Resolution and Constructive Controversy

Judith Puncochar
Northern Michigan University, jpuncoch@nmu.edu

Don Faust
Northern Michigan University, dfaust@nmu.edu

Recommended Citation

Puncochar, J., & Faust, D. (December 12, 2014). Invited Address: Some Observations on Scientific Epistemological Issues with Applications to Conflict Resolution and Constructive Controversy. Universitas Indonesia, Depok, Jakarta, Indonesia.

SOME OBSERVATIONS ON SCIENTIFIC EPISTEMOLOGY
WITH APPLICATIONS TO
CONFLICT RESOLUTION AND CONSTRUCTIVE CONTROVERSY

Judith Puncochar (School of Education, Leadership, and Public Service, jpuncoch@nmu.edu)
&
Don Faust (Department of Mathematics and Computer Science, dfaust@nmu.edu)

Northern Michigan University

ABSTRACT

An overview, by Judy and Don (published in 2013 in the BULLETIN OF SYMBOLIC LOGIC):

Explorationism is a perspective wherein all of our knowledge is (so far) less than certain, and naturally would come equipped with a *base logic* entailing machinery for representing and processing evidential knowledge. One such *base logic* is **Evidence Logic**, which strives to deal with the phenomenon of the gradational presence of both confirmatory and refutatory evidence. From this perspective, we will address questions surrounding sociological problem areas that we see as deeply infused with substantial epistemological factors. By defining a *framework* as any theory, in the technical sense this term is used in logic, in Evidence Logic, we will attempt to see each sociological milieu as a largely unelaborated framework. A dearth of elaboration leads to both a lack of awareness of presuppositions and implications inherent within each framework and an overconfidence regarding the veracity and applicability of the framework. For example, some sociological milieux involve Belief Systems (*), below which lurk poorly elaborated frameworks (e.g., Wittgenstein's *forms of life*). The lack of elaboration allows believers to assert that their beliefs should apply to 'the other' as well as themselves. We consider the possibility that, even when further elaboration of a framework seems infeasible, increasing the awareness of the framework and its unelaborated status will mitigate the likelihood that believers will assert the veracity of their beliefs.

*: Agent A <u>believes</u> a sentence S iff A asserts S is true although A does not know S is true.

Presentations, first by Don, followed by a workshop with Judy (see workshop abstract):

Indonesian democracy needs an informed, educated citizenry that practices skills of perspective taking, debate, and evidence-based reasoning to deal with conflict constructively. An expectation of education in democracies is for educators to provide opportunities for students to hone democratic skills of constructive controversy, debate, and logic and to practice critical thinking, creativity, moral and ethical reasoning, and problem solving and decision-making. A hands-on student-centered, active learning workshop by Judy on structured controversy will follow Don's overview of scientific epistemological issues and their application to conflict resolution. In the workshop, participants will learn how to create and handle intellectual conflict as part of the expected university classroom experience. Structured controversy is a well-researched educational strategy to help students learn course content and polish skills necessary for dealing with difficult ethical situations and working toward the construction of a peaceful, cooperative, respectful, safe, and economically fair democracy in a diverse society.

An introduction to Evidence Logic, by Don:

Evidence Logic (EL) is an extension of Classical Logic whose languages $L_{n,\tau}$, for any stipulation τ of predicate symbols and any n>1, are equipped with the following:

(1) an Evidence Space of evidence values $E_n = \{\, i/(n-1) : i = 1,\ldots,n-1 \,\}$, such that
(2) the atomic formulas are, for any s-ary predicate symbol P and any terms $t_1,\ldots,t_s$, and for any e in E_n,

$$P_c t_1 \ldots t_s : e \qquad \text{and} \qquad P_r t_1 \ldots t_s : e,$$

where the former asserts that there is evidence at level e confirming $Pt_1 \ldots t_s$ while the latter asserts that there is evidence at level e refuting $Pt_1 \ldots t_s$.

Semantically, in any model $\mathfrak{A} = <A,\ldots>$ of $L_{n,\tau}$ each s-ary predicate symbol P is interpreted by *a pair* $<P_c{}^{\mathfrak{A}}, P_r{}^{\mathfrak{A}}>$ each coordinate of which is a partial function from A^s to E_n.

To overview the mathematical structure of the Boolean Algebra of Sentences (BAS) and the Topological Space of Models (TSM) of any EL language $L_{n,\tau}$, we will briefly discuss them in terms of the languages $L_{n,\mu}$ for *decidable* μ stipulating p proposition symbols, k constant symbols, and u unary predicate symbols:

THEOREM. The BAS of $L_{n,\mu}$ has order basis $\quad \omega^m \cdot n^{2p} \cdot (_{i=1}\Sigma_k\, s_{ki} \cdot n^{2ui}) \quad$ where ω is the order type of the Natural Numbers, $m = n^{2u}$, and the s_{ki} are the Stirling Numbers of the Second Kind (i.e., s_{ki} is the number of ways of partitioning a k-element set into exactly i non-empty subsets).

The following provide precise definition and elaboration / analysis of Evidence Logic:

(Abstract) "Full Opposition Symmetric Evidence Logic", BULLETIN OF SYMBOLIC LOGIC 17 (2011), 326.

"Explorationism, Evidence Logic, and the Question of the Non-necessity of All Belief Systems", PROCEEDINGS OF THE 22ND WORLD CONGRESS OF PHILOSOPHY, 2008.

"On the Structure of Evidential Gluts and Gaps", pp. 189-213 in HANDBOOK OF PARACONSISTENCY (eds. Jean-Yves Beziau, Walter Carnielli, and Dov Gabbay), 2007.

"Conflict without Contradiction: Paraconsistency and Axiomatizable Conflict Toleration Hierarchies in Evidence Logic", LOGIC AND LOGICAL PHILOSOPHY 9 (2001), 137-151. (abstracted in The Philosopher's Index 2005)

"The Concept of Evidence", INTERNATIONAL J. OF INTELLIGENT SYSTEMS 15 (2000), 477-493.