Unifying Epistemologies by Combining World, Description and Observer

Stuart Umpleby
Research Program in Social and Organizational Learning
The George Washington University
Washington, DC
Umpleby@gwu.edu

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Stuart Umpleby
The George Washington University
Washington, DC
Umpleby@gwu.edu

The epistemologies of realism, constructivism, and pragmatism can be viewed as emphasizing different combinations of world, description and observer. Realism emphasizes world and description. Constructivism emphasizes observer and description. Pragmatism emphasizes observer and world. These three epistemologies are similar to three stages in the development of cybernetics – engineering cybernetics, biological cybernetics, and social cybernetics. Viewing the three epistemologies as emphasizing different facets of a triangle clarifies the relationships among the epistemologies and creates an opportunity for unifying them. Advocates of each point of view tend to direct a conversation toward the issues of greatest interest in that epistemology.

Background

Over dinner in Vienna in November 2005 Karl Mueller mentioned Heinz von Foerster's article "Computing in the Semantic Domain." (von Foerster, 1971) Specifically, Mueller asked about a triangle proposed by von Foerster – world, cognitive processes, and descriptions. Mueller said that von Foerster associated the dyad "world and descriptions" with syntactics and the dyad "descriptions and cognitive processes" with semantics. He asked how the dyad "world and cognitive processes" should be described. I suggested pragmatics.

Later it occurred to me that these three perspectives correspond with three historical points of view in cybernetics – engineering cybernetics, biological cybernetics, and social cybernetics. (Umpleby, 1997) See Table 1. I associated engineering cybernetics with first order cybernetics, biological cybernetics with second order cybernetics, and social cybernetics with an additional point of view.

	Engineering Cybernetics	**Biological Cybernetics**	**Social Cybernetics**
The view of epistemology	A realist view of epistemology: knowledge is a "picture" of reality	A biological view of epistemology: how the brain functions	A pragmatic view of epistemology: knowledge is constructed to achieve human purposes
A key distinction	Reality vs. Scientific Theories	Realism vs. Constructivism	The biology of cognition vs. the observer as a social participant
The puzzle to be solved	Construct theories which explain observed phenomena	Include the observer within the domain of science	Explain the relationship between the natural and the social sciences
What must be explained	How the world works	How an individual constructs a "reality"	How people create, maintain, and change social systems through language and ideas
A key assumption	Natural processes can be explained by scientific theories	Ideas about knowledge should be rooted in neurophysiology.	Ideas are accepted if they serve the observer's purposes as a social participant
An important consequence	Scientific knowledge can be used to modify natural processes to benefit people	If people accept constructivism, they will be more tolerant	By transforming conceptual systems (through persuasion, not coercion), we can change society

Table 1. Three Versions of Cybernetics

When I presented this interpretation to Mueller in Vienna in June 2006, he pointed out that von Foerster would prefer to associate second order cybernetics with the triangle as a whole. Certainly this is the message of the article "Computing in the Semantic Domain." However, most of the work in second order cybernetics involved developing the "biological cybernetics" perspective as a departure from the "engineering cybernetics" perspective. (Umpleby, 2005)

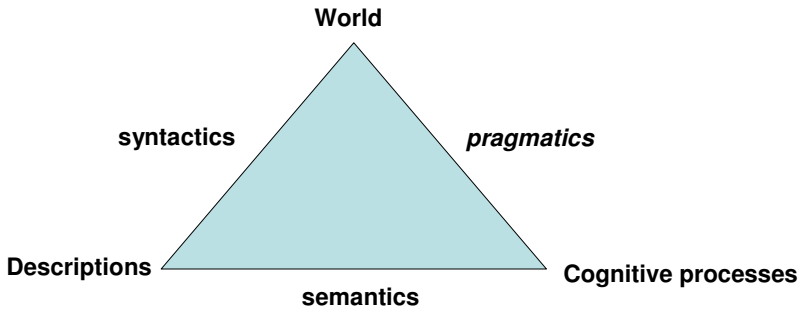

Figure 1. Von Foerster's triangle of epistemological elements

Syntactics	Semantics	*Pragmatics*
Rc(W, D)	Rw (D, C)	Rd (W, C)
Determined by an organism's behavioral potential	Determined by an organism's cognitive potential	Determined by an organism's perceptive potential
Gives rise to concepts such as "territory," "control," "objects," and "names"	Gives rise to concepts such as "volition," "action," "conceptions," and "propositions"	Gives rise to concepts such as "niche," "instinct," "reality," and "consciousness"

Table 2. Von Foerster's description of the triangle

Von Foerster maintained that a holistic conception was needed. However, he noted that science has so far emphasized formalized descriptions in narrowly defined academic fields. By "the syntactic domain" von Foerster meant mathematical formalisms, equations, deductive logic, and tautological transforms. By "the semantic domain" he meant contextual richness, paraphrases, and relations to the system as a whole. In semantics inductive inference is possible. Pragmatics would mean trial and error, learning by doing, and the development and use of methods rather than theories. (Umpleby, 2002)

Mark Notturno, a former colleague of Karl Popper, has suggested in conversations that the three elements -- world, cognitive processes, and descriptions – correspond to Popper's distinctions among world 1, world 2, and world 3. Continuing the descriptions of the sides of the triangle begun in Table 1, additional descriptions of the sides of the triangle are presented in Table 3.

Research Methods	Unquestioned objectivity -- experiments with inanimate objects	Constructed objectivity – experimental groups and control groups	Contested objectivity -- social experiments or political reforms
Philosophical perspective	Empiricism	Idealism	Pragmatism

Table 3. Additional descriptions of the three perspectives

The descriptions of the three sides of the triangle can be further elaborated by associating them with three points of view regarding the philosophy of science. The two most well-known perspectives regarding the philosophy of science are 1) Karl Popper's normative view of how scientific theories should be constructed, (Miller, 2002) and 2) Thomas Kuhn's sociological description of how scientists actually operate. (Kuhn, 1972) I once suggested to von Foerster that his view of a more subjective approach to the philosophy of science was very similar to Kuhn's view. He said no, that his view was quite different. So, in 1990 I described three views of the philosophy of science – Popper, Kuhn, and constructivist cybernetics or the work of von Foerster, von Glasersfeld and others. (Umpleby, 1990) These three perspectives match quite well the three sides of the epistemological triangle.

Popper	von Foerster	Kuhn
A normative view of epistemology: how scientists should operate	A biological view of epistemology: how the brain functions	A sociological view of epistemology: how groups of scientists operate
Non-science vs. science	Realism vs. constructivism	Steady progress vs. revolutions
Solve the problem of induction: conjectures and refutations	Include the observer within the domain of science	Explain turmoil in original records vs. smooth progress in textbooks
How science as a picture of reality is tested and grows	How an individual constructs a "reality"	How paradigms are developed and then replaced
Scientific knowledge exists independent of human beings	Ideas about knowledge should be rooted in neurophysiology	Even data and experiments are interpreted
We can know what we know and do not know	If people accept this view, they will be more tolerant	Science is a community activity

Table 3. Three philosophical positions

What each epistemology neglects

Each epistemology tends to neglect or deemphasize one of the three points of the triangle. Positivism neglects the role of the observer. Constructivism claims that reality cannot be known with certainty. Pragmatism focuses on action rather than description.

The left side of the triangle represents the philosophy of science as it is usually taught to doctoral students. The design of experiments is essentially an exercise aimed at reducing biases that might be introduced by the observer. The assumption underlying this view is that theoretical statements and observational statements are independent. Observational statements give empirical substance to theoretical statements, and theoretical statements lend coherence and significance to observational statements. Observations serve to test theories, and theories bring meaning to observations.

The constructivist critique of this "received view on theories" (Suppe, 1972) is that both observations and theories exist in the mind of the observer. They are not independent. Theories, or preconceptions, tell us what to observe and observations form the foundation of generalizations or theories. The result of the constructivist perspective is to focus on perception, cognition, and observer bias rather than the world. I remember several conferences at which Ernst von Glasersfeld was asked for his view of reality. He usually replied by making the distinction between "match" and "fit." He would say that we cannot know what the world is really like, since our perceptions are always mediated by our senses. We cannot claim that our theories "match" reality. All we can say is that our descriptions "fit" our experiences in somewhat the same way that a key fits into a lock. (1987,1995)

From the pragmatist perspective what matters is how an observer acts in the world. Descriptions are transient and fallible. This perspective is quite different from that of the academic community which is devoted to preserving, modifying, and teaching "the literature." Academics construct, test, and pass on theories that are accepted as workable approximations to "truth" at least for a time. Scholars in the humanities note that texts are interpreted differently in different societies and historical periods, but they agree that some texts are more important and worthy of attention than others even when they disagree which texts are most important for a particular time and place. However, from a pragmatic perspective, descriptions can be discarded when they are no longer useful. The attempt to identify essential texts may be important for philosophy but not for practical action. George Soros (2006) has emphasized the fallibility of descriptions.

When advocates of the three points of view converse, they tend to direct the conversation toward the issues that particularly interest them. For example, people using the accepted scientific view emphasize collecting data to test theories. Constructivists on the other hand often ask, How do you know? Or, whose opinion is being expressed? A pragmatist usually wants to know the implications of a theory for practical action. He would ask about the utility of a theory. Continuing the conversation, a person who prefers the position of a scientific observer, might say that various methods of action can be tested to find which is most effective. A constructivist might question the goal of "effectiveness" and ask who defines it. A pragmatist would focus on the practical implications of the other two sets of concerns.

Implications of the epistemological triangle

One might ask what the implications of the epistemological triangle are. There are several possible answers.

First, many people have expressed doubt about the usefulness of Popper's conception of "world three." The triangle as a way of organizing the three points of view in cybernetics (engineering, biological and social cybernetics) calls attention to world, observer and description and hence provides an argument for the utility of all of Popper's three "worlds" – descriptions as well as world and observer.

Second, the triangle shows how three epistemologies are related. It serves to organize a large body of literature that has been developed in many fields over a period of decades. Hence, it structures existing knowledge in a way that clarifies at least some similarities and differences.

Third, by showing that the different epistemologies are different parts of a larger whole, there may be less inclination in the future to debate which perspective is better than the other. The preferred perspective depends on one's purpose. And for each perspective the other two epistemologies suggest useful secondary perspectives.

Finally, by bringing together three perspectives, the triangle creates the possibility of moving to a higher level of analysis. In this regard it is helpful to remember Elliott Jaques's (1991) theory of cognitive functioning. Jaques suggested that human cognition develops in identifiable stages. See Table 4.

According to Jaques this "quintave" theory of levels of functioning progresses from the concrete to the abstract. Furthermore, the levels of cognitive functioning are associated with timeframe. Hence, workers on an assembly line deal with physical objects in time intervals of minutes, hours, or perhaps days. Middle managers organize inventory, work flow and production methods and think in terms of days, weeks, months, or years. High level managers think about product lines, competition, technological trends and the viability of the firm over a period of years, decades, or longer. As a person matures and gains experience, he or she moves to more abstract levels of analysis.

- Shaping – operating at a particular level of analysis
- Reflecting – proposing an alternative
- Extrapolating – working out the implications of the alternative
- Parallel processing – using both analyses in parallel
- Shaping at a higher level – viewing the two analyses as parts of a larger whole

Table 4. Elliott Jaques's theory of cognitive functioning

From the perspective of Jaques's theory, positivism could be seen as "shaping." Including the observer would be an example of "reflecting." Working out the implications of constructivism for the social sciences would be an example of "extrapolating." Using both positivism and constructivism at appropriate times would be an example of "parallel processing." Unifying the three epistemologies in the form of a triangle would be an example of "shaping" at a higher level. It remains to be seen whether the triangle will be adopted and widely used. If it is, according to Jaques, the next step in the development of epistemology will be proposing an alternative to the triangle. Proposing an alternative would be a new stage of "reflecting."

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