



## Removing Constraints on the Advance of Cybernetics

Keynote speaker: **Stuart Umpleby**

**Purpose** – Current conceptions of science and philosophy have impeded the development and spread of cybernetics in the US. The purpose of the paper is to make possible new forms of knowledge by removing some constraints on how we think about knowledge.

**Design/methodology/approach** – The approach of the paper is to explain what ideas in science and philosophy have been an obstacle to the development of cybernetics and how those ideas are changing.

**Findings** – The effort to advance the science of cybernetics in the United States has required reconsidering some ideas in both science and philosophy.

In science there has been a change from studying inanimate objects to working with thinking participants, both individuals and organizations. In the past scientists sought to use the same methods in the social sciences as were used in the physical sciences. Those efforts worked well for a time, but a strong interest in the relevance of theory to practice has led to awareness of limits. In management and operations research analytical and mathematical methods have been supplemented by group discussion methods.

Regarding philosophy, some key ideas in cybernetics appear to be contradicted by rules against fallacious reasoning. Morris Engel divided the informal fallacies into three groups of ideas that should be avoided. The three groups of fallacies involve language, thought and action. One informal fallacy in each group implies an obstacle for cyberneticians. These obstacles have caused people new to cybernetics to doubt the philosophical soundness of the field. Solutions have become possible by inventing new methods and changing our thinking about acceptable methods.

Furthermore, comparisons of cybernetics theories in several countries has led to awareness that Europeans are using a larger set of conceptual possibilities than Americans, because Americans choose not to study a significant part of philosophy. The part of philosophy that was neglected was less important during an industrial society but is becoming more important due to the growth of an information society. The part of philosophy that Americans were missing is important when conducting transdisciplinary research.

**Originality/value** – The value of this research is that it removes obstacles to the advance of knowledge not only in the development of cybernetics but in other disciplines as well.

**Research/ Practical/ Social/ Environment implications** - Changing assumptions in science and philosophy that limit innovation, will enable collaboration and cooperation among research fields and will help in generating more general theories for transdisciplinary research.

**Research limitations** - Ultimate outcomes are speculative. Removing barriers in our thinking creates the possibility for more creativity, but it is not possible to know what specific new ideas will be imagined.

**Keywords:** Cybernetics, transdisciplinary research, innovation, questioning assumptions, creativity, philosophy of science.