Management Cybernetics

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Abstract

Since the late 1940s the fields of systems science and cybernetics (the science of communication and regulation in human beings, machines, and organizations) have influenced many fields -- computer science, psychology, artificial intelligence, management, family therapy, philosophy, and political science, to name a few. This tutorial will review the contributions of cybernetics and systems science to the field of management and organizations.

The tutorial will cover both academic and practitioner perspectives. The tutorial provides an overview of several theories and methods. A few methods can be used immediately without further training, but several would require more study in order to use them in practice. The tutorial will introduce managers to some management methods they may want to look into further.

1. A brief summary of quality improvement methods will be provided along with an explanation of how they improve the adaptability of an organization. The "quality improvement priority matrix" is an easy-to-use and highly effective method for implementing data-driven decision-making. Stafford Beer’s Viable System Model is a tool for diagnosing organizational structure and processes. It illustrates the law of requisite variety and shows how to insure that an organization generates sufficient innovation.

2. Russell Ackoff’s approach to Interactive Planning will be explained along with three metaphors -- an organization as a machine, an organism and a social system. Other group facilitation methods, called the Technology of Participation, will be introduced. These methods provide a way to promote the sharing of knowledge in a group. They increase commitment to goals and plans and encourage initiative and responsibility. The methods can be used to create a shared vision, to identify obstacles to achieving the vision, and to formulate strategies for removing the obstacles.

3. There are several ways of describing systems -- in terms of variables, events, groups and ideas. This section will focus primarily on variables and causal influence diagrams as a very useful method for understanding complex systems. A brief history of system dynamics will be presented with special attention to some of its important applications.

4. Some less well-known management cyberneticians will be introduced along with brief summaries of their theories. Heinz von Foerster’s studies of perception and
cognition led to major advances in our understanding of knowledge and communication. John Warfield’s approach to interactive management provides a way for a group of people to structure the relationships among the parts of a very complex system. Gerard Endenburg developed a way to manage the sharing of information within an organization that encourages openness and responsibility. Elliott Jaques’s theory of requisite organization shows connections among cognitive complexity, time frame of thinking, position in an organization, and compensation.

Biography

Stuart A. Umpleby is a professor of management and director of the Research Program in Social and Organizational Learning at The George Washington University in Washington, DC. In the early 1970s he developed applications for computer-based communication media, what is now called the internet. In the late 1970s he was the moderator of an on-line discussion of General Systems Theory, which was funded by the National Science Foundation.

In the 1980s he was the American coordinator of a series of meetings between U.S. and Soviet scientists on the Foundations of Cybernetics and Systems Theory. He has consulted with the World Bank, the U.S. and Canadian governments, and corporations in the U.S., Europe, Japan, and China. He is a past president of the American Society for Cybernetics.

Professor Umpleby has experience in Participatory Strategic Planning. He has directed several projects and has publications in this area. He will direct the sessions to be held at the 11th Multi-conference on Systemics, Cybernetics and Informatics, WMSCI 2007, with regard to Participatory Strategic Planning on Academic Globalization

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