

PARTICIPATING IN EDUCATIONAL INNOVATION: ABSTRACTS
PREPARED BY 2007-2008 VISITING SCHOLARS

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Preface

The Research Program in Social and Organizational Learning at The George Washington University hosts visiting professors for periods of several months or an academic year. In the 2007-2008 academic year, the Research Program hosted 8 visiting scholars. Six were part of the Junior Faculty Development Program, which is funded by the U.S. Department of State's Bureau of Educational and Cultural Affairs. These abstracts were prepared by professors and visiting scholars associated with the Research Program.

Paper 1 was a plenary address delivered at the 7th Understanding Complex Systems conference at the University of Illinois in Urbana-Champaign, May 2007. Paper 2 was a keynote address delivered at the World Multi-conference on Systemics, Cybernetics, and Informatics in Orlando, FL, in July 2007. Item 3 was a tutorial presented at the conference in Orlando. Paper 4 was a presentation at the Heinz von Foerster Society conference in Vienna, Austria, November 2007. Papers 5, 6 and 7 were published in *Systems Research and Behavioral Science* in Fall 2007. An early version of paper 8 was published in the *Southeast European Journal of Economics and Business*, and a later version was published in the *Journal of the World Universities Forum*. Paper 9 was presented at the Community Research and Learning conference at the University of the District of Columbia in April 2008. Papers 10, 11, 12 and 13 appeared in the proceedings of the European Meeting on Cybernetics and Systems Research, which was held in Vienna, Austria, in March 2008. Paper 14 summarizes the results of a participatory planning exercise conducted with the 2008 visiting scholars. Paper 15 became part of Asset Nussupov's doctoral dissertation in Almaty, Kazakhstan. Paper 16 is a working paper.

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Managing Complex Systems: The History of Cybernetics as Seen from the Biological Computer Laboratory at the University of Illinois

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The field of cybernetics originated in the Macy Foundation conferences held in New York City between 1946 and 1953. Chaired by Warren McCulloch, the participants included Norbert Wiener, John von Neumann, Gregory Bateson, Margaret Mead, Ross Ashby, and Heinz von Foerster. Von Foerster established the Biological Computer Laboratory (BCL) at the University of Illinois in 1958. He served as director until 1975 when he retired and moved to California. The laboratory was then closed. The research agenda of BCL was essentially the same as that of the Beckman Institute, but few people at the Beckman Institute are familiar with BCL. Meanwhile a Heinz von Foerster Society has been established in his home city of Vienna, Austria, and several books have been written describing BCL as an example of a highly productive research team. The work conducted at BCL continues to inspire leading edge research 30 years after it closed.

This paper will describe three mental models used in cybernetics, including the concept of self-organizing systems, which was the subject of three conferences around 1960 and which has been greatly expanded in recent years to become the field known as complexity theory. The origin of the term “self-organizing systems” will be explained, along with two early conceptions and several examples. Ross Ashby’s conception of a self-organizing system can be regarded as a more general version of learning theory, Darwin’s theory of natural selection, and a theory of political and economic development. One consequence of the theory is a general design rule.

A key difference between current cybernetics and complexity theory is the use of a different epistemology. Complexity theorists use a realist epistemology and assume that complexity exists in an observed system, or perhaps in a computer model. Cyberneticians use a constructivist epistemology and assume that the system of interest is defined by the observer. Cyberneticians emphasize the regulatory nature of knowledge. An observer constructs a representation of a system in order to be able to manage a system of interest. Hence, cyberneticians assume that the task is to manage complexity through a circular process of interaction and interpretation. In social systems observers both construct descriptions and participate in the operation of the social system using those descriptions.

Finally, the paper will describe two scientific revolutions. The first was the great expansion of science that occurred in the years following World War II when the various systems sciences were created. The second was “second order cybernetics,” a term coined by von Foerster, which advocated including the observer within the domain of science.

Academic Globalization: The Growth of International Collaboration on Research Projects

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Several trends have brought the world's universities closer together. The internet makes communication among academics far easier than before. The end of the Soviet Union and the Cold War removed a major political obstacle to international scientific contacts. The globalization of trade has encouraged many comparative studies of economics, health, education, and culture. Environmental problems, which often cross national borders, have stimulated collaborative research. The Bologna Process has led to standardizing credits and degrees in order to facilitate the movement of students and faculty members among campuses. Universities are cooperating on offering degree programs as a way of speeding the transfer of curricula. Quality improvement methods, which were originally developed for manufacturing, are now being used to improve the efficiency and effectiveness of government agencies, health care institutions and educational institutions.

Because of the internet a research project in one country can often be duplicated in a second or third country, thereby transferring knowledge and methods. Theories can be tested in several locations simultaneously. The full benefits of this possibility, particularly for the social sciences, have yet to be realized. One benefit will be the possibility to test more quickly whether a theory which works in one society also works in other societies. Conferences, rather than simply being a place to report research results, could become, in addition, a place to plan cooperative projects, which would be worked on jointly between conferences.

Management Cybernetics: Approaches to Creating a Holistic View of Management

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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 fields of management and organizational theory. The tutorial will cover both academic and practitioner perspectives. Topics covered will include interactive planning, the viable system model, process improvement, group facilitation, critical theory, the generation and regulation of innovation, complexity, negotiation and ethics. The tutorial will introduce the work of Russell Ackoff, Stafford Beer, C. West Churchman, Edwards Deming, Gerard Endenburg, Elliott Jaques, Vladimir Lefebvre, John Warfield, and other systems scientists who have contributed to management thought.

Disciplinary Matrices for Cyberneticians and System Scientists

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In his 1962 book, *The Structure of Scientific Revolutions*, Thomas S. Kuhn introduced the term “paradigm” to the philosophy of science. Critics claimed that Kuhn had used the term “paradigm” in more than one way. So, in the 1970 second edition Kuhn added a postscript intended to clarify what he meant. He introduced the concept of a “disciplinary matrix.” Without attempting to be exhaustive, Kuhn said that a disciplinary matrix consists of symbolic generalizations; beliefs, models, and analogies; values; and exemplars. Whereas most people associated “paradigm” with the entire disciplinary matrix, Kuhn said he intended paradigm to refer to exemplars. This choice permitted distinguishing scientific subgroups.

I have found the taxonomy of a disciplinary matrix to be useful when teaching. Several years ago I gave my students the assignment of finding examples of each of the components of a disciplinary matrix for a theorist in the field of cybernetics or systems science. This work led to adding to Kuhn’s four components three additional components – guiding questions, techniques, and anecdotes.

A disciplinary matrix provides a helpful synopsis of an author’s work. Textbooks in a well-established field explain many of the same elements of the field’s disciplinary matrix. However, books by cyberneticians and systems scientists often have no overlapping elements of the disciplinary matrix. Indeed the guiding questions can be quite different. A few guiding questions are the following: Warren McCulloch, “What is a number that a man may know it and a man that he may know a number?” Ross Ashby, “How can adaptive behavior be explained?” James G. Miller, “What are the critical subsystems of a living system?” Humberto Maturana and Francisco Varela, “What distinguishes a living system from a non-living system?”

Physical Relationships Among Matter, Energy and Information

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General systems theorists often refer to matter, energy and information as fundamental categories. The three concepts – matter, energy and information – are related through scientific laws. Matter and energy relations are more thoroughly understood than relations involving information. At the level of data or signal “difference” is suggested as a more elementary term than “information.”

A Global Strategy for Human Development: The Work of the Institute of Cultural Affairs

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In the 1970s the Institute of Cultural Affairs (ICA), based in Chicago, Illinois, began to create community development projects around the world. Initially 24 were created, one in each time zone. These demonstration projects were followed by Human Development Training Schools in which the local people, working with the Institute's staff, explained to people in surrounding communities how progress had been made in the first community. The process of creating model villages continued in additional countries. In 1983 a conference on Sharing Approaches that Work was organized by ICA, held in New Delhi, India, and funded by UNESCO. The conference was the culmination of several years of reviewing and selecting the best of a wide variety of community development projects implemented by many organizations around the world. The methods developed by the ICA to conduct its planning and training programs are now called the Technology of Participation. These methods have been used by businesses, government agencies, schools, and private voluntary organizations to encourage reflection, conduct participatory planning and problem-solving and guide systematic implementation. They have been used to build leadership capacity and to institutionalize team work as organizational practice.

Reflexivity in Social Systems: The Theories of George Soros

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George Soros's reflexivity theory is quite compatible with second order cybernetics. Indeed his work shows how to apply ideas in second order cybernetics to economics, finance, and political science. This paper briefly reviews three theories of reflexivity in cybernetics. It provides an introduction to Soros's version of reflexivity theory and reviews applications in economics and finance. Soros's approach to economics is based on different assumptions about information and about human behavior. His approach to finance is more holistic than most current work in finance. He does not emphasize mathematical models but rather sees finance as a human player game with himself as a participant. The paper concludes that Soros's work is a very important contribution to and expansion of contemporary social science.

Adopting Service Learning in Universities Around the World

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In the United States service learning has proven to be an effective means both for education and for community development. It seems logical to assume that service learning would be similarly effective in other countries. However, universities in other countries operate quite differently from universities in the U.S. Discussions with professors from the former Soviet Union and Southeast Europe produced a list of obstacles to adopting service learning in other countries. The paper suggests some ways to reduce the obstacles. As service learning is implemented in universities around the world, new teaching methods will be developed, and universities will become more influential in their local communities. Some obstacles to implementing service learning in other countries include curricula designed by the Ministry of Education rather than by faculty members, low faculty salaries which lead to little time to experiment with new teaching methods, and ways of grading which limit student commitment to a course. Actions, which would help to remove these obstacles to adopting service learning, include more local autonomy, higher salaries, and new forms of teaching.

How Service Learning is Conducted in a School of Business

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Students in management are doing service learning projects at The George Washington University. Graduate students work with clients who may be businesses, government agencies, universities, or non-profit organizations. The assignment is to do something that improves the performance of the organization. Students work in teams of three to five people. The projects function as the laboratory part of the course. In their final project reports students are expected to use as many concepts from the course as possible. Consequently, students make connections between theory and practice. The student projects are evaluated by the client as well as the instructor. The article describes how clients are chosen and the types of projects done in the past. The emphasis is on projects conducted with private voluntary organizations in the DC area.

How Group Facilitation Methods Are Being Used in Building a PhD Program in Almaty, Kazakhstan

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Creating a PhD program in Kazakhstan requires a lot of communication and planning among the faculty with some foreign professors involved. The Participatory Strategic Planning (PSP) method, developed by the Institute of Cultural Affairs, is being used to improve the PhD program at al-Farabi Kazakh National University. The results of the exercises show ways in which the university should move to improve its performance. Some of the suggestions involve improving staffing, upgrading technology, developing the financing process, popularizing scientific work, and attracting the most talented people. After analyzing the results of participatory planning exercises held in 2005, 2006, 2007, the authors concluded that: a) these exercises help to identify the difficulties that the new PhD programs encounter, lead to new strategies, and solve problems, b) when systematically organized and conducted, PSP methods can lead to great results in the long run, and their immediate results are shown in solutions to smaller problems, c) the PhD program can be a very important part of increasing innovative intellectual capital in Kazakhstan.

Educating Managers During a Period of Social and Economic Transition

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The current period of development of all countries, including Russia, is characterized by change from an industrial to a postindustrial society. However, instead of a limited conception focusing on economic growth what is needed is change in organizations, psychology, society, and moral values as well. All dimensions of human beings need to be considered.

Fifteen years of Russian market reforms have clearly shown that one of the most serious problems in educating Russian managers for the modern economy is to change the totalitarian style of thinking, when a person is considered only as a means to achieve economic goals. Totalitarian consciousness produces repressive forms of management, which cannot promote development of a modern, innovative economy in Russia, or its development will be based on physically and psychologically exhausting human resources.

This paper describes the work of the Center for Business and Management at Siberian State University of Transport in Novosibirsk, Russia, in preparing young managers of the West-Siberian Railroads to work in the new, more open economy in Russia. The idea that the Center's work is based on is that it is necessary not only to educate but to develop young managers, to assist them in forming a modern, democratic, innovative style of thinking.

Improving the Performance of Universities in Transitional Economies

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The Participatory Strategic Planning method, developed by the Institute of Cultural Affairs, can be enhanced so that it allows, in addition to defining the strategic directions for an organization, to prioritize them according to the opinions of the stakeholders of the organization. A practical example -- improving the performance of universities in transition economies -- is presented. The results of the planning exercise suggest several directions for improving the home universities of the participants. The suggestions include internal reorganization, introduction of new university structures and services, increasing the efficiency of faculty, staff and students, and influencing the external environment. Using a Quality Improvement Priority Matrix and introducing a new method of priorities ranking, the authors conclude: a) the external environment has a great influence on university performance and can make considerable improvements in a relatively short period of time; and b) small but permanent quality improvements receive more support from faculty and are easier for management to implement than large, rapid changes.

Three Theories for Interpreting Participatory Strategic Planning

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Group facilitation methods are a way of improving the performance of a group of managers or an organization. Participatory Strategic Planning methods, which aid organizational adaptation, are thought to be particularly helpful in the post communist countries, which are going through a long-term process of changing their management practices. In addition to dramatic changes in the political system and the economy, universities are also being affected. The role of universities is particularly important, since they have the task of training managers for the new economy. In spring 2005 a group of professors from the former Soviet Union and the former Yugoslavia conducted a Participatory Strategic Planning activity at The George Washington University. The purpose of the exercise was both to demonstrate participatory decision-making methods and to conduct a conversation on how the visiting professors could contribute to their universities upon their return. This paper describes how the conversation was conducted, the results of the conversation, and interprets group facilitation methods from three theoretical perspectives.

Group Facilitation Methods: An Instrument for Improving the Quality of Higher Education in South East Europe

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The Participatory Strategic Planning method, developed by the Institute of Cultural Affairs, enables the members of an organization to define the strategic directions for the organization. A practical example, improving the university system in South East European (SEE) countries is presented. The results of the planning exercise suggest several directions for improving the home universities of the participants. The suggestions include creating new funding sources, improving enforcement of laws, decreasing the level of corruption and further developing curricula, teaching methods and research. This paper analyses how South East European countries are managing the process of transition in the higher education system in the context of European integration.

A Study of Economic Change in the Eurasian Economic Community Using Time Distance Analysis

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An innovative method is presented for analyzing some economic indicators for the countries of the Eurasian Economic Community. The method used in the paper, time distance analysis, was developed by Pavle Sicherl and is based on a horizontal, dynamic view of data series rather than a vertical, static view. The method permits examining the time gap between the Central Asian countries in comparison with Russia and the EU-15 and helps to illuminate the reasons for the gap. The authors suggest that the gap was caused mainly by two factors: First, the centrally planned Soviet economy turned the Central Asia region into a raw materials-producing, agrarian appendage; and, second, Russia and the EU-15 spend a larger percentage of their GDP on research than the countries of Central Asia.

A Measure of the Efficiency of Organizational Networks: Jixuan Hu's Organizational Friction Coefficient

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Jixuan Hu has proposed the concept of organizational friction. It is based on a distinction between the amount of time spent doing work for customers (R_w , resources expended on work) and the amount of time spent coordinating activities with colleagues (R_c , resources expended on coordination). The Organizational Friction Coefficient (OFC) is defined by the equation:

$$\text{OFC} = R_c / (R_c + R_w)$$

Hu believes that in some countries (e.g., China) the amount of time spent on coordination is much higher than in some other countries (e.g., the U.S.). The same holds, no doubt for companies. To test this idea, and to gain practice with collecting data, Stuart Umpleby asked his students, who were working on semester group projects, to keep track of the amount of time they spent on each of these two activities. Nine student groups, consisting of 3 to 5 students each, reported their data. The data reveal that groups which found a client quickly had a lower OFC than groups that took longer to find a client and to decide upon a project.