Thank you

Many thanks to all who contributed their writing, photographs, and information to this issue of the newsletter, especially all the session reporters: Mónica Altamirano, Stefano Armenia, Fabrizio Baldoni, Steffen Bayer, Allyson Beall, Laura Black, Inge Bleijenbergh, Güven Demirel, Rajat Dhawan, Gökhan Dogan, Jim Duggan, Diana Fisher, Valerie Gacogne, Stefan Groesser, Gary Hirsch, Megan Hopper, Birgit Kopainsky, Min Liu, Debra Lynes, Alessandro Nanni, Gints Ozolins, Hassan Qudrat-Ullah, Scott Rockart, Alessandro Saullo, Sabine Schmidt, Doreen Schwarz, Geertje Tonnaer, Silvia Ulli-Beer, Els van Daalen, Max Visser, John Voyer, and Aldo Zagonel. Apologies

if we have inadvertently omitted anyone.

Additional photos provided by: Souleymane Bah, Richard Dudley, Niraldo do Nascimento, Camilo Olaya, Oleg Pavlov, Habib Sedehi, and others.

**From the President**

Outline of President’s Address: “System Dynamics for the 21st Century” given at the International System Dynamics Conference in Nijmegen, The Netherlands, 2006:

- The Past
  - Some history
- The Present
  - Some Data
- The Future
  - Growth of the Field
  - Challenges to the Field
  - Celebration of the Field

Michael J. Radzicki

To read Stefan N. Groesser's report on the presentation click [here](#). To view the presentation slides go to the Society website, click on the gray box “Publications”, find “Presidents’ Addresses” then click on President’s Address 2006 (Michael Radzicki) or use the direct link: [http://www.systemdynamics.org/newsletters/PresidentsAddress2006.pdf](http://www.systemdynamics.org/newsletters/PresidentsAddress2006.pdf)

**Society News**

Read Debra Lyneis's account of the New Award Announcement. For more information on the new award, contact Alan Graham.

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**Member News**

**Tom Fiddaman Wins Forrester Award**

The Jay Wright Forrester Award was presented this year to Thomas S. Fiddaman for his winning work *Exploring policy options with a behavioral climate-economy model* published in the *System Dynamics Review* 18(2) Summer 2002.

Tom's award winning article can be found at Wiley InterScience; to view the abstract (and full paper, if you are a Society member) click [here](#).

To read Scott Rockart's report of the session click [here](#).
Jay W. Forrester named to IFORS OR Hall of Fame

The creator of the discipline of System Dynamics, Prof. Jay Wright Forrester, has been made a member of the International Federation of Operational Research Societies' OR Hall of Fame.

Dana Meadows Award Winners for 2006

Out of the over 30 student papers submitted for this year’s awards, these were regarded as excellent papers and worthy contributions to System Dynamics. The authors are to be congratulated for their efforts and their success in analyzing and providing insight into significant dynamic issues. This year’s winner of the Dana Meadows Award for the best student paper presented at the annual conference is Ozge Karanfil, currently at the Centre for Nonlinear Dynamics, Department of Physiology, McGill University, Montreal. Her paper, based on work done at Bogazici University, Istanbul, is entitled “A Dynamic Simulator for the Management of Disorders of the Body Water Metabolism.”

Honorable mentions in the competition for 2006 were extremely close in their ratings. In reverse alphabetical order, they are: Burcu Tan, the University of Texas at Austin, for “A Dynamic Analysis of Long Term Impacts of Genetically Modified Crops”; Jeroen Struben, MIT, for the paper “Identifying challenges for sustained adoption of alternative fuel vehicles and infrastructure”; Willem Geert Phaff, Delft University of Technology, and Burak Guneralp, from the University of Illinois at Urbana-Champaign, for the paper “Investigating Model Behavioural Analysis: A Critical Examination of Two Methods.”

Congratulations to all the 2006 Dana Meadows Award winners! Their papers, as well as the full text of the Dana Meadows Award Ceremony may be viewed at the 2006 Conference online proceedings at:

http://www.systemdynamics.org/conference2006/proceed/index.htm

Joel Rahn, Dana Meadows Award Committee

Willem Geert Phaff, Burcu Tan, Ozge Karanfil, Jeroen Struben, and Burak Guneralp

Jay W. Forrester named to IFORS OR Hall of Fame

The creator of the discipline of System Dynamics, Prof. Jay Wright Forrester, has been made a member of the International Federation of Operational Research Societies' OR Hall of Fame.
The declared aim of the IFORS Operational Research Hall of Fame is “to celebrate the significant contributions made by the OR pioneers and those who have followed in their footsteps. Such contributions may be to methodology, to applications, to the advancement of IFORS or its member societies, to OR in and for developing countries, to teaching and program development, to organization and management of OR, and to the international dissemination of OR knowledge and understanding.”

Inductees are selected by a panel consisting of the administrative committee of International Transactions in Operational Research (the IFORS official journal), the editors and editorial board members of ITOR, the presidents of IFORS member societies and seven additional members included to furnish both historical perspective and geographical balance. Other inductees include: P.M.S. Blackett, Philip Morse, Russell Ackoff, Agner Erlang, West Churchman, Ken Arrow, John von Neumann, Howard Raiffa, John Little and Herbert Simon. More details about the OR Hall of Fame can be found at [http://www.ifors.org/hall/](http://www.ifors.org/hall/).

By special arrangement, the announcement of Prof. Forrester's induction was made by David Lane on 25th July in a session at the 2006 International System Dynamics Conference held at Radboud University, Nijmegen, The Netherlands. A response from Prof. Forrester was read by his son Nathan.

Induction is accompanied by the publication in *International Transactions in Operational Research* of a biography of the individual concerned showing their contribution to operational research. This gives information on Prof. Forrester's background, his contributions to theory and practice in servomechanisms and computing, and his creation of system dynamics, as well as the evolution and institutionalisation of the discipline to the present day. The citation is expected to appear in November 2006, as: Lane DC. 2006. IFORS' Operational Research Hall of Fame - Jay Wright Forrester. *International Transactions in Operational Research* 13: 483-492.

The citation for Prof. Forrester's induction begins: "IFORS' Operational Research Hall of Fame - Jay Wright Forrester, Creator of the system dynamics modelling technique and a life-long practitioner and advocate of its use to promote long-term policy analysis, learning about complex organisations and the redesign of such organisations."

It continues: "Jay Wright Forrester's distinguished career at MIT led to his founding the field of system dynamics. By adapting servomechanistic ideas he created a new approach to simulating the behaviour of social systems, to explaining that behaviour and to crafting effective long-term policies. He established the subject as an academic discipline at MIT's Sloan School and led high-profile modelling studies himself. System dynamics is now one of the most widely used systems approaches in the world, with academics and practitioners on every continent and interest, applications and publications all growing. Forrester's writings continue to inspire the field and he remains actively involved in its development."

Many congratulations to Jay!

David C. Lane
To read Stefan N. Groesser's report on the presentation click [here](http://www.systemdynamics.org/newsletters/2006Oct/NL10-06.htm).

Bob Eberlein Visits China

While at Pudong Airport during a visit to China in August, Bob Eberlein was able to meet and discuss Society business with the Society's President-elect, Qifan Wang, the Society's China chapter representative, as well as JianGuo Jia (Vice-Dean of Tongji Development Institute) and Miss L. Q. Zhang.

Pictured at Pudong Airport, from left to right: L. Q. Zhang, JianGuo Jia, Qifan Wang, Bob Eberlein and Bing Wu

New PhD's

It is our pleasure to announce members of the Society who have recently received their PhD's.
NIJMEGEN CONFERENCE REPORT

Photos from the Nijmegen Conference are posted on the Society website at http://www.systemdynamics.org/conf2006/pictures/index.html — please take a look. Each year we have volunteer photographers wandering around the conference taking photos. If you have any photos you would like to share, please send them and we will add them to the website collection. (If there is a photograph of you on the web that you would prefer us to remove, please let us know at system.dynamics@albany.edu.)

Links to many full papers, including abstracts and supporting materials can be accessed on the Society website at http://www.systemdynamics.org/conf2006/proceed/index.htm.

If you would like a copy of the printed proceedings, extra copies are for sale through the Society office.

From the 2006 Conference Organizing Team, thanks!

Session Reports

This account represents a cross-section of conference sessions, as reported by attendees who volunteered to share their impressions with you. If you were not able to be there in person, here you can gain some of the flavor and a sense of the varied activity that made up the Nijmegen conference. If you were there, perhaps you will recognize yourself in a photo or a description. More importantly, you will gain to some extent what is impossible to achieve while in actual attendance at the conference: the ability to go to more than one session at once.

8:50 AM Sunday: PhD Colloquium
2:00 PM Sunday: Special Convened Session: Dynamics of Health Reform
9:00 AM Monday: Plenary Session: Applications of System Dynamics
11:30 AM Monday: Parallel Session: Diffusion of Alternative Energy
11:30 AM Monday: Parallel Session: Macroeconomics I
11:30 AM Monday: Parallel Session: Decision Making and Learning
11:30 AM Monday: Parallel Session: Military Applications
2:30 PM Monday: Parallel Session: Dynamic Analysis of Business Applications
2:30 PM Monday: Parallel Session: Organizational Dynamics
2:30 PM Monday: Parallel Session: Stakeholders and the Environment
2:30 PM Monday: Parallel Session: Group Model Building
2:30 PM Monday: Parallel Session: Epidemiology and Health Planning
3:30 PM Monday: Poster Session: Knowledge Management and Innovation
8:30 AM Tuesday: Plenary Session: Jay W. Forrester Award Ceremony
10:30 AM Tuesday: Poster Session: Quantitative Methods in System Dynamics
10:30 AM Tuesday: Poster Session: Information Science
10:30 AM Tuesday: Poster Session: Agent-Based and Non-Linear Dynamics
11:30 AM Tuesday: Parallel Session: Using Models in Diverse Applications
11:30 AM Tuesday: Parallel Session: Strategy and Organization Design
11:30 AM Tuesday: Focused Research Session: Health
11:30 AM Tuesday: Parallel Session: Emergent Behavior
12:30 PM Tuesday: Peer Review Dialog Peer Review Dialog Report
2:30 PM Tuesday: Parallel Session: Planning Models (Energy, CO2, Tankers)
A first-timer’s view

Having had little face to face experience with system dynamics modelers other than my chair Andy Ford, I came to the colloquium having no idea what to expect. Literature can certainly help one grasp the diversity that could be expected but it does not reveal the sense of enthusiasm that system dynamics modelers share for their field (or is it a methodology?).

This colloquium was attended by over 80 participants, a number greater than that of the entire first conference held in 1997. The presentation topics were diverse and presented examples of the continuum which ranges from practical applications to grappling with abstractions, often in the same discussion. The plenary sessions were designed for two presenters followed by discussion workshops. These workshops served three purposes. First, they gave the presenters an opportunity to explain their topic in more detail. Second, they provided a venue for experienced practitioners to give feedback. And third, for me and perhaps others, they provided an opportunity to wrap my mind around the many different ways that people approach and describe problems. Additionally, as a first timer and accustomed to a particular system dynamics verbiage, it gave me time to get up to speed on the many different ways of describing the things that system dynamicists “do.” I often wondered how those that use English as a second language were able to translate all of the idiomatic diversity.

The morning session opened with a discussion of the model by Hendrick Stouten which concerns the Belgian fleet’s fishing gear and how it is related to declining fish stocks and declining profits. Stefan Groesser, modeling innovations in the residential building market, is grappling with the goal of the Swiss government to dramatically reduce residential energy demand. The second session opened with a study by Mathias Bosshardt of technological change in the Swiss car fleet. It was followed by an analysis of the choice of modeling paradigms for soft variables by Adriana Ortiz. Justus Gallati opened the afternoon session with a discussion about the development of a threshold model dealing with the management of the problem of uncertainties in overlapping phases of engineering projects. Jaziar Radianti described her project modeling the security issues faced by the application of continuous data sharing by offshore oil platforms and land based support. Mónica Altamirano closed the student plenary with a discussion of the issues she faces modeling the evolution of national road procurement strategies.

The 4:00 poster session provided another look at the diversity of subjects that PhD students are addressing. In some ways I preferred the poster session. Having a one-on-one exchange with presenters provided the opportunity for more lively discussion with less pressure for explaining the entire topic in 20 minutes. I believe it also provides more opportunity for networking. I thought of describing the posters that I did view… but that seemed unfair to the many that I was sorry that I missed. I would have liked to have had more time and perhaps we may have all wished for a little more room.

The afternoon concluded with an animated discussion by Yaman Barlas on model validity, quality and improvement. Yaman integrated the philosophy of science and the technical attributes of both structural and behavioral testing. But aside from the seriousness of his topic, his humor, enthusiasm and passion for system dynamics modeling was a great way to feel welcomed to the conference.

Allyson Beall

2:00 PM Sunday: Special Convened Session: Dynamics of Health Reform

The special convened session began with presentations of six papers that addressed various aspects of health reform at the local, regional, state, and national level. There was also a brief presentation on recent Dutch experience with health reform. These presentations were followed by a discussion of common issues facing those who attempt reform of health care systems. The final portion of the meeting was a discussion of future directions for the HPSIG and possible topics for a session at the 2007 ISDC.
The first presentation on health reform by Gary Hirsch drew on the experience of several states in the US to develop a causal model of health reform. These experiences suggested the importance of coalition building, proposed programs that are fine-tuned to meet the needs of specific groups, and financing that spreads costs evenly among multiple public and private payors. He suggested that successful health reform efforts would also have to shift spending toward “upstream” preventive services and reinvest savings. Gary’s work also drew on work from political science such as John Kingdon’s agenda setting model and on work by John McDonough in applying these models to health reform.

The next presentation, by David Todd, focused on the reform of depression services in the UK. Todd described how a system dynamics model helped to support the introduction of “stepped care” reforms designed to reduce the overload on psychiatric services by moving more care “upstream” to deal with patients’ problems before they become severe. The model helped practitioners understand the potential benefits of reform and need to allocate resources to earlier steps in the care process.

Eve Pinsker then spoke about the effects of Federal and state spending cuts on the public hospital “safety net” that provides care for indigent, uninsured patients in Cook County (Chicago), Illinois. Her presentation described how these funding cuts have created a potential vicious cycle in which a resulting decrease in quality and effectiveness of services and demand for payment from indigent patients could lead to reduced public support for these services.

Geoff McDonnell presented the next two papers. One dealt with the transition of China’s health care system in line with market reforms and the problems that resulted. These included reduced access to care for poorer people and those living in rural areas and a shift to more expensive high tech medicine and away from cost-effective care provided by health workers in rural areas. Geoff’s other presentation described different world views of health care that guide people’s approaches to health reform (hierarchical control, market, network/professional) and how differences in those world views have become a barrier to reform. He also described some possible mechanisms for overcoming those differences such as generic models of health system processes that facilitate international comparisons.

Etienne Rouwette then spoke briefly about recent Dutch experience with health reform. This primarily entailed a shift from a uniform national plan with a mix of public and private administration to mandatory private insurance with a basic package and competition among plans on the additional benefits. An unintended effect of the shift was a high rate of switching among plans (18-20% in 2006 vs. 3-8% previously) and possible adverse selection in which healthier people may have avoided higher cost plans.

Gary Hirsch

9:00 AM Monday: Plenary Session: Applications of System Dynamics

The Nijmegen conference opened with presentations of system dynamics applications in the environmental and business domains. Both applications illustrate how system dynamics provides an experiential laboratory for assessing policy options, enhancing the likelihood that policy changes will yield their intended outcomes.

Allyson Beall presented a participative study involving both environmentalists and land owners, aimed at recovering an endangered species, while at the same time preserving the livelihood of the human population affected. “Participatory Modeling of Endangered Wildlife Systems: Simulating the Sage-grouse and Land Use in Central Washington” is a wonderful example of how stakeholders and experts can come together and carry out a constructive conversation facilitated through system dynamics. The study was carried out to facilitate and support land-use management decisions affecting the sustainability of wildlife and the livelihood of landowners. Specifically, it addresses the fragile balance between the survival of a bird population, the greater sage-grouse, and the profitability of the economic activities of farmers and ranchers. On one hand, the sage-grouse has been considered for inclusion in the threatened and endangered species list; on the other, such listing would cause drastic changes in the management of the remaining sagebrush lands that harbor its populations, undermining existing economic activity.

To avoid both problems, the stakeholders involved came together and developed and used a system dynamics model to synthesize sage-grouse biology with land use patterns to form a system-wide perspective of local impacts on the sage-grouse population. The model was designed to help understand which land types and conservation efforts are most important for the recovery of the sage-grouse—within reasonable reach of landowners—in search for a win-win solution that would stabilize and increase the sage-grouse populations and prevent the listing of these birds as an endangered species.

Through this work, the authors confirmed that melding local and scientific information into a system dynamics model offers a unique venue for data verification, shared learning, and improvements in communication and trust. The model gained a user-friendly interface that allows stakeholders themselves to explore the sensitivity of the system to parametric changes, as well as examine alternative strategies to deal with this situation. Facilitated conversations using the model as an experiential lab helped bring about a holistic understanding of the problems, as well as to indicate potential trends in the bird population.

Martin Kunc and John Morecroft presented the second study, involving the launching of a premium product in the fast-moving consumer goods industry. Their model-based strategic analysis of this highly competitive market yielded a number of insights that helped guide strategy implementation. “Business Dynamics for Strategic Development” also lays out a theory of model development and use for “strategic rehearsal” and traces an analogy between strategic development and feedback control theory. The analogy is then extended to include a second feedback loop based upon the “virtual feedback process.” The authors argue that the virtual environment enables a fast turnaround in insight and learning, clarifying cause-and-effect linkages, and controlling for exogenous factors and temporal issues. Use of the models by the management team leads to an imagined outcome and virtual performance for comparison with strategic direction and goals, and intended results. Thus, one way to use models is for rehearsal–to test strategic initiatives for their future impact before rolling them out in the organization.

For the case at hand, the questions examined were how the new product could grow and attain sustainability in the face of stiff competition. Model projections serve as “memories of the future” that managers can use to adjust strategy if it appears unlikely to fulfill initial objectives, or to adjust the objectives themselves. From this modeling exercise were extracted a number of case-specific insights that helped guide strategy implementation.

Aldo Zagone

11:30 AM Monday: Parallel Session: Diffusion of Alternative Energy

As a session reporter I try to mirror back how the session and the presented research have been perceived by an interested person. Hence my interest is mostly guided by some questions about the current line of discussion concerning the method or the content and to find some inspiration for my own work.

In the session on diffusion of alternative energy three papers tackled challenges of technological change processes in the future transport and power market. The scope and the dynamical complexity addressed in the papers exceed conventional diffusion research approaches–synthesizing a selected combination of transition concepts for partial policy analysis.

Marcello Contestabile’s work, “The possible future development of a market for PEM fuel cell road vehicles – A SD based analysis within an EC funded project,” introduced how system dynamics modeling can be effectively used for market implementation research in the context of a large EC-funded technology development project on proton exchange membrane fuel cells. In his research the technology under consideration is well defined; however, the overall conceptualization and the operationalization need some further clarification.

Jeroen Struben’s work, “Identifying challenges for sustained adoption of alternative fuel vehicles and infrastructure,” concentrates on behavioral decision making concepts including spatial aspects in transparent specified utility functions. His analysis highlights clustering phenomena of alternative fuel vehicles in urban regions with low penetration in rural areas leading to market stagnation. The model is focused in depth on interactions between alternative
fuel vehicle adoption and their fueling infrastructure, but stresses also the importance of further concepts and feedback processes that may dominate market penetration over the long run. While Jeroen builds partially on best practice standards in system dynamics modeling, his approach is unique: He actually cuts the overall transition challenges in small tractable model modules of micro-mechanisms, while overall policy analysis cannot yet be conducted. It seems to me that his sophisticated way of modeling goes first into the details—addressing specific observed real world phenomena from one angle before developing a first rough cut of an integrative dynamic model which would capture the main challenges of the possible transition from ICE to alternative fuel vehicles. Hence the discussion of preliminary results of model module analysis such as “more efficient vehicles are not necessarily better for the emergence of a self-sustaining market” has to be carefully communicated, since the co-evolution of preferences towards new vehicle technology under a new energy regime may become dominant.

Isaac Dyner’s work, “SD for assessing the diffusion of wind power in Latin American: the Colombian case,” explores the feasibility of wind farms in developing economies. He states that the analysis is based on a system dynamics model of an electricity market that represents the behaviour of the agents involved and their decision to invest according to market and/or regulatory incentives. While such a model could be of interest for many system dynamicsists, neither the presentation nor the paper explains a transparent white box model highlighting main decision functions or main guiding feedback-processes. Hence for the audience the policy analysis may be plausible but not really comprehensible—however, wouldn’t this be the goal of a system dynamics research?

This session on diffusion of alternative energy showed nicely the challenges of the field of system dynamics. While system dynamics tries to contribute to some of the most challenging future issues caused by dynamical complexity, individual researchers are challenged to address these topics in a rigorous and comprehensible way. Although the field has developed some best practice approaches and standards that give some guidelines, parallel sessions do not yet fully reflect them. System dynamicsists are still struggling in aligning their research efforts, their language and terminology or source of knowledge. Excellent work such as that presented by Jeroen Struben may act as a lighthouse that demonstrates the rigor of system dynamics. Also it could help to build a common language on issues like technology change processes that is understood and also used by other social scientists—although in a rather static perspective or descriptive manner. We should not hesitate to challenge our own work and to ask how it contributes to the advancement of the field and how it contributes to existing research streams, e.g. on diffusion and transformation research in the energy domain. This will be my driving force and I am very thankful for inspiring discussions on these topics in future parallel sessions of coming International System Dynamics Conferences.

Silvia Ulli-Beer

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11:30 AM Monday: Parallel Session: Macroeconomics I

Links between system dynamics and macroeconomics

The Nijmegen conference gave place to several papers applying system dynamics methodology or employing findings from previous system dynamics studies in the field of macroeconomics. This parallel session included three such presentations and a general discussion about the links between macroeconomics and system dynamics.

The first presentation, “Implications of Dynamic Decision Making Research on Monetary Policy Making at the Federal Reserve,” by Hyun Jung Kim, focused on the application of findings from previous Dynamic Decision Making (DDM) research—especially originating from the works of researchers in the field of system dynamics—to a real life case, monetary policy making at the Federal Reserve. In this research, monetary policy is defined as a DDM; then previous DDM research findings are utilized to expand the understanding of the monetary decision making behaviors. The qualitative analysis is based on the transcripts of regular Federal Open Market Committee (FOMC) meetings. The decision making environment and the behavior of the FOMC are identified. The main characteristics of the decision making environment are found to be the high system complexity resulting from time delay, limited information and confounding variables, conflicting goal structure and high consequences of the decision making environment. The decision making environment is decided to be unfavorable, based on the findings from previous DDM studies and transcript analysis. Despite the undesirable decision making environment, the performance of the FOMC is categorized as successful, which is claimed to result mainly from the efforts made by the committee to understand the complexities in the problem, utilization of task expertise and informal information cues. At the end of the presentation, several proposals were made to Kim for future direction of the research; one of which was the use of neural networks in the analysis of the transcripts.

The second presentation, “Controlling primary income distribution and employment under increasing returns,” by Alexander V. Ryzhentkov, is based on a theoretical question about the conceptualization of “increasing return” and on the inclusion of direct increasing return to the Kennedy-Goodwin macroeconomic model of capital accumulation. In this work, Ryzhentkov asserts that even though increasing returns/economies of scale are largely ignored by neoclassical economists they are ubiquitous and very important in real economy. Ryzhentkov makes use of system dynamics in explicit disclosure of feedback loops in the Kennedy-Goodwin model. The Kennedy-Goodwin macroeconomic model of growth cycles shows damping oscillations behavior and an alternative formulation is made by Ryzhentkov that generates sustained oscillations behavior. The model is changed by inclusion of direct increasing returns to scale, whereby the growth rate of employment ratio positively influences the growth rate of labor productivity. Ryzhentkov also proposes a closed loop control to stabilize the oscillatory growth dynamics under direct and reinforcing roundabout increasing returns.

The last presentation, by Michael Radzicki, was an interactive discussion of the heterodox economic view, the links between economics and system dynamics, and propagation of the use of system dynamics modeling in the field of economics. Radzicki listed a series of propositions about economics and asked the audience to answer in the positive or negative. Some of the propositions were as follows: “Increasing savings will increase investment and lead to full employment.” “Cutting wages will clear the labor market and lead to full employment.” “Running a federal budget surplus will avoid crowding out.” “Tax revenues and treasury bond sales fund government spending.” “Central banks can control the money supply.” “The future is risky, but not unknown.” and etc. According to Radzicki, each affirmative answer reflected an orthodox economics viewpoint, whereas each negative one reflected a
heterodox economics viewpoint. Radzicki gave brief information on heterodox economics and possible addition of system dynamics methodology among the major Post-Keynesian computational methods. Radzicki continued and concluded by informing the audience about the works, and their relationships with system dynamics, of two important theorists who influenced the development of Post-Keynesian economics: Abba Lerner and Hyman Minsky.

Güven Demirel

11:30 AM Monday: Parallel Session: Borders In and Between Societies

The session was chaired by Cornelia (Elis) van Daalen and visited by an estimated 25 people.

The first paper was presented by Edward Anderson and was on the issue of “A Preliminary System Dynamics Model of Insurgency Management: The Anglo-Irish War of 1916-21 as a Case Study.” Anderson’s aim was to argue that system dynamics is suitable for analyzing national security issues, and the development of insurgencies in particular. He began with arguing why he chose to analyze the Anglo-Irish War. It was the first modern urban insurgency, and an example of an asymmetric conflict. This makes it a suitable case for testing a system dynamics model.

Anderson showed that in the early twentieth century Ireland was incorporated into the UK. There was only little support for armed revolution. Three feedback loops can explain why nevertheless a war developed at that moment. The incident suppression loop explains that the British government increased pressure to suppress incidents because the number of insurgents was increasing. The insurgent creation loop shows that lack of satisfaction with British rule increased the number of insurgents. The war weariness loop shows that British war weariness went up because of the foreign war. The British government decided on the reduction of troops in Ireland and so allowed the increase of insurgents in the long term. Anderson concludes that even a model with only three causal loops can explain the behavior of a variable in a test case and so is suitable as a tool for insurgency management. It shows that a bundle of policy action is needed to change outcomes.

An audience member commented that an extra loop might be created, referring to the number of deaths by an armed conflict. A rise in the amount of deaths will stimulate the development of the conflict.

The second paper was presented by Leonard Malczynski and was on the issues of “Borders as Membranes: Metaphors and Models for Improved Policy in Border Regions.” His fellow authors are Kristian Cockerill, Craig Forster and Howard Passel. He shows that the use of a biological metaphor such as a membrane may help to explain social developments like illegal migration. He uses the technique of system dynamics to overcome the different disciplinary backgrounds of the participants in the research team. The group started with building a system dynamics model for membrane processes and then applied it to the case of illegal border immigration between Mexico and the United States. Public policy and economic policy appear to play games with the migration concentration at two sides of the borders. Especially the expansion of business in Mexico proves to be a variable with heavy impact on migration level; higher investments in Mexico might cut the level of illegal immigration to the US by 50%. In contrast, increasing levels of border security in the US seems to stimulate illegal immigration, by hindering immigrants from returning to Mexico. The model shows that it is difficult or even impossible to eliminate the presence of migrants. Like the first speaker, Malczynski concludes the model shows that no single policy can work. One person asked how to involve policy makers with these insights. Malczynski answered that policy makers in the US seem to be more concerned with being reelected than with solving the problem of immigration, but involving them with the problem definition might increase their awareness of possible solutions.

The third presentation was by Habib Sedehi and was called “GAIM (Gestione Accoglienza IMmigrati): A System Dynamics Model for Immigration ‘housing’ Management.” He evaluated possible tools to support the managers of first aid immigrant housing centres. In Italy immigrants come from East and North Africa, Asia and Europe and have a diversity of first aids needs, such as housing, health and social needs. On the basis of a system dynamics model, he developed a flight simulator to predict the manager’s needs for providing administrative and legal services, health and social services and personal management. This model allows managers to consider the opportunities and limitations of their management tools and may support decision making. During the presentation Sedehi showed an example of how this flight simulator works. Till now the model is mainly used in training courses, but it is also under evaluation as a decision-support system in first aid immigrants housing management. After this presentation the session closed, since the time finished.

Inge Bleijenbergh

11:30 AM Monday: Parallel Session: Decision Making and Learning

The journey continues—understanding the science of decision making

This report attempts to capture the dynamics of the session on decision making and learning at the Nijmegen conference. To begin with, what a sensational, participatory, and productive session we had! Why not? All of us have seen the faces of “complex tasks” in a variety of settings: personal decision making, managerial decision making, and group decision making situations (or at least helping managers to make better decisions–the raison d’etre of system dynamics practitioners and specifically of our consultant brethren©). Also, for the most part, decision making and learning go hand in hand in the real world.

All three presenters did an excellent job and addressed questions from the audience in the spirit of learning and scholarship. Overall, these presentations were successful in generating interest and potential future research collaborations on decision making and learning in complex tasks. Presenters were present well in time and so was the readiness of technology (except that to hook up the computer and the projector properly, we had to rely on our “guess-based” skills in the Dutch language; it worked!). While we set up for the first presentation, our house filled almost to capacity!

Jonas Kunze was our first presenter, who presented on “Decision Patterns and Information Availability in the Beer Distribution Game” (by Jonas Kunze and Yalin Gündüz). Kunze was very articulate right from the beginning and captured the attention of the audience by presenting them with colorful graphs of the results of the experiment with the Beer Distribution Game. He shared two conclusions of this study: (i) “Decision making is not always consistent during the whole game. Changing situations may lead to a complete change in the order policy. Often, these changes are preceded by a long decision time”. (ii) “Experimental setup suggests anchor point. These anchor points have a special attractiveness for decision makers”. As chair, I made good use of my time cards, actually using all of them—“time left is 5 minutes,” “time left is 3 minutes,” “time left is 1 minute,” and “time left is 0 minutes”—to allow Kunze to be “in time” to the end (I hope Kunze was not intimidated by this exercise, after all this is the core task of a session chair 😊). The Q/A session was very engaging and had to be stopped only due to my dutiful request.

Then Ignacio Martínez-Moyano presented on “Integrating Judgment and Outcome Decomposition: Exploring Outcome-based Learning Dynamics” (by Ignacio Martinez-Moyano, Eliot Rich, Stephen Conrad, Thomas Stewart, and David Andersen). This was an interesting presentation showing the utility of the integration of social judgment theory and signal protection theory using a system dynamics approach in the exploration of “learning dynamics” and outcome feedback. Ignacio’s presentation also generated a lot of interest and he with some help from David Andersen addressed the issues and queries raised by some very lively participants of our session. Again, I used all of the time cards. Hopefully practice will help me learn 😊.

Luis Luna-Reyes gave the last but not the least presentation of our session on “Trust and Collaboration in Interagency Information Technology Projects.” Luis presented a model that helps better understand the reinforcing processes involved in the development of trust through collaboration in a project. His conclusions are: “experiments with the model suggest that the initiation of a collaborative project with a new partner could be slow due the lack of knowledge about the partners. The initiation of the collaboration could be accelerated by shaping expectations of benefits of the project or by reducing the perception of risk associated with the project”. Luis was so passionate and immersed in his presentation that he did not notice any time cards shown by me (from the last row of course!) except the last: “time left is 0 minutes.” Then followed a very lively discussion on the insights gained during this project. As you can see from the photo, Luis was very well in action!

Finally, I made the announcement that if anyone is interested to do joint research around the topic of decision making and leaning in complex tasks, feel free to contact me at <hassanq@yorku.ca>. I will be more than happy to be your collaborator from Canada. Our session concluded with my thanks to the presenters and the audience!

Hassan Qudrat-Ullah

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2:30 PM Monday: Parallel Session: Military Applications

The military session of the Nijmegen conference consisted of 3 presentations:

- “Defence Capability Management: Introduction Into Service of Multi-Role Helicopters,” by Alan McLucas, David Lyell and Ben Rose;
- “Hierarchy or Network in Military Command Organizations? Preliminary Results from Experiments with the NCW Learning Lab,” by Bjorn Bakken and Morten Ruud.

The common point of these three military applications is the use of a system dynamics approach as a training tool for decision making in military issues.

The model presented by Dr. McLucas from the Australian Defence Force Academy aimed to model the transition of army aviation human resources through the introduction into service of multi-role helicopters, in order to assist in identifying and mitigating the risks of achieving successful in-service support. The model creates a management flight simulator for managing transition stage training. It can be used to assess the impact of helicopter availability on the ability to achieve operational capabilities. In addition, the modules can be reused for other applications such as an aircraft maintenance/availability module or a pilot training module.

MindLab, introduced by Laila Frothjold from SIKT AS, is a concept supporting leadership training in organizations, where simulation models are used to generate events and progress relevant for the training situation. The users log on to a game session, and can interact with both the simulation model and the other players through an adapted user interface. “The game itself serves as a frame for creating situations which require the user to make decisions based on incomplete and insufficient information.”

The MindLab architecture has four essential parts: simulation model, Mindlab server, Mindlab database and MindLab client. The software used for simulation models could be Powersim, Vensim or AnyLogic. The MindLab server is a middleware between the clients and the models, managing single- and multi-user game sessions. The Mindlab database is used by the MindLab server (and may also be used by the models) and stores game scenarios. The MindLab client communicates with the Mindlab server using XML and visualizes data retrieved from the server.

The NBF Learning Lab, used as an example in the presentation, was developed for the Norwegian Defence Leadership Institute in cooperation with the Norwegian Battle Lab and Experimentation. It is based on the MindLab architecture and aims to train users to solve problems such as shipwrecked seamen, a tsunami disaster or a violent demonstration through the use of police, medical personnel or military units.

MindLab as a training tool provides a solid and flexible training environment which gives the users valuable insights into decision dilemmas in an engaging and informative way and can be used economically and effectively at different organizational levels.

The project introduced by Bjørn T. Bakken is part of the research program HADMICS (Human Aspects of Decision Making in Complex Systems). This is the first study which systematically surveys interrelationships between individual, organizational and technological factors, as well as their impact on performance in real Norwegian multi-level command organizations. The contemporary writings hold the opinion that network-centric command structures could improve situational awareness and the understanding of a situation. Therefore they are seen as “the” organizational solution for making decisions in increasingly complex environments. However, a set of experiments carried out by the Norwegian Defence Leadership Institute using the NCW (Network Centric Warfare) Learning Lab cannot prove this theory. The NCW Learning Lab is easy to operate and manage. It is based on an open platform and will be available on the web beginning in October 2006. A main impression stemming from this set of experiments is that many aspects of human interaction have to be managed before a network-centric structure may give a full range of benefits in operations.

Min Liu

2:30 PM Monday: Focused Research Session: Dynamic Analysis of Business Applications

In this session, chaired by Shayne Gary and Thomas Fiddaman, five papers with highly interesting contents were presented.

The first presentation, by Gloria Pérez Salazar (with co-authors Ana Isabel Campa, Claudia Decanini, Johanna Altamar, Leyci Garcia) and entitled “Auto parts industry in Mexico: future perspectives,” dealt with a system dynamics approach in the auto parts industry by using an aggregate value platform, in particular the micro-electromagnetic system technology. Different scenarios were arranged visualizing the development in the auto part industry in the next ten years. The experiments gave interesting insights into the development of the auto parts sector in the year after peaking in the year 2000. Since 2001 a slow decline has been identified.

In the second paper, entitled “Dynamic Analysis of the Long-Distance Telecom Bubble,” the presenter Nathaniel Osgood (with co-authors Rintaro Kurebayashi and Sharon Gillett) focused on answering the following research questions in detail in order to give useful advices for regulators and enterprises: Why did the bubble occur, Was the bubble avoidable, and Could we reduce the risk of a telecom bubble happening again? A system dynamics model was built for considering the technological advancement, misinformation concerning demand growth, and the competition among telecom backbone network service providers in a time horizon from 1995 until 2003. The conclusion was that the bubble resulted in a large part from myopic decisions ignoring feedbacks, e.g. price wars, investor-driven capital investment decisions and demand information hoarding.

Jose Gonzalez (with co-author Graham Winch) presented a study of the increasing importance of traffic congestion. The title of his presentation was “Coming To Terms With Traffic Congestion.” He investigated two research questions (especially the second one): how to optimise policies to contain traffic congestion, and how to mitigate negative aspects of traffic congestion. He analyzed different scenarios where the shuttle-office approach could operate for the benefit of travel groups and mitigate waste of productive time, taking into consideration highway capacity, travel time, and traffic volume as well as the adequacy of mass transportation. In this study two generic archetypes were especially explained: the “automotive Parkinson’s Law” and the “mass transit death spiral.”

Adolfo Crespo Márquez developed a model for presenting several “Maintenance Policies for Capacity Constrained production Systems” and discussed different optimization criteria in the maintenance decision. His new research figures were traditional (equipment age and equipment condition) and advanced maintenance policy drivers (equipment inter-dependence and production system state variables).

The last paper, by Stanislava Mildeova (with co-authors Viktor Vojtiko, Jan Trojacek, Ingeborg Nemcova) described an approach in “Market Dynamics for Decision Support in Marketing” for the Czech Republic. The system dynamics model represented the market structures from the view of a company, for the description of customer behaviour. The structure of consumers is analyzed by dividing end consumers into several groups: the Non Addressed

Market, Inexperienced Consumers, First Time Consumers, Experienced Non Consumers and Experienced Consumers, where the non addressed market is influenced by advertising and word of mouth. The aim of the approach is a better understanding of consumers’ loyalty and satisfaction impacts.

Sabine Schmidt

2:30 PM Monday: Parallel Session: Organizational Dynamics

Two remarkable papers were presented in the parallel session on organizational dynamics chaired by Rogelio Oliva. The papers gave insight into organizational dynamics, and were extremely rich in information.

The first paper is based on a fictional case study—a regional airline—and focuses more especially on change controls that can improve information technology management. This case study was built on results of a survey launched by the ITPI (Information Technology Process Institute). Results showed that in low-performing IT organizations change controls were considered mostly bureaucratic, whereas in high-performing IT organizations they were believed to be crucial to success. Using a system dynamics model to analyze the relationship between controls and IT performance, Andrew Moore pointed out the following to explain this discrepancy in the way controls were perceived. Low performers have a disproportionate focus on short term objectives that are achieved at the expense of long-term performance, with evident consequences in human resources allocation. Emergency and unplanned work activities override planned work involving the so-called proactive activities, leading to a downward spiral with self-generated unplanned work. But he also insisted on the fact that the implementation of controls exhibits worse-before-better behavior, of which IT management must be aware. The development of an system dynamics model helped the understanding of the mechanisms underlying observations, and how those change and access controls participate in the success of IT management.

Andrew Moore

Human resources management appeared to be an important issue underlying those organizational dynamics not only in terms of resource allocation, but also coaching, training, possible stress, etc. The work presented by Laura Black goes further in the apprehension of social aspects. This dimension needs to be taken into account to reduce effectively disconnects in large complex programs. This presentation underlined, for instance, the discrepancies that exist in perceptions of the technical baseline by members of different organizations involved in a project (implying interdependent works). Laura Black explained that communication across organizations is a noisy process. The expertise level of staff was identified as a leverage for reducing disconnects, but the clarity of communication appeared also to be a key element for improving program management. Whereas increase in expertise level may be critical, her explicit advice to improve communication clarity was to use concrete objects (boundary objects), i.e. schematically, pictures must be preferred to large texts. They facilitate communication and they can also help to accelerate observation and orientation, since this delay was identified as another leverage point.

Laura Black

Valerie Gacogne

2:30 PM Monday: Parallel Session: Stakeholders and the Environment

The parallel session entitled “Stakeholders and the Environment” presented three speakers who used group model building to solve issues in very different parts of the world. The first presentation, by authors Shanty Syahril, Muhammad Tasrif, A. Taufik Mukhith, and Lucentezza Napitupulu, described their paper “Group Model Building Intervention in Developing Country: Lesson Learned from Developing Strategies for Clean Air.” The authors described a group model building intervention to develop strategies to reduce vehicle emissions in Jakarta, Indonesia. Although air pollution from vehicles is a major problem in many developing countries, this project is one of the
first to develop a model to develop policies in order to decrease the problem. The authors found that in developing countries, policies guiding everyday decisions by individuals are set by people who are not affected by them. Due to this discrepancy, environmental problems are becoming increasingly worse. In Jakarta, as the number of cars on the road has increased from 500,000 in 1990 to 1.5 million in 2002, the number of good air days has decreased. The authors used a system dynamics approach to engage stakeholders in collaborating to develop clean air policies through a group model building process.

The Integrated Vehicle Emission Reduction Action Plan for Jakarta was formed with the support of the Asian Development Bank. A stakeholder group composed of national and local government, the private sector, academics, and non-governments organizations was convened to develop an action plan for the air quality problems faced by Jakarta. Six workshops were held with 30 hours of stakeholder time over 15 months, starting from scratch with an introduction to the project and system dynamics modeling, through the entire system dynamics model building process, and finally to the testing of policies. At the end of the project, participants rated the group model building process using system dynamics as a positive experience. Although participants learned from the model, they did not reach a consensus on how to reduce air pollution in Jakarta. The researchers determined that a consensus was not reached because they needed a wider variety of stakeholders and the stakeholders needed more time to play with the model. Although they have not yet developed a consensus, the stakeholders believe that they will be able to do so using the model. The authors found the model to be an effective communication tool and plan to hold further meetings.

The second presentation, by Justus Gallati, Bakyf Askaraliev, Daniel Maselli, and Peter Niederer, and entitled “Towards a System Dynamics Framework for Understanding Interactions of Head- and Tail-Users in Irrigation Systems in Kyrgyzstan,” presented a conceptual framework of a model on collective action for two user groups, the upstream and downstream users, who share a common resource. A workshop was held in Kyrgyzstan with farmers, researchers, and representatives from non-profit organizations with the goal of developing a framework for the interaction of head- and tail-users of the irrigation system. Farmers in the Saz village of Kyrgyzstan face a problem, sustainable management of a resource, which is common in areas that are highly dependent on a natural resource. The upper part of the irrigation system is composed of canals under the joint control of village administrators and farmers in the area. Canals are maintained by water fees paid to district administrators, which cover distribution services and maintenance of the canals. The main problems in the system are a consequence of the farmers’ distrust and dissatisfaction with district administration. Due to this distrust, many of the farmers do not pay their water fee to the district. Although there is plenty of water for the users, tail end users complain that they do not get enough water and do not receive it at critical times.

The authors of this paper found a research gap in this system between the users and administrators of the system. In order to fill this gap, they decided on a dynamic, integrative approach. The first step in developing the conceptual framework and preliminary causal loop diagram was based on literature reviews of the theory of collective action and irrigation management. In September 2005, a workshop was held in the Saz village in order to develop a system dynamics framework of the problem. The authors are currently working on modifying the structure of the model and validating the model before holding a second workshop during 2006. From the first workshop, the authors found that achieving a fair and equitable water distribution depended on both ethical and normative aspects, as well as consideration for basic attitudes towards society, nature, and the administration. The authors further found that motivation to engage in collective action was highest when (1) farmers have a long time horizon and (2) farmers faced sufficient scarcity. The authors found that the preliminary causal loop diagram facilitated the discussion of the basic discussion on irrigation and collective action and is a starting point for their further modeling.

The final presentation, by Krystyna Stave and Michael Dwyer of “Lessons from LUTAQ: Building systems thinking capacity into land use, transportation, and air quality planning in Las Vegas, Nevada” investigated group model building from a land use perspective. Las Vegas has experienced rapid population growth which has led to the problems of traffic congestion, poor air quality, and urban sprawl. Planners have been unable to keep up with this rapid growth, due in part to a lack of communication and integration between land use and transportation planners. In order to develop smart growth planning strategies in Las Vegas, the authors used a group model building approach to integrate land use, transportation, and air quality planners.

The LUTAQ model was developed for the Southern Nevada Regional Planning Coalition over a 24-month period in order to evaluate the effects of land use and transportation policies on air quality, traffic congestion, and quality of life. The stakeholder group that participated in the development of this project included land use planners, air quality modelers, and transportation planners. These group members helped to identify the purpose of the model, define the problem, classify the model structure, and quantify the variables. Once the model structure was complete, the stakeholders used the model to test policy options. Using the model for policy analysis, the modeling group found that the model helped quantify the idea that both traffic and air pollution are problems that are getting worse and that doing nothing will significantly increase these problems. The group also found that the popular solution of densification alone will make things even worse than doing nothing. The group found that the best solution did not require extreme changes in land use or transportation design. The solution that reduced congestion, maintained air quality within EPA standards, maintained population, and minimized costs, was a combination of increasing density moderately, reducing the number of average trips per day and distance per trip, and a small increase in the use of public transportation. By the end of the model building process, the authors found that stakeholders had changed from speaking about their individual issues to speaking about the system as a whole. The modeling participants plan to take their policy suggestions to the Regional Planning Coalition. The authors found the group model building process successful in increasing the systems thinking abilities of participants and increasing the integration among separate stakeholder groups.

Although the three problems addressed by these authors occurred in vastly different areas with different topics, all of the authors found that the group model building process helped increase communication with different stakeholder groups. The stakeholder groups that participated in the modeling process each had different purposes and goals for attending the meetings, which made developing a common consensus on problems and solutions more difficult. However, the authors found that the use of a group model building process enabled communication and the development of policy options.

Megan Hopper
George Richardson was the first presenter in this session. His paper is called “Concept Models.” He wrote this paper to show what concept models look like, what their use is, and why these models can help the group model building project. Ideally, the concept model should have no more that three stocks; it should be transparent, problem-focused, and wrong (but agonizingly close to the solution). This is the easiest way to show stakeholders who are not familiar with system dynamics the basics, without making it too confusing. You are not there to teach the stakeholders how to build good models but you are there to solve their problems. His main message is that concept models should be simple. If you have to choose between good modeling practice and simplicity, always choose simplicity. Use the concept models as a way to start the conversation between stakeholders.

The second presenter was by Stefan Groesser. He wrote the paper “Learning by Doing: Towards the Development of a Group Model Building Framework.” With this paper, he integrates two main streams of group model building practice; one is by Jac Vennix (1996) and the other is by Andersen and Richardson (1997). He wants to integrate the two ways of practice to get a higher standard of group model building, to learn from experience and to contribute to the literature on group model building with practical cases. There are some decisions a facilitator of group model building can (and maybe should) take. Vennix (1996) and Andersen and Richardson (1997) each mention several. These decisions are integrated into a group model building decision diagram. This work definitely adds to the previous work done on group model building.

The third and final paper presented in this session was written by many authors, and presented by one of these authors, Silvia Ulli-Beer. The paper is called “Understanding and accelerating the diffusion process of energy-efficient buildings: Introducing an Action Science Venture.” The various stakeholders concerned with building take different measurements to reduce energy use. In this project, the authors facilitated four workshops with the stakeholders from the field. By making the scientific researchers and practical stakeholders come together in workshops, an intervention is created. The authors believe that working with stakeholders in these kinds of settings creates learning. Argyris (1985) distinguishes two types of learning, single loop and double loop, and the authors believe that working together like this and building models creates double loop learning. With cognitive mapping you show people what they do and why and people can reflect on this. With this reflection, a more durable change in behavior is created.

After these presentations, a short discussion between audience and presenters emerged. “Should we develop a framework and stick to it, or keep our flexibility in working together with clients?” George Richardson commented that he would like people working with stakeholders, calling it group model building or not, to come forward with their ways and tricks, so we can all learn from each other. 

Geertje Tommaer

2:30 PM Monday: Parallel Session: Psychology

This session, chaired by Eva Jensen, consisted of three presentations. The presenter of the first paper, Francesco Ceresia, focused on political, economic, social and individual intended change in retirement behavior in Italy caused by the aging society and the change in workforce. The main aims were to present a general causal diagram to describe the complexity of retirement behavior, and to reason the roles of organizational commitment and breach of psychological contract.

Eva Jensen, presenter of the second paper, by Jensen and Sawicka, discussed the various purposes for which dynamic tasks are constructed, and suggested what to consider prior to constructing a dynamic task for any purpose. In the paper, the Computer Security Incident Response Team (CSIRT) task, used to address several important issues, was analysed in terms of what kind of basic system concepts it is based on, and the ideas inherent in these concepts.
Shayne Gary talked about developing flexible expertise in senior executives, a research by Gary and Wood. The assumed future shortage of human capital in the senior executive ranks could be solved by new methods for accelerating the development of the required knowledge and skills. In the paper they presented a research program and agenda for the accelerated development of flexible expertise and synergistic leadership skills using microworld simulations, coaching and role plays.

All these presentations revealed interesting problems and challenges for further research using system dynamics. Probably the approximately 15 attendees at the parallel session wished to have more time to discuss in detail the research results of the authors.

Doreen Schwarz

2:30 PM Monday: Parallel Session: Epidemiology and Health Planning


This session had three very interesting talks, each by an energetic speaker.

The first talk dealt with the growing problem of obesity in the United States. Jack Homer (a consultant working with a group of people at the Center for Disease Control) presented a brief history of the growth in obesity in different age groups in the US from 1970 to the present, then explained the dynamic view of the obesity problem. A very interesting slide showed a reference graph upon which he superimposed some generic feedback loops that he anticipated might produce each segment of the behavior displayed in the graph. He developed the dynamic hypothesis by overlaying those historical factors, such as an increasingly sedentary life style, on an aging chain structure that was organized by age, sex, and obesity category. To calibrate his model (graphing the fraction of the population who are obese) he started the early 1970s in steady state and produced an inflection point in the 1990s (as historical data support). He then identified categories that lent themselves to policy intervention. Those categories included focusing on addressing obesity in school children (ages 6-17), all children (0-17), children and parents, just adults, or everyone. As might be expected, the focus on “everyone” produced the best results in reducing adult obesity. Surprisingly, intervention in youth obesity programs had only a small impact on adult obesity. The most effective programs involved adults, but, before full effort can be placed on this intervention, it is necessary to determine how to counteract the propensity for people who diet to regain their weight. Homer cautions that it will take decades before we see the effects of lower caloric intake (to 1970 levels) among adults, even if successful interventions occur by 2015.

Not only was the topic for this talk timely (schools across the US are currently replacing candy and pop in school vending machines with more nutritious snacks), the presentation of the topic, artfully displaying the major
components of the standard system dynamics method, was very illuminating.

In the second talk Gary Hirsch presented a generic model of the spread of a contagious disease. He then adapted the model to simulate the transmission of avian flu between humans. Hirsch decided that producing a generic model would make analyzing disease transmission more accessible to state and public health officials. A generic model would allow an “all hazards approach for emergency preparedness.” Hirsch's structure started with an expanded SEIR (Susceptible-Exposed-Infected-Recovered) sequence. Additionally, he broke the population into five groups: children ages 0-17, workers 18-64 who are in health care, workers who are not in health care, non-workers 18-64, and adults 65 and older. Two different regions of people were considered in the simulation. The disease starts in one region and travels back and forth between the two regions. The model allows the user to select one of two methods of disease transfer for a specific disease. Then there is a segment of the model that allows the user to intervene to control an outbreak, and display the result of that intervention. Hirsch shows the baseline graph when selecting each method of transfer. The baselines (number of total cumulative cases) are very similar curves, logistic in shape. Each standard method of intervention is tested using each method of transfer. Using mass vaccination, multiple scenarios were presented indicating the percent of the population who were vaccinated, the effectiveness of the vaccine, and the time delay in vaccinating people. It appears that the size of the stockpile of vaccine was the most effective in limiting the spread of the disease. Both disease transfer methods were similar in response to mass vaccination. If vaccines are in short supply, targeted vaccinations, contact tracing, and immunization and quarantine of contacts appeared to be an effective strategy. Hirsch concludes the latter was the most effective and practical of the four strategies tested. He also presents other factors in his conclusion that may impact the results of his simulated experiments.

Hirsch invested considerable energy and expertise to create a simulation that would be accessible to the people who would need such information and would probably not have the time to spend (or interest) in analyzing the structure.

The final presentation, by David Rees, focused on the use of system dynamics modeling to aid health care planning for the city of Manukau in the southern part of Auckland, New Zealand. The specific disease that was/is of major concern in Manukau, a city that serves lower income Maori and Pacific Island populations, is diabetes. The rate at which diabetes is projected to grow in this population is 1.5 to 2 times the growth rate of diabetes in the general population over the next 15 years. The purpose of the study was to convince the Manukau District Health Board that the diabetes issue needed to be addressed (and a project funded, to make recommendations for potentially successful policy interventions). The project was funded in 2004. As part of the project an aging chain array (for the three populations–Maori, Pacific Islander, general) model structure was developed with the help of clinicians in Manukau and epidemiologists from Auckland University. Preliminary results from the simulation indicate that, rather than place significant energy in the population that already has diabetes, working with the significant number of people who are overweight (76% of the Pacific Islander and 51% of the Maori populations) would be a high leverage point.

Diana Fisher

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3:30 PM Monday: Poster Session: Knowledge Management and Innovation

This poster session showed how an important field such as knowledge management and the study of the innovation process can make good use of system dynamics methodologies. This happens both with more general topics, like the influence that different types of organizations have on the effectiveness and duration of innovation benefits[1], and in more specific issues, like the analysis of the importance of different causes of turnover among Egyptian Information Technology employees[2]. In the first case the analysis has made it possible to clarify some logical issues regarding the balance between flexibility and hierarchy in an organization. In the second case the work done has pointed out the relations, and the relative importance, of the aspects that influence the turnover, and has evidenced the positive effects that actions focused on turnover control have on other important parameters, for example productivity.

Even considering the less “technical” aspects of knowledge management, for example the pure process of knowledge creation and evolution[3], system dynamics can be useful in analyzing more “philosophical” processes with a scientific point of view, analyzing the interactions between the different types of knowledge creation.

[1] “Efficiency and Dynamics of the Organizations: Innovation and Decline,” by Didier Cumenal

Alessandro Saullo

8:30 AM Tuesday: Plenary Session: Jay W. Forrester Award Ceremony

A highlight of the conference is the presentation of the Jay W. Forrester Award. The award recognizes the most significant contribution in system dynamics published during the preceding five years. John Morecroft, chair of the award committee, thanked the committee members for their hard work and asked 1997 award winner Jack Homer to announce and introduce this year’s recipient. Tom Fiddaman won the award for his paper “Exploring policy options with a behavioral climate-economy model,” published in the System Dynamics Review in 2002. In his introduction, Jack noted that while the award is officially given for a particular publication, Tom’s contribution to the field goes well beyond that single work. Tom is a frequent and thoughtful contributor to the system dynamics listserv particularly for topics on the environment and has made contributions to our understanding of environmental

issues while working for Barry Richmond and Dennis Meadows at Dartmouth, during his PhD work at MIT leading to the winning publication, and through his work at Ventana on transportation and the environment. Jack described Tom’s work as “sophisticated, subtle, clear and compelling” in addressing one of the most important questions facing the world.

Tom began his acceptance with his traditional modesty and by thanking many people, including Barry Richmond; Dennis Meadows; his cohort of graduate students at MIT, especially Liz Keating; his PhD committee members, John Sterman, Edward Parson, and Nazli Choucri; his colleagues at Ventana; and his wife, Sarah. Tom presented compelling data about the severity, causes and effects of rising amounts of carbon dioxide in the atmosphere. With a touch of alliteration, Tom showed why when one relaxes “mismeasured” assumptions and questions “misanthropic” objectives in existing models, appropriate carbon taxes rise one or more orders of magnitude from practically nothing to substantial levels, challenging “misguided” policy recommendations. Tom related the relative benefits and political issues involved in using carbon taxes and carbon permit systems to control carbon dioxide and concluded with three challenges to the field: developing global model structures consistent with aggregated populations of realistic firms; developing ways to keep models transparent and highly usable while incorporating sophisticated structures for realism; and increasing productivity in the field through faster model building, more efficient use of existing models, more efficient use of data, automation of robustness checks, and more tools for exploration and visualization of models.

Scott Rockart

10:30 AM Tuesday: Poster Session: Quantitative Methods in System Dynamics

The poster session dedicated to “Quantitative Methods in System Dynamics” was characterized by studies in the eigenvalue and eigenvector field, in an actual context in which the quantitative link would represent not only a stop point but a start point to new discoveries and new “dynamics.” In particular, these researches showed how eigenvector sensitivity plays an important role, determining the impact that a change in structure has on model behaviour in nonlinear systems.

Alessandro Nanni

10:30 AM Tuesday: Poster Session: Information Science

This poster session displayed four initial studies on issues relative to the IT/ICT field, and showed how a system dynamics modelling approach may investigate the structures and behaviours involved in subjects such as software project management, business processes, knowledge management, and IT security.

The presentation regarding the project dynamics issue[1] was mainly centred on some of the classical human resource problems (hiring, allocation, training, learning, etc.) and especially on the management of virtual project teams/groups, which may be a good response for managing projects in emerging distributed organizations.

As far as the paper regarding the knowledge management issue is concerned, the focus here is mainly on investigating the practice of outsourcing the knowledge management processes of an IT firm and analyzing the advantages and disadvantages which outsourcing may introduce.

The paper dealing with the business processes issue covers first a review of models of the information systems investment appraisal process and then describes a study that produced a simplified system dynamics model of an intervention based on an enterprise resource planning application and designed to produce a transformation of certain IS business processes in a professional services company.

The poster on information security mainly tries to investigate how investment in information security can have an effect on information security while analyzing the causal factors in the information security industry. Moreover, it tries to identify a feedback loop which decreases the necessity for information security when satisfaction is full enough because of previous information security investment.
The overall session was quite an interesting one for the issues addressed despite the fact that the papers only covered some initial research questions about them. The contents were generally quite well communicated by the presentations, a little bit less (though in a sufficient way) by the designated presenters, who could not always express themselves in fluent and correct English, thus making the understanding of the presented research not always easy. Furthermore, once again the presentations were displayed as a series of printed slides, which from my own point of view does not add to understandability and also takes away some of the spirit of this kind of presentation. In general, the session was anyway quite a good one and presented interesting models, focuses and research questions which will for sure develop into interesting works and which will undoubtedly make the related papers, which will be included in the proceedings, worth reading in order to gain some insight into the described systems.


Stefano Armenia

10:30 AM Tuesday: Poster Session: Agent-Based and Non-Linear Dynamics

The poster session dedicated to “Agent-Based and Non-Linear Dynamics” was represented by two papers: “Acceptance Dynamics” by F. Gassmann and S.A. Ulli-Beer and “Cobweb Model in System Dynamics Form: Hyperincursive Perspective” by A. Skraba, M. Kljajic, D. Kofjac, M. Bren, and M. Mrkaic. The first paper analyzed internal and external forces relating to time, through a recycling model and the study of its balance. In the second paper, the cobweb model of competitive market dynamics has been examined in the form of system dynamics. After a separation of the structure elements and an anticipative form, the system has been reformulated in order to show the dependency of future-present-past events; the value of the present is dependent on the past as well as on the future. The period conditions of the model have been analytically determined by the application of z-transform.

Alessandro Nanni

11:30 AM Tuesday: Parallel Session: Using Models in Diverse Applications

From the use of renewable energies to the growth of museums in Italy
This session was a truly good sample of the variety of uses system dynamics can have, and the valuable tool system dynamics is for policy analysis. The session was introduced by Luc van Den Durepel, who referred to the variety of topics being studied nowadays with the system dynamics methodology. Immediately after a good sample of this variety was presented.

First, Pawel Bartoszczuk presented “SD Economic Model with Fossil and Renewable Energy,” in which he presented the different scenarios for the use of renewable energy—defined as a variety of different percentages of use for fossil fuels and the complementary percentage by renewable fuels—and emphasized the dramatic increase of carbon emission and the implications of a depletion of fossil fuels.

Some of the questions from the public were if fossil fuels were considered in the model as limited; how was the technology factor in the model calculated for such a long term—problem being faced by the questioner too—and why population decreases in the scenario of fossil fuels depletion.

After Pawel, Leza Ospenko presented “System Dynamics Model of A New Prenatal Technology,” in which after reviewing the model structure, submodels and assumptions, she presented the results—under different scenarios—for the application of a screening technology already implemented in Russia, in the US healthcare system. The technology consists of a simple blood test, on the basis of which women can be categorized into six groups with different risk factors. The results from the study show a very good potential and a positive cost-benefit analysis.

Questions from the public were whether the effects calculated assumed that all women that are diagnosed in risk and prescribed a further treatment go for it, and how much and good data was available on the effects of the technology. She explained that the percentage of women who do not go for further treatment—even given the diagnosis of risk—is a variable parameter assumed to be between 70 and 30%, and that indeed enough data about the effect was available for the Russian case where the technology has been in use already for 10 years.

Last but not least, Chiara Bernardi presented a very interesting work about the problematic of growth and maintenance of museums in Italy. All were surprised to know that income from the public, in the form of entrance tickets, covers only 5 to 10% of the total costs. Therefore museums have to compete for resources which are geographically determined and scarce, thus creating a phenomenon of “local focused interdependence.” One of the questions posed was about the possibility of eliminating entrance fees, to which she gave reasons for not doing so.

Mônica Altamirano

11:30 AM Tuesday: Parallel Session: Strategy and Organization Design

The session included one conceptual paper and two real life applications. The first paper, “Innovation and the dynamics of capability accumulation in project-based organisations,” by Steffen Bayer and David Gann, was the conceptual paper. The authors build a comprehensive causal loop diagram on the interaction between work acquisition and innovative capability building.

The second paper, “Investigating how Intellectual Capital policies in a Telecom Call-Center affect Company Performance: a System Dynamics approach,” by Enzo Bivona, reports a field study in a leading telecom company in Italy. The study focuses on the impact of investment policies. The authors build on existing literature by considering changes in average skill level and the impact on workload on performance. They point out that the existing literature considers the average skill level as fixed and does not consider the influence of workload on customer satisfaction.

The third paper, “Project of the Future Vision: Using System Dynamics to Achieve ‘Model-in-Loop’ Project Planning & Execution,” by Scott Johnson, David Peterson and Greg Swank, presents the use of a system dynamics model for assessing an ongoing project at BP. The authors use the model to assess the project in addition to traditional assessment tools used by the company. The model predicts that the project will miss project deadline significantly and will have substantial cost overruns. These predictions are in stark contrast to the traditional assessment results, which are much more optimistic. Based on their experiences, authors present their thoughts on how formal system dynamics models can be used for project assessment.

Gökhan Dogan

11:30 AM Tuesday: Focused Research Session: Health

This research session was chaired by Gary Hirsh and attended by about 20 participants. Research sessions generally feature work which is at an early stage. This session consisted of five brief presentations, each followed by a number of questions from the audience.

The first presentation was entitled: “An Evaluation of Healthcare Policy in Immunisation Coverage in Uganda.” The paper was presented by Agnes Rwashana Semwanga and co-authored by Ddembe Williams. The objective of this study is to improve immunisation coverage. Although there is a significant level of immunisation of children in Uganda, access is not yet comprehensive and there is a dropout rate of 27% of children who do not reach the end of immunisation. 82% of districts fall below the immunisation target and there is still an occurrence of epidemics. A dynamic hypothesis was developed with immunisation coverage as the central variable. Six loops were identified, and parental participation was found to be a key issue. In order to determine factors of importance to this issue, Agnes interviewed a number of mothers. Factors such as effectiveness of health centres and availability of immunisation services were identified. A separate causal loop diagram was drawn up for parental participation, as well as for the health care system, in which health care workers were deemed important. In conclusion, the level of literacy, availability and accessibility of health centres, cultural background, monitoring system, human resources, communication, transport and response to epidemics are important factors. Management is currently focusing on access for immunisation coverage.

instead of on a range of factors.

One of the questions asked after this presentation was how to incorporate beliefs and attitudes in the model. The presenter still sees this as a challenge. Martin Cloutier suggested that some of these could be captured by time delays. Roy Greenhalgh said that he did some work in Zambia and one of the problems there was that record books are lost and then immunisation is stopped. Agnes answered that there is the same issue in Uganda, which is also a problem if people move.

The second presentation was by Eve Pinsker. The paper addressed “System Dynamics of the ‘Safety Net’ and U.S. Health Care reform: The View from an Urban Public Hospital” and was co-written by Carolyn Lopez. Eve presented a qualitative model of people who are not insured and are not covered by Medicaid. The diagram of factors affecting a US public hospital included variables such as public political support, public satisfaction with services, and federal and state funding. American political cultural factors were mentioned specifically, as these are fundamental assumptions (e.g. belief in individual rights) which are very resistant to change.

A member of the audience commented that part of the problem of modelling culture seems to be the high level of abstraction. A suggestion by David Gillespie was made to take a step back to see what is meant by culture here: does it mean ethnic groups or behaviour? Eve responded that it concerns behaviour. These are tacit models which are very abstract. Gary Hirsch asked a question about the predictive capacity of the model. In response, Eve said that one of the important things is framing. A challenge in a public hospital is how to frame the debate on public resources.

The next paper, “Dynamics of Innovation Implementation in Social Service Organisations” by Peter Hovmand and David Gillespie, was presented by David. The authors are aiming at developing a model to capture the implementation of evidence based practice (EBP) in social service organisations. Currently, they are looking at barriers to implementation of EBP, and defining the types of knowledge managers need to explore the consequences of implementation. Four papers from the literature were found which provide useful information related to system dynamics models for innovation and organisational change: a general model of human treatment dropout (Levin and Roberts, 1976), a model of planned organizational change (Samuel and Jacobsen, 1997), a model of punctuated organizational change (Sastry, 1997), and a model of innovation implementation by Repenning (2002). Lessons drawn from these models are relevant for managers. However, they need to be tested against organisational data. The authors will now identify substructures from the existing models that can be used, as the existing models cover different phases of organisational change. A testable model will be developed.

A suggestion was made by Gary Hirsch to look at the work done by Gary on curriculum innovation at schools for a group organized by Jay Forrester and Ted Sizer. Douglas McKelvie pointed toward a model he has co-developed on drug and alcohol treatment in London. Roy Greenhalgh mentioned that EBP is becoming mainstream in the UK. There is a belief that the only way of measuring evidence is by means of the balanced scorecard. This is going to be problematic for system dynamics and for relating it to behaviour over time.
Martin Cloutier then presented the paper “Modeling the Productivity Crisis in Pharmaceutical Research using System Dynamics,” which was written by Jean-François Lavigne, Martin Cloutier and Luc Cavassi. Most studies in this field look at exogenous factors. There has been no attempt to integrate these and look at the industry system. The authors first elaborated a dynamic hypothesis and then developed a simulation model. The model was tested on a 1992-2002 data series, and was able to replicate the data. The model findings show the complexity of the drug development pipeline (time delays) with the repercussions of business decisions.

Gordon Kennedy commented on the 1992-2002 period and indicated that this was a period with changes in the way of doing research and the way of discovering drugs. Martin responded that there were no earlier data available. He also indicated that a technological shift has been taken into account in certain parameters. Gordon mentioned that there have been more technological shifts, one of which is the genome.

The final paper, entitled: “Strengthening Intellectual Property rights in Biotechnology Innovation: Learning from a System Dynamics Synthesis” was also presented by Martin Cloutier. The paper was co-authored by Niranjan Calindi. A model has been developed to study the consequences of strengthening of the intellectual property regime following the introduction of the TRIPS (trade-related aspects of intellectual property rights) agreement. The question is how this change is going to affect developing countries in both the short and the long terms. A dynamic hypothesis was developed and a generic structure was extracted using experience from the pharmaceutical sector and transferring this to biotechnology. One of the consequences may be that strengthening patent protection leads to pricing out, so some parties don’t have access, which leads to less revenue and a reduction in purchasing power in developing countries and less capability for innovation. The balancing loops limit the reach of the policy to get things going. The analysis shows that the promise of TRIPS may be difficult to achieve and there may be unintended consequences that need to be carefully examined. The patent system is perhaps a necessary, but not a sufficient, condition for stimulating system innovation and technology transfer.

Els van Daalen

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11:30 AM Tuesday: Parallel Session: Emergent Behavior

The session about “Emergent Behavior” consisted, like most other parallel sessions, of three presentations. For each presentation, 20 minutes have been reserved. The presentations lasted for approximately 15 minutes and were followed by five minutes of discussions. This session was chaired by Nathaniel Osgood.

Güven Demirel gave the first interesting presentation with the title “Aggregated and Disaggregated Modeling Approaches to Multiple Agent Dynamics.” In his research, Demirel compared the aggregated modeling approach of system dynamics modeling and the disaggregated modeling approach of agent based modeling. He pointed to important distinctions between the two: first, that system dynamics rather concentrates on abstract concepts and not on individual objects. Agent based modeling, on the other hand, focuses on the individual micro level actions, their interconnection with other agents and the emergent results of this process. And second, that most system dynamics models are deterministic in nature whereas ABMs are most often stochastic. Demirel created a supply chain model in Stella (SD) and Netlogo (ABM) in order to test the effects of several behavior alternatives of the simulated firms, such as prices, inventory positions, shadow orders, loyalty towards a specific firm, and safety stocks. The results of the research can be summarized with the following statements: All of the named policies could be incorporated in the agent based model. The system dynamics model, on the other hand, could not embody policies that concentrate on the diversity and heterogeneity of agents. Both models are, however, able to capture typical supply chain
dynamics. Consenting that the results of the research are not completely new, Demirel delivered an insightful presentation on the comparison between SD and ABM that confirmed known differences between the two methodologies and, in addition, based the work on practical evidence rather than on theoretical speculation.

The second presentation, with the title “Principles of Emergence–A Generic Framework of Firms as Agent-Based Complex Adaptive Systems,” was delivered by Meike Tilebein. She concentrated in her presentation not on a methodological comparison but on the requisite conditions underlying the emergent phenomena in complex adaptive systems (CAS). Especially by means of complexity science, it can be stated that agent based systems which balance emergent efficiency and innovation without central control are causative for the emergent behavior of CAS. According to the presenter, the immanent characteristics of these CASs satisfy the current management scientists better than system dynamics does. Tilebein presented a generic framework of emergence in CASs for use in management science. She created a framework that integrates characteristics drawn from well-accepted model of CAS, e.g. cellular automata (Wolfram, 1994) and Boolean networks (Kauffman, 1993). Her framework was comprised of the following principles: Agents, agents’ properties, action rules of the agents, change rules of the agents, diversity of the agents’ properties and rules, and external and internal links that represent the agents’ external and internal complexity. The last two principles are the level of aggregation of the agents and the kind of fitness landscapes existing in the CAS. After Tilebein had discussed her generic framework, she presented several examples of business applications of CAS and showed that the principles of CAS are considered in her framework. Her generic framework condenses important principles of complex adaptive systems from established literature in this field and provides a sound stepping stone for analysis of problems related to CAS.

Nathaniel Osgood, the chair for this session, gave the third presentation. The topic was “Low-Dimensional Dynamics in Agent-Based Models.” Osgood started his presentation with the elaboration of weaknesses of agent based methods, such as lack of formal canonical, declarative and transparent mathematical semantics. Furthermore, they are challenging to program, understand, calibrate, generalize and validate. Osgood concentrates in his presentation on the fact that many highly complex agent based models actually do not have to be that highly complex because many models do only utilize a part of the possible internal dimensionality. He built a framework to measure the dimensionality of a simulation model that is based on the theory of delay embedding and generic algorithms for intrinsic dimensionality assessment. The intention is to estimate the intrinsic dimensionality of the trajectory of agent based models. He showed that this dimensionality measure can provide a lower bound on the number of state variables required in any model that seeks to reproduce the behavior of the analyzed models. During the discussion, Osgood stated that this framework is most suited for models about physical systems. Most interestingly, he concluded his presentation with the hypothesis that highly descriptively complex agent based models may be expressed by modest sized system dynamics models.

Stefan Groesser

12:30 PM Tuesday: Peer Review Dialog

Participants Yaman Barlas, Peter Vanderminden, Gloria Pérez, Camilo Olaya, and Kristjan Ambroz.

Introduction During the session two kinds of things surfaced. The first were observable events (facts) that will be reported first. The second type of contributions were points of critique and suggestions and will be presented afterwards.

Events Events related to submitted papers: The submitted papers are formally incorrect. Model-based papers without models. There have been papers sent to reviewers with author information. Events related to the reviewing:
Refuted papers become accepted. Accepted papers become excluded. Some reviews are very thorough, others superficial. Events related to the quality control and its role for the Society: No member of the policy council participated in the meeting.

**Points made with respect to the reviewing process** The reviewing process as such should be made explicit (purpose, stages, procedures, decision points). Reviewers should be reviewed. There are several ways of doing so. For example, the papers’ authors may grade the reviews’ usefulness. There are conferences where the reviewers have a discussion forum, which enables them to ask and suggest (and exercises some peer-to-peer social pressure).

But also, the programme committee must:

- Monitor the reviews’ quality, refute bad reviews (like three-liners) and ban bad reviewers;
- Take the definitive decisions, at least for the plenary sessions.

The review process is only a subsystem. Also important are:

- The composition of the programme committee, which should be designed in advance (why isn’t it a criterion when selecting a proposed conference site?);
- A clear policy with respect to the trade-off between the quantity of papers needed for the conference (most of the participants need an accepted paper in order to get the money they need for coming) and the quality.
- A clear sponsorship from the Policy Council (in this respect the absence of its members was interpreted as an adverse signal).

Participants expressed their frustration that despite their efforts as reviewers, the overall quality of the work presented is not satisfactory (could be better but is not). This was related to the fact that there are two different types of work: on one hand there are applications of system dynamics to a particular case or field, in general model based; on the other hand there are methodological papers which treat aspects of the fundamentals, of the method and techniques or of the relationship with other methods. The feeling was that there are too many papers of the first type and too few of the second.

Anyway, in both cases, the review process should be seen as an attempt to improve the papers, in order to have high quality work presented, and fundamentally it should be understood as a learning process for both authors and reviewers.

The session attendees expressed frustration because they give time and effort to their reviewing work, but they feel left alone with the problem and are afraid that without implementation of the mentioned measures (or other measures with the same finality), their efforts will be in vain. However, they are disposed to keep working on this.

**A personal remark of the session chair** There are around 300 reviewers who serve the conference; however, only 6 participated (including the chair). This may mean that it is not an attractive session (as compared to the other sessions), or/and many reviewers do not give a great deal of importance to the possibility to help improve the review system.

Given this and the participants’ opinions, critique and suggestions, I believe that the whole process should be improved in the following way for next year’s conference:

The PC defines a clear sequence of steps where precise rules are set out:
1. Formally deficient papers are rejected without revision.
2. The minimum quality of reviews will be defined and assessed; formally deficient reviews will be eliminated and the reviewer will be suspended for one year.
3. It is made explicit who takes the final decision: the reviewers or the programme committee.
4. Authors of papers that are accepted with minor or major observations shall evaluate the review’s usefulness.
5. Reviewers shall have a discussion forum in order to collaborate in their critique of a submitted paper.

I suggest to formally say “thank you” to the people who participated in the session. Additionally, special thanks to Camilo Olaya for helping with the report.

**Martin Schaffernicht**

**2:30 PM Tuesday: Parallel Session: Planning Models (Energy, CO2, Tankers)**

Sponsored by LISTO bvba, this session focused on models used for large-scale planning. Andy Ford chaired the session on Tuesday afternoon. The session was well attended, and the presentations provoked some interesting question-and-answer exchanges, despite the remarkable heat’s sapping our energy just a little. Below is a synopsis of the presentations.

“Modeling the Effects of the Single-Hull Tanker Phase-out on the World Oil Tanker Market.” Jim Ellison and Tom Corbet, both of Sandia National Laboratories’ Critical Infrastructures Modeling and Simulation Group, co-presented. Following the 1989 Exxon Valdez oil spill in Prince William Sound, Alaska, the United States passed legislation that increased the use of double-hull (rather than single-hull) tankers to transport oil and required that only double-hulled tankers be used after 2010. The resulting phase-out of single-hull tankers has the potential to affect the industry’s capacity to move oil from its sources to points of use. This is an important issue because currently two-thirds of the world’s oil supply moves by tanker. Over time, the distance oil travels by tanker has been decreasing; between 1972 and 2002, the average distance traveled decreased by 35 percent. Jim Ellison and Tom Corbet explored two issues in this study: discerning if there would be an oil supply crunch in 2010 due to tanker capacity, and exploring long-term implications of the industry possibly over-building new double-hulled tankers. They
constructed an industry-level model of oil tanker capacity (measured in billion-ton-miles; a single tanker’s capacity ranges from 80 to 300 deadweight-tons) and ran multiple scenarios of various industry growth rates to explore how capacity utilization could change over time. Through analyses of the simulations, they concluded that capacity could be tight through 2010, but a crisis was not likely; that industry tanker capacity utilization could fall very low in a longer timeframe, perhaps about 2018; and that individual firms’ quest for profits could create a tragedy of the commons for the industry, as it becomes less profitable to build and run tankers. The authors acknowledged that these conclusions would be affected by questions outside the scope of the model, such as how trends in oil use and oil demand and the average distance that oil travels by tanker will change in the coming years.

“Using System Dynamics to Extend Real Options Use: Insights from the Oil & Gas Industry.” Scott Johnson of the Business Dynamics group at BP presented this paper, which was co-authored with Tim Taylor and David Ford. Although real-option valuation has become common in many financial markets, the use of real options in the oil and gas industry remains relatively uncommon. Real options provide the holder with the right, but not the obligation, to change her strategy as key elements of uncertainty are resolved over time. This study used system dynamics modeling to plan—and, it is hoped, in the future to execute—applying real-option valuation to BP decisions about how and when to use reserves of oil and gas. Scott Johnson said that the authors constructed and used the model to date in the context of understanding how project managers actually act in the face of risk and uncertainty. For example, they asked project managers to write a paragraph on uncertainty and to fill in blanks in a paragraph template on uncertainty, which they then used to identify key words and issues. He then described two case examples given with the model to managers, one about the changing economic viability of a particular field, and the other about bad weather possibly delaying a project’s completion by more than nine months. He reported that the system dynamics modeling facilitated the managers’ deeper understanding of the problems and conveyed powerfully the economic impacts of various options under different resolutions of uncertainty. He acknowledged that, in imperfect markets, delays often obscure uncertainty resolution and that managerial goals and incentives may actually work against maximizing option values. Scott Johnson concluded by advocating that system dynamics can provide differentiated tools to people using real-option theory because it offers causal reasoning operationalized to a particular problematic situation as an alternative to the triangular probability distributions often used to depict risk.

“Simulating the Impact of a Carbon Market on the Electricity System in the Western U.S.A.” Andy Ford of Washington State University’s Program in Environmental Science and Regional Planning presented this paper, which reported on research funded by the US National Science Foundation between 2002-2006. The study explored the effects of creating markets for carbon emissions on the electricity-generation industry. Because electricity must be consumed when it is generated, and because there are long delays in utility plant construction and modification, the industry has traditionally been characterized by significant price spikes and boom-and-bust dynamics. Coal is responsible for generating most of the carbon emissions in the United States, and the electrical utility industry consumes most of the coal used. Therefore the utility sector can play a critical role in reducing carbon emissions. Using a system dynamics model dynamically linked to a Matlab model to explore the long-term effects on the utility industry as well as short-term effects on price and electricity transmission flow system dynamics model, Andy Ford simulated the effects of establishing a carbon-allowances market for the coal-burning utility industry in the western US. Through simulation analyses he concluded that drastic reductions in carbon emissions could be achieved during the next 20 years. Perhaps surprisingly, his analyses indicate that this can take place with retail price increases that are considerably lower than those predicted by many policy-makers. He asserted that, since it is not possible for coal-based plants to close for a few hours each day if they exceed emission allowances, these plants will necessarily close, and utility companies will explore and exploit other forms of electricity generation, such as wind-power. He advocated that establishing a trade for carbon-allowances could provide high leverage in reducing carbon emissions nationwide, since electrical utilities will lead the way into alternative power technologies if provided financial incentives to do so.

Laura Black

2:30 PM Tuesday: Special Session: Organizational Learning

One of the most important goals of system dynamics modeling and interventions is to achieve learning in and by organizations. Yet, system dynamics scholars seem to diverge on the kind of learning that is desired. For some the goal is to attain learning that is deep, double-loop, or generative in nature. For others the goal is to attain learning that is experiential, behavioral, and routine-guided in nature. Probably as a consequence, most evaluations of system dynamics modeling and interventions do not specify what kind of learning has been attained. For example, they refer to problem insight or even performance as an indication of the learning that has been accomplished.

The first purpose of this session was to clarify what level of learning system dynamics scholars want to achieve in organizations and how they intend to accomplish that. The second purpose was to clarify how the desired levels of learning should be measured and evaluated, in order to determine the effectiveness of system dynamics modeling and interventions in achieving these learning purposes. Finally, the third goal of this session was to reflect on the positive and negative aspects of the various levels of learning that system dynamics scholars consider desirable.

The three papers in this well-attended special session more or less addressed these three purposes. The paper by Visser centered on learning from the process of group facilitation and communication, vis-à-vis learning from the content of models and simulations. Here the author proposed a theory of group facilitation and communication, based on the work of Bateson, Watzlawick, and others. This theory permits an analysis of group facilitation processes on the basis of the same principles that inform system dynamics model building and simulation. Through this theory existing lists of appropriate facilitation skills and attitudes may be elaborated and augmented, leading to greater insight into the quality of the process of group model building and possible ways to evaluate that process.

In the brief group discussion of this paper the role of modeling by the facilitator was emphasized. Through correct modeling behavior many of the communication problems that Visser identified could in principle be solved. Yet, this ultimately may depend on the personality and experience of the facilitator.

The paper by Sarah, O’Brien and Haslrett described a group model building intervention in a department of an Australian university experiencing relationship problems, deterioration of communication and in general what Argyris
calls defensive routines. The intervention is embedded in an organization-wide capability-building program toward becoming a learning organization, in which a culture of dialogue and open conversation is highly valued. The authors concluded that their intervention, supported by the new learning culture program, has succeeded in achieving double-loop learning, and that the real learning was in the process, rather than the content, of the group model building.

In the brief group discussion of this paper the role of the CEO in the group model building team was mentioned in relationship to defensive routines in the department under consideration. Could it be that such routines go “underground” when the direct supervisor of the department is involved in the group model building effort? However, it turned out that the problems in the department were adequately solved in the process, and the direct involvement of the CEO is felt to have had a positive impact on dealing with the issues underlying this intervention.

The paper by Vaishnav, Khakifirooz and Devos described a US company employing a bell curve performance evaluation process. Here every six months the top performers are well rewarded, the large majority of average performers are encouraged, and the low performers at the bottom are being laid off. The authors observed several problems with this evaluation process, among others a demoralizing effect on employee morale, a rewarding of visible performance over actual, and an erosion of social capital in the company. The authors recommended a less rigid application of the bell curve and a balancing of pressure and morale, in particular by decoupling the issue of lay-offs from the performance evaluation process.

In the brief group discussion of this paper the argument was put forward that performance of organizational members is to a large degree determined by organizational structures, routines and processes and only to a small degree determined by individual effort. The bell curve system seems to neglect this, leading to the unnecessary dismissal of competent workers and the instilling of fear in employees for mainly wrong reasons. Further, it was noted that, while the bell curve evaluation process could be seen as a rather crude, behaviorist formal learning system, there were many unintended, informal learning effects that effectively undercut this system.

As a concluding note: there was a lot of good constructive and critical conversation in and after the special session, with questions even continuing over to dinner and to the next day. Clearly organizational learning is a topic that resonates within the system dynamics community. It may be worthwhile to harness the enthusiasm for this topic and to include issues of organizational learning in the 2007 conference planning.

Max Visser

2:30 PM Tuesday: Parallel Session: Pedagogic Applications

This very interactive and interesting session, chaired by Diana Fisher, consisted of three presentations: first, a talk about “Difficulties Understanding System Dynamics: A Challenge to Researchers, Educators, and Citizens,” a work by Matthew Cronin, Cleotilde Gonzalez, and John Sterman; second, a presentation entitled “Comparing Systems Thinking Inventory Task Performance in German Classrooms at High School and University Level,” by Hans Kasperidus, Hanno Langfelder, and Peter Biber; and last but not least, a presentation about “Teaching Strategic Management with the Industry Evolution Management Flight Simulator”, by Joe Hsueh, Gökhan Dogan, and John Sterman.

John Sterman and his colleagues examined people’s comprehension of stock and flow systems. In a series of six experiments they demonstrated that highly educated people have great difficulty understanding even the simplest stock and flow systems. For example, based on a simple diagram with the number of people entering and leaving a shop per minute, the subjects had to answer the question: During which minute were the most people and the fewest people in the store? The authors found that people have the cognitive capacity, can read graphs and also do take the problem seriously, but they are poorly able to recognize the stock-flow structure, and to relate the behavior of flows to the behavior of stock. They reasoned that people’s inability to properly understand the accumulation or depletion of a stock is a robust error, and that at least part of the difficulty arises from people’s inability to properly represent the basic principles governing accumulation. Given the ubiquity of stock-flow systems, and their importance in making informed judgments, the future work will deal with possibilities to eliminate the error, implications for teaching, and the relevance for communication between experts and public on important public policy issues.

Hans Kasperidus presented the results of an experiment with selected student groups at different German educational institutions. This experiment was about the assessment of basic systems thinking skills and system concepts. As other studies have shown before, overall performance was poor. The authors argued these are fundamental systems thinking errors and not just calculation mistakes. Age and education of the subjects seem to have no significant influence on performance, whereas gender does seem to play a role in performance.

The third presenter, Joe Hsueh, introduced the Industry Evolution Management Flight Simulator. The intention was to overcome several limitations of the case method which is the traditional way of teaching strategic management at business schools, and to capture the generic industrial structure with endogenous firm entry and exit. Joe Hsueh presented in his talk a version of this Flight Simulator with a complex strategic setting, represented by the video game industry. The players—the audience as CEO of Nintendo—made multiple decisions to increase the market share. The effects on market share revealed the importance of understanding that the main loops have a different weight in different circumstances. The busy discussion about the simulation and decision results actually overran the regular session time.

The room was overcrowded, but the attendees were enthused and appreciated the three very interesting presentations. We absolutely look forward to hearing new research results from the authors, particularly with regard to the question: “What does it take to improve performance?”.

Doreen Schwarz

2:30 PM Tuesday: Focused Research Session: Methodological Challenges for System Dynamics

This session was effectively a thorough discussion of the challenges ahead on the development and proper use of system dynamics. While Switbert Miczka and Erik Pruyt discussed the applicability of system dynamics for some kind of problems, Mirjana Kljajic presented her results about the effectiveness of system dynamics for teaching purposes. Matteo Pedercini and Kemal Sarica instead called for more understanding and better documentation of the “causal relationships” used in the models, and for more understanding of the underlying mathematics. The work of Xiaojing Jia also contributed to the mathematical basis for the analysis of models, specifically of newly gained feedback loops. Each of the six authors gave a very concise presentation of about five minutes and then a time for questions was given, where any of them could be addressed.

Matteo Pedercini gave an overview of the study he has conducted on the notion of causality—what is the extra element that makes a correlation a “causal” relationship? This is a study intending to achieve more understanding and calling for better documenting of causal relationships in models.

Later, Switbert Miczka presented a very interesting classification of how expectations about the future are formed, ranging from “straight from the gut” or intuition to explicit understanding or systems thinking. He also emphasized how the latter does not follow the two assumptions of univariance and auto regression, a fact often ignored in the literature.

Shortly after, Erik Pruyt presented his work on energy systems and climate change. He came to the conclusion that stand-alone system dynamics is not appropriate for studying dynamically complex multi-dimensional (societal) issues. He suggested complementing system dynamics with multicriteria analysis—in other words, simulation plus evaluation. He also advocated for the use of ethics in the process of defining the boundaries and what actually matters, which is the basis for both simulation and evaluation.
A change to these rather conceptual topics was brought by Xiaojing Jia, who explained her matrix system approach for the analysis of newly gained feedback loops in the context of human resources policies.

Mirjana Kljajic enriched the reflection even more by presenting the results of the experiments she and her collaborators have conducted in their business classes. These aimed to test the effect of using simulation models and feedback groups in teaching students how to formulate a business strategy. They found that the mode of facilitation does influence the decision process followed by students.

Finally, Kemal Sarica compared the analytical solution for the expected states (phase plane) based on the Lambert function with the results given by the different system dynamics simulation programs, which calls for further discussion and more understanding of the underlying mathematics.

Mónica Altamirano

2:30 PM Tuesday: Parallel Session: Business and Corporate Strategy

Understanding corporate strategies and their failures

Two papers were discussed in the parallel session on business and corporate strategy. In the first paper system dynamics is used to retrospectively explain why certain corporate strategies have failed. The other shows how a model-based learning environment can be used to plan and improve future strategies.

The first paper, “Hard-disk maker 1973-93 overshoot rooted in disruptive innovation,” presented by Nicholas Georgantzas, investigates disruptive innovation theory using a system dynamics model. Disruptive innovation refers to highly revolutionary or discontinuous innovations that let customers embrace new paradigms. A system dynamics model is built to highlight dynamic consequences of designing and implementing disruptive innovation strategies in established high-technology markets that contain over- and under-served customers. In the case study the model replicates the hard-disk makers’ overshoot and collapse dynamics that disruptive innovation allegedly caused. Model analysis shows that, over five distinct time phases, four different feedback loops become prominent in generating the hard-disk makers’ population dynamics from 1973 to 1993. Methods to detect and analyse dominant feedback loops in the model were discussed. In retrospect we can see that companies should invest in new technologies early enough to sustain disruptive innovation. This often entails a conscious choice of compromising deliveries to existing customers. The difficulties of making such a decision are reflected in the fact that in the research period only two hard-disk companies with tremendous effort have survived disruptive innovation cycles.

The second paper, “A system dynamics computer-based learning environment for the formulation of manufacturing strategy,” by Emmanuel Adamides, discusses how a learning environment that is based on a system dynamics model can improve the operational strategy formulation process. Scenario-driven manufacturing strategy formulation methodology is introduced, which can be used to address internal and external dynamics of the organisation and cope with future uncertainties. A system dynamics learning environment is used to articulate the linkages between strategy elements, simulate and calibrate the model to learn dynamics, and explore different scenarios. Practical use of the methodology and the learning environment was presented in a case study for one of the largest food processing companies in Greece.

Gints Ozolins

2:30 PM Tuesday: Poster Session: Growth and Market Development Strategies

There was a presentation about “Applying Models to Forecast Mobile Service Market Development” by Andrey Koblov, Vladimir Shiryaev, and Alexander Blinov. Their system dynamics model should give a better understanding of the competitive mobile service market, taking into account the problem of optimal price strategy synthesis. They considered the marketplace concerning the competition of five mobile companies. The foundation for the model was the Bass diffusion model with the drivers of diffusion the adoption from word of mouth and the adoption from advertising. The market share of the five companies was simulated and analyzed by using pricing policy, services quality, marketing and subscriber base.

Sabine Schmidt

4:30 PM Tuesday: Plenary Session: Methodological Foundation

The plenary session with the title “Methodological Foundation” took place on Tuesday afternoon from 4:30 PM to 6:00 PM and consisted of three presentations. For each presentation, half an hour was reserved for the presentation,
In the system dynamics related literature as well as on the system dynamics internet discussion list, several attempts have been undertaken to define system dynamics. However, each of them fails to mention if system dynamics is a field and/or a methodology. Vanderminden reasons that the lack of a clear and simple definition of what system dynamics is limits its usage. He presented two simulation models that depict the relationship between the state of the system dynamics field and the state of the system dynamics method. In both cases, the definition is self-referencing, or, to put it in terms of Poincaré’s dynamical systems, “the motorium provides the interpretation for the sensorium, and the sensorium provides the interpretation for the motorium.” In both cases, it is evident that the definitions are not helpful to explain system dynamics to interested people. Moreover, most definitions of system dynamics incorporate both the field and the methodology, leading to the result that the more the method is applied the more unfocused the field becomes.

Vanderminden proposed a need to decouple the method from the field and to use distinctly different terms for each of them. In addition, the definitions should include operations and terms that are not self-referencing. His suggestion is to use the term SD(M) when the methodology of system dynamics is considered, and SD(F) for the field of system dynamics. The benefit of this separation is that the field and the methodology can develop and evolve independent from each other. In other words, SD(M) can be used as a method of investigation that enables other fields to better investigate their field of study, and simultaneously frees members of the SD(F) and encourages them to develop new methods and use other methods appropriate to investigate, hypothesize and theorize about the object of inquiry of the field. After Vanderminden provided a definition of SD(M), he elaborated on the possibility that the content of the field of system dynamics is already covered by another field. In order to answer the question whether or not an akin field already exists, he distilled a definition for the field of system dynamics. The definitions of SD(M) and SD(F) provided below are drawn from Vanderminden’s paper presented at the conference in Nijmegen:

“SD(M) is a method by how one can model process structures and analyze their behavior through the investigation of how resources flow, accumulate and interact in the system, over time, in dynamic interdependent feedback loops.”

“SD(F) is the science of viability, emergence and sustainable dynamic adaptation of self-organizing systems.”
The second presentation, with the title “System Dynamics and Operational Research: Common foundations and new developments,” was delivered by David Lane. During the first part of his presentation, Lane explored the similarities between system dynamics and operational research using three examples concerning the creation of military defensive systems. Choosing a member of the IFORS’ Operational Research Hall of Fame, his first example was Patrick Blackett, a Nobel Prize winner in physics and “The Father of OR.” He worked on the air defense system of the UK during World War Two, eventually helping to create a system which used radar sighting data to control fighter aircraft and anti-aircraft guns to repulse attacking bombers.

Jay Forrester was the second example. As we know, during that same war Forrester was asked to develop servomechanisms for the control of radar antennas. In the 1950s he was central to the creation of the SAGE air defence system which used a network of radar stations and digital computers to control fighter aircraft and missiles to repulse bombers. Magnetic core memory, Forrester’s invention, was a central element of this system.

For his final example Lane presented Archimedes’ work during the Second Punic War. Asked to develop military means to support Syracuse against Roman attack, Archimedes developed and redesigned military devices and technical improvements based on information feedback about the enemy’s capabilities and the effectiveness of the devices.

The common roots of the field of system dynamics and operational research lead to a strong overlap in ideas that the fields display in their modern form. Both Blackett and Forrester have contributed significantly to the development of not only their fields but also the scientific community in general.

At this point in his talk, David Lane, a Fellow of the Operational Research Society, turned to the subject of “new developments” in the relationship between operational research and system dynamics—and the purpose of his session became clear. He had been empowered by IFORS to announce at ISDC 2006 that Jay W. Forrester has been made a member of the IFORS’ Operational Research Hall of Fame which comprises 23 members up to now. Lane described the purpose of the Hall of Fame and outlined the contributions that Forrester was judged to have made to OR that had made IFORS induct him to membership.

Nathan Forrester then read a response on behalf of his absent father. He first thanked David Lane for his interesting speech. Forrester then continued to elaborate the differences between the two fields. He argued that operational research is a wider field of inquiry, whereas system dynamics can be considered as a unified field which uses a method that follows six principles: (1) changes through time are caused by feedback loops; (2) only the two concepts of stocks and flows exist to represent system elements; (3) system dynamics is an experimental approach conducted via computer simulations; (4) system dynamics models are based not only on historical time series data but also on mental data bases; (5) system dynamics models specify directly the stock and flow structure of the studied problem, leading to a better comprehension; and (6) confidence in a model is established by thorough validation techniques. Forrester noted that the acknowledgement of his work by the field of operational research is a sign of interdependence of the fields and called upon both fields to elaborate how they can work together for a better world.

Michael Radzicki delivered the presidential address as the third presentation of this plenary session. In his presentation, Radzicki focused on one topic only, the System Dynamics Society, and regarded it from three different time perspectives: the history, the present and the future. Beginning with the past, Radzicki gave a lively portrayal of how the first idea came up to form a society for system dynamics in 1982. Decisions about the regional structure of the Society as well as about the publication organ had to be taken. After this appraisal of the past, he provided a snapshot of the status quo of the Society. Currently, the Society has members in 77 countries, 16 chapters, six special interest groups, and 29 sponsors. The Society consists of around 1000 members and grows with an average growth rate over the last 20 years of approximately 8%. The group of conference attendees has approximately half the size of the society members, but exhibits the same annual average growth rate.

As the final point in his presentation, Radzicki concentrated on the question what an individual can do to support the field of system dynamics. Researchers should choose an important problem and should create “good work.”
Teachers and professors should train their students to do good work on important problems in order to increase the capacity of the field of system dynamics. As a second part of the future of system dynamics, Radzicki concentrated on the contribution of groups, such as chapters and special interest groups. According to him, the future of the Society lies in these groups. One mission for a chapter or a SIG could be to present at other societies’ conferences. Thereafter, Radzicki mentioned several challenges to the field of system dynamics that have been elaborated by Richardson (1999), e.g. improving the implementation of model-based results, understanding model behavior, and accumulation of wise practice. Given these challenges, the presenter raised the question of what the properly trained system dynamicist should know. One possibility is that one has to become a simulation scientist and no longer a system dynamicist.

As the last issue for his presentation, Radzicki carved out challenges to the field that are caused by the member stock structure regarding age, gender and geographical distribution. However, even many challenges have to be met in the future, there is something to celebrate: the Society will have its 50th anniversary and next year’s conference will be the 25th annual International System Dynamics Conference. Radzicki closed his presentation with the words, "We may not be perfect, but we have accomplished a lot and have much to celebrate."

Stefan Groesser

9:00 AM Wednesday: Plenary Session: Business Applications

Paolo Gonçalves began this session promising, in the service of diversity, to deliver his talk in Portuguese. While he did not make good on that promise he did, in solid system dynamics tradition, demonstrate concern for the terminology and needs of practicing managers. He described his work with colleagues from Stanford on sales downturns and how this work led them to design and implement a process at Intel for identifying and balancing demand side risks in product transitions.

New product introductions were also the topic of the next talk, where Jan Juerging spoke of his work with Peter Milling. Given that companies face tradeoffs between rapidly introducing new product features and achieving production efficiencies, Jan and Peter built a model to identify the relative merits of a number of policies managers use for updating products and scheduling production.

Willem van Open continued the strong links to practice in this session as he related how his phone company (KPN) managed a dramatic turnaround after almost going bankrupt in 2001. While few in the lecture hall appeared to have heeded Willem’s unorthodox request to use their phones during the presentation (and at all other possible times to generate revenue for his company), we were all treated to a practicing manager’s account of bold changes in the incentive schemes used with suppliers and a “smart room” where KPN and a major supplier use system dynamics models to manage key performance indicators.

David Anderson brought the three talks together asking, to general agreement, if in each case the system dynamics models served as “boundary objects” that allowed for discussions to take place among people with competing objectives but a shared system.

Scott Rockart

11:30 AM Wednesday: Parallel Session: Use and Re-use of System Dynamics

Is system dynamics a paradigm, a philosophy, methodology, a method, set of techniques or tools, or a theory of structure? The first paper in this session attempts to place system dynamics within a framework of paradigms, and concludes that it is part of the Critical Pluralist paradigm: its ontology is critically realistic, its epistemology is subjective, and its axiology is concerned with value-ladenness. Also, its methodology is both quantitative and qualitative, it professes that causality is key to understanding the real world, and its logic is deductive and inductive. It determines the appropriateness of models and results by asking if models lead to real insight and understanding. Lastly, the appropriateness of strategies is assessed by their potential for structural transformation. The second paper shows the links between pragmatist philosophy and system dynamics, arguing that there is a distinction among abduction, deduction and induction that helps us resolve model validity issues. The last paper is an application of Saeed’s model of environmental mitigation banking to a new problem, the loss of mangrove lands in Thailand. Click here for the full-length report.

John Voyer

11:30 AM Wednesday: Parallel Session: Healthcare Reform

In the parallel session on health reform three diverse papers were presented.

David Todd (Symmetric SD) presented the paper “Reforming Mental Health Services in the UK–Using System Dynamics to support the change in depression services.” Todd and his co-authors, Eric Wolstenholme, Dean Repper, David Monk and Douglas McKelvie, reported on the use of system dynamics modelling to support the implementation of structured care guidelines for the treatment of depression. Under these guidelines new, intermediate level care
services had to be introduced on the local level allowing treatment of less severe forms of depression. Todd and his colleagues developed a model in order to understand what would happen if these guidelines were implemented. In a set of simulation experiments the base case (without the implementation of the new guidelines) was compared with the service after the introduction of intermediate care steps and with a “pure step care model” where all service users will flow through the lower care steps. These experiments showed that the base case will result in a deterioration of the services with longer waiting times, while the introduction of the intermediate care steps will decrease waiting. The “pure step care model” could be shown to allow double system capacity without additional resources. Subtle shifts in resources could therefore result in large improvements. The simulation model was used interactively in workshops. This work not only helped to plan implementation (including the shifting of resources) but also proved useful in generating engagement of clinicians in the change process and helped to speed up the implementation process.

In his paper “Expanding Health Coverage and Access for the Uninsured: A Model of Common Factors in the Experience of Several States” Gary Hirsch looked at a particularly challenging aspect of health reform in the US. He used a causal model of health care reform focusing on the expansion of health coverage in order to understand the success factors for this aspect of healthcare reform. This work drew on the experience of reform in several US states as well as concepts from political science (such as agenda setting and punctuated equilibrium). Giving particular attention to the political dimension of healthcare reform, Hirsch emphasised the important role of coalition building. He suggested that monopolistic approaches to healthcare reform were less likely to be successful than approaches which made use of a variety of tailored programmes covering different populations and which allowed the spreading of costs among diverse private and public payers. He suggested that a phased approach to reform reduced resistance of powerful interest groups and had greater chances of success than fundamental, one-off change. His model drew attention to the fact that a particularly promising reform strategy was the generation of savings through upstream investment in prevention and risk management as well as disease management. The reinvestment of these savings could then enable ongoing reform and expansion of coverage and a shifting of expenditure away from expensive high tech care.

James Thompson (University of Strathclyde and CIGNA Health Care) gave a talk titled “Making sense of U.S. health care system dynamics” in which he presented a relatively comprehensive model (over 160 levels and 1000 equations) of the US health care system. He described how this model is used to understand system behaviour and to forecast trends. The model integrates patient behaviour and development and utilization of health care services (including the supply of physicians and treatment facilities) as well as innovation in health care technologies. The model also includes the impact of cost-control initiatives of governmental and managed care organisations and the influence of medical malpractice organisations. This national level model allows the forecasting of price and consumption trends over a four-year time horizon in order to set insurance rates in advance of expenses. The model has also been useful for the interpretation of health system behaviour, such as the role of medical innovations in driving costs. An important feedback loop links the utilization of medical technologies to innovation in medical technologies which in turn results in higher utilization as unmet needs are addressed. Thompson’s paper reported how modified and more aggregated models as well as an equilibrium version of his model have been used to develop new policies and strategies for a managed care organisation. A version of the model has also been used to develop scenarios for the outbreak of pandemic influenza.

Steffen Bayer

2:30 PM Wednesday: Parallel Session: Operations Management

This well-attended afternoon session, chaired by Andreas Groessler, had three presentations on different aspects of operations management. The first talk—“I’m not hoarding. I’m just stocking up before the hoarders get here”—was presented by Gökhan Dogan, MIT. This talk proposed a novel explanation for poor performance by Beer Game players. The focus of the research was to explore the “outliers,” namely, Beer Game performers whose performance was so way out that there had to be more than misperception of feedback at play. In the second presentation, entitled “A Concept of Resilience in Production Systems,” Felicjan Rydzak from Wrocław University of Technology opened his talk by explaining how resilience focused on the dynamics of dealing with disturbance, and how this idea can be used to understand better the dynamics of reliability improvement programs. In the final talk, “Mining for Insights: Simulating the Dynamics of Process Improvement,” J. Bradley Morrison spoke about causes of implementation failure for process improvement programs. These included resistance to change, lack of senior management support, and explanations due to feedbacks at play in the system.

One of the first slides in Gökhan’s presentation showed the human side of a Beer Game “outlier.” It was a photograph of a player—a wholesaler—with a staggering amount of chips in front of him. This type of individual was the object of study. The challenge was to somehow get inside the mind of this player and discover the “heuristics” that were at play. Gökhan reasoned that the extreme ordering behaviour (30,000 chips in one order!) was not due to ignorance or a lack of understanding, because the game had been simplified so that every player knew that demand was constant. To find an explanation he turned to neuroscience: he explained that there are two parts of the brain, the rational and the emotional. In these situations, the only logical and rational explanation was that the players had “switched off” their rational “heuristics” and instead activated their emotional hoarding instinct. In conclusion, it could be said that when the hoarding instinct becomes the dominant behaviour mode, all rationality—bounded or unbounded—is lost, and regardless of goals, adjustment times, expected demand or what’s already in the supply line, the decision maker just keeps ordering more stock.

In the second talk, graphics were used to good effect to visualise the concept of resilience: a ball in between two peaks showing the current state, and once the ball was disturbed beyond a peak it move to a different part of the landscape. Resilience was defined as the ability of systems to experience disturbances and still maintain their functionality, or to link back to the graphic, their ability to stay in equilibrium between two peaks. Models based on machine reliability improvement programs were presented, using the example of the Dupont and Lima Refinery. Further to this, a stylized model of resilience in production systems was summarised, which explored the ideas developed in a paper by Repenning and Sterman, who wrote on the issue of quality management and the two alternative strategies of maintenance: preventative and reactive. In conclusion, Felicjan found that system dynamics is a viable approach for conducting analysis that focuses on the key concept of resilience management in production systems.

For the final talk, Bradley introduced the goal of the research, which was to build on the earlier work of Repenning and Sterman from 2002 which addressed the dynamics of process improvement programs. A mathematical model was presented, and the critical interaction between two areas of resource allocation was explored. The first area was how much to allocate to production, the second, how much to allocate to process improvement, and all of this in the context of management setting throughput goals which must be achieved. The model results demonstrated tipping points in the dynamics of process improvement, and showed that this tension in finding the balance between
throughput and process improvement is likely to thwart the good intentions of practitioners. In summary, the work shows how moving from causal loop models of process improvement to simulation can yield insights into this important operations problem.

Jim Duggan

The contributions in the “resource management” parallel session covered a wide range of resource management issues such as fishery policies and land use management as well as the diffusion of energy-efficient technology.

The first paper, by Erling Moxnes, entitled “Individual transferable quotas versus auctioned seasonal quotas, an experimental investigation,” analyses the transition dynamics of various regimes to allocate fish rights. The paper presents a laboratory experiment of a market with seven fishing firms to compare two fishery policies, individual transferable quotas (ITQ) and auctioned seasonal quotas (ASQ). Unlike traditional laboratory experiments, this experiment allows for dynamic adjustments of fishing capacities as well as quotas. While ITQs and ASQs exhibit no differences as far as efficiency is concerned the experiments reveal some surprising strengths and weaknesses of the two fishing regimes. For instance, having to pay variable prices, ASQs may lead to less variation in equity than owning ITQs. The discussion of this paper centered around the limitations on how much of the quota share fishing firms can hold and around the flexibility of the two fishing regimes in the long run.

The second paper, by Oxana Dordzhieva and Mats Svensson, is entitled “Preventing desertification and achieving sustainability in the Black Lands, Republic of Kalmykia, Russia: a system analysis approach.” The paper investigates how livestock, human population, saiga antelope and grassland depend on each other and influence land use and the generation of income. Model simulations show that the driving forces of the Black Lands’ grassland-livestock-human population system are human dependence on livestock as the main source of economic revenues and livestock grazing as the destructive factor of the grassland ecosystem. A number of scenarios are tested but the results indicate the same desertification and migration trends as the model base run. Policies that contribute to sustainability—both in terms of ecosystem viability and economic revenues for the population—are limited to limiting livestock grazing, controlling saiga poaching and providing the population with additional sources of income.

The third paper, by Stefan Groesser, Silvia Ulli-Beer and Mohammad Mojahedzadeh, is about the “Diffusion Dynamics of Energy-Efficient Innovations in the Residential Building Environment.” The paper presents insights from a preliminary model that explains the development of key variables of the building environment system. Model simulations reveal beneficial and less beneficial intervention points for the federal government with the objective of increasing the diffusion and adoption of innovations in the residential building environment. In addition, the strengths of the balancing and reinforcing feedback loops in the model are assessed. This provides decision support for the management of the innovation diffusion process. By and large, model simulations imply that a sound understanding of the decision process of potential building owners is necessary in order to design effective policies for the diffusion of energy-efficient building designs. Questions about the second and the third paper addressed, among other topics, the long simulation periods of the two models.

Birgit Kopainsky

2:30 PM Wednesday: Focused Research Session: Public-Private Sector Interaction, Across the World

System dynamics for better public policies.

Five papers related to public-private sector interaction from different parts of the world (Pakistan, South Africa, Latvia, the US and New Zealand) were discussed in this focused research session. Muhammad Azeem Qureshi, in a paper “Estimation, Prediction and Policy Design for Population and Universal Primary Education in Pakistan,” challenges government’s ambition to meet the goal of universal primary education by 2015 with current education policies. Adequate government spending on education is considered as a key factor to improve the situation. Inspired by T21, a system dynamics model is developed, which shows that with current spending levels only 75% of the target population will have primary education. As one possible policy it is suggested to channel more resources to decrease an alarmingly high dropout rate.

Martin Kaggwa presented main findings from the paper “South Africa’s Motor Industry Development Programme: A Case for System Dynamics Approach”. A system dynamics model is used to explain underperformance of policies to achieve sustainable development of the industry. Findings show stakeholders’ failure to acknowledge interrelationships and synergies between industry sectors. Thus the system dynamics model could play an important role in planning and evaluating policy actions based on possible effects on the industry as a whole.

Gints Ozolins discussed key findings from the paper “Systems Thinking for Research and Development Policy Impact Assessment in Latvia.” Main feedback loops that underlie technological innovations in a country were discussed and public policy levers identified. Following Lisbon’s strategy EU countries are aiming at increased public and private research and development spending. To meet this target balanced and holistic public policies should be developed to assure that required resources are available for sustainable growth.

George Richardson introduced the results of the study “Low Income Housing in the Context of Jay Forrester’s Urban Dynamics: A Lesson in Framing,” by Karen Jarzynka, in which Forrester’s model and its policy implications are
challenged. Several updates in the urban dynamics model are suggested that help achieve a better fit to data. Real world policies and their outcome (the city of Detroit is used for a case study) are tested with the original and the improved model. Simulation results do not disprove Forrester’s policy suggestions. However, the author suggests that common ground should be found for both long-term urban development programs and short-term needs of the population.

Finally Arun Abraham Elias introduced the paper “Environmental Conflicts, Stakeholders and a Shared Mental Model,” which gives an illustration of how group model building was used in developing a shared mental model of stakeholders in the transport infrastructure project in Wellington, New Zealand. Using casual loop diagrams and the “hexagon process” various interests of stakeholders in this environmental conflict were revealed. Qualitative analyses were done to provide insights into potential system behaviours.

Gints Ozolins

2:30 PM Wednesday: Parallel Session: Strategy Implementation

How implementation of strategy is affected by systemic structure was the theme of this session’s three presentations. The first paper discussed resource allocation in mergers and acquisitions. It was a multi-method study that used qualitative field research and a system dynamics model where the resource allocation process was formalized. The results showed that systemic structure affects allocation of the various types of resources (Product Integration, Marketing Operations, Technical Operations and Organizational Integration) that are needed for success of the corporate strategy move. The second paper discussed consistency, using many years of data from women’s magazines that showed organizations that try to achieve success through consistent application of simple rules are indeed largely successful–consistency is a “high point,” not Emerson’s “hobgoblin.” However, this result might not be true for organizations that need to innovate for high-velocity environments. The third paper used qualitative field data gathered from an initiative of the Canadian Economic Development agency that tried to create “Virtual Practice Communities.” The VPC initiative failed, and the research found that emergent systemic structure and archetypes created limits to success. Most of these limits cluster around culture and learning. Click here for the full-length report.

John Voyeur

3:30 PM Wednesday: Poster Session: Operations Management/Supply Chains

In this poster session are shown different uses of the system dynamics approach in the wide context of operation management and supply chains. It was so interesting to see some works with different objectives but with the same final purpose: make instruments to analyze the many relationships between variables in real world situations for management decisions. Let’s see quickly the many objectives of the papers: to capture generic structures and the intrinsic dynamic behaviour of supply chains, considering aspects of responsiveness and efficiency[1]; to understand the dynamic structure of digital product supply chains and evaluate possible policies to enhance their current performance[2]; to model different conditioning actions for minimizing the imbalances between supply and demand in supply chains[3]; to simulate the software testing process in order to get better understanding of the complexity of software development[4]; to simulate impacts of disruption in a network of chemical manufacturing plants by modelling the critical components[5]; to develop new alternatives to deal with demand amplification in logistics and production networks and analyse the effect of learning labs on inventory control[6].

[1] “Supply Chain Responsiveness and Efficiency—Complementing or Contradicting Each Other?,” by Dennis A. Minnich and Frank H. Maier

Fabrizio Baldoni

3:30 PM Wednesday: Poster Session: Stocks and Flows: Teaching and Learning

The “stocks and flows” session evoked a good response from the participants at the conference. Despite a late afternoon session, both the presenters and the audience of this session were quite vibrant. The session included posters on a variety of topics which were held together with a common theme. The presenters (Dhawan, Schaffernicht and Susta) were satisfied with their presentation and with the feedback they received from the audience.

The poster “Mental Models and Dynamic Decision Making: An Experimental Approach for Testing System Methodologies” by Dhawan, O’Connor and Borman presented results of a dynamic decision-making experiment conducted in a pre-test/post-test setting. This research seeks to explore the relationship between decision making in dynamic tasks and systems methodologies. The aim of this experiment was to test participants’ ability to perform in dynamic situations with a variety of skills: (i) With systems thinking skills alone; (ii) With a combination of systems thinking and system dynamics skills.

With this aim the following hypotheses were proposed:

1. The understanding (completeness and accuracy of mental model) of a complex system is enhanced when participants use systems thinking as a decision aid as compared to a control group not using any decision-aid.
2. The understanding (completeness and accuracy of mental model) of a complex system is enhanced when participants use a combination of systems thinking and system dynamics as a decision aid as compared to those who use mere systems thinking and controls.

Results displayed at the session showed that systems thinking skills alone are useful in situations where the task is simple; however these skills were inadequate to solve complex tasks. The relative contribution of system dynamics was apparent in complex tasks where performance increased manyfold. The poster evoked a good response from the system dynamics community and the author received feedback to refine the research design. The authors of the study are currently involved in a comprehensive study to test the effect of systems thinking, system dynamics and a combination of the two on dynamic decision-making, which they intend to present at the next conference.

The poster “LaTina–An online system for teaching and learning stock-and-flow thinking skills,” by Martin Schaffernicht, was based on the previously published literature on stock and flow thinking. “LaTina” uses one of these theories, based on Polanyi's work about implicit integration. According to the particular teaching model used here, beginners have to be given context-free rules that allow them to classify situations and determine actions. This has been done: there are rules for interpreting graphical information about inflows and outflows, rules for converting this into a net flow and rules for transforming this information into knowledge about a stock’s dynamics. The online system allows beginners to work through challenges and keeps track of the time needed and the attempts made; this enables each student to see how he or she progresses (less time and fewer attempts). It also allows us to observe how diverse groups of students develop over time, which is an opportunity to gather and analyse data. Beyond a very helpful discussion, there was interest from various participants to have some challenges in the English and German languages.

Schaffernicht also presented another poster on “Modifying the Beer Game to make its dynamic structure more salient.” The results presented by him this time suggest that the “real delivery” players receive is not a good signal for recognizing mental errors in their decision making, even though they think of the delay structure: there are too many orders mixed in most of the deliveries. Several modifications were suggested for future experiments, all of them having to do with the “interface” of the game (conceiving of the game as an interactive system that defines a space for interaction with its players). The author plans to conduct three new experiments based on this: one where the beer units are visually separated according to which purchasing order they belong to; a second where the orders and the beer units draw a trace on the screen (in order to trace out the actual routes and delays these things are taking) and a third where players can see their future inventory (anticipated) according to the current movements. He hopes to report on these experiments next time.

Marek Susta presented his work on serial killers through his poster “Modeling Serial Killer Development Theories.” Due to the very nature of this application, many people from the system dynamics community were interested to know about the patterns of behaviour serial killers follow. The author explained that serial killer behaviour used to be very rare in the Czech Republic, until recently when two cases in two years raised both expert and public discussion, only to discover that there are mostly emotions on the side of public and non-acquaintance on the side of professionals. Susta’s poster describes the process of the construction of a dynamic model to capture serial killers’ behaviour (psychobiological and/or psychosocial).

Rajat Dhawan
Application Award, and gracious thanks for an excellent conference to all the organizers and volunteers from President Michael Radzicki and Conference Chair Jac Vennix.

Michael Deegan described his NSF-funded PhD research at the University at Albany, “Defining the Policy Space for Disaster Management: A System Dynamics Approach to U.S. Flood Policy Analysis.” Despite the availability of current public policy tools and mitigation efforts, flood damage in the United States continues to rise. Deegan has developed a system dynamics model to complement the traditional cost-benefit approaches and to provide a policy space for a more robust policy analysis of the implications of various mitigation, incentive and regulation policies.

Since “natural disaster occurs when hazard meets vulnerability,” an effective disaster management policy to minimize damage must address both the physical hazard and the vulnerability long before a flood occurs. Using photographs, Deegan illustrated policy alternatives including flood-proofing, elevation incentives, land-use regulations and structural mitigation projects. Deegan’s reference behavior mode showed that although flood damages were initially reduced with the construction of levees after a large hurricane, increased development in vulnerable areas caused higher damages from later storms. Tracing the major feedback loops in the model offered an explanation for the behavior: people move back into vulnerable areas because mitigation projects like levees give them a false sense of security, causing even more damage—the “moral hazard” loop. Deegan will use his model to test more effective targeted policy solutions.

There was time for three questions from the audience. One asked how Deegan had defined the soft variable, “Willingness to develop in hazardous area influence on relocation.” This was an aggregated term representing other variables, fractions, and ratios from the literature. Another question asked how Deegan had determined that the moral hazards loop was the most important. Deegan explained that he had operationalized what his clients in the hazards community deemed most important and that this was not yet an insight derived from the model. Finally, there was a question about the demographics of people moving into vulnerable areas.

In “Recruiting clients to a community based HIV-prevention program: A dynamic model,” Robin Lin Miller and Ralph Levine presented a model developed by their team at Michigan State University to assess the effectiveness of a hypothetical evidence-based HIV prevention program. A global summary marking the 25th anniversary of the discovery of AIDS indicates the continued magnitude of the AIDS epidemic; it affects millions of people worldwide. In the United States, most NGOs are now directing their funding to evidence-based prevention programs—a small set of tested templates for service delivery.

The model was designed to assess the effectiveness of the most common type of program. In small-group HIV prevention workshops, around twenty participants attend eight face-to-face sessions. In practice, it is difficult to recruit many at-risk people to such a demanding program and to sustain their full participation. Low graduation rates lead to reduced funding and fewer services, while the goal of a prevention program should be to raise graduation rates and thereby reduce the number of people likely to contract AIDS.

The authors traced the causal loops in their dynamic hypothesis to explain how word-of-mouth growth in the number of program participants is constrained by difficulties in recruiting and graduating at-risk people. Model output showed that recruitment numbers consistently fall below recruitment goals under various conditions. The authors conclude that although evidence-based programs are thought to be the best way to serve the HIV at-risk population, they are actually very inefficient because only a few people can pass through the enrollment bottleneck. Policy changes are necessary to increase the effectiveness of HIV prevention programs.

There was time for four questions from the audience. The first asked about the move toward evidence-based programs. The authors responded that political factors are driving this change; organizations are being asked to discard current programs in favor of new programs that have not yet been studied in service delivery. Another question asked why the word-of-mouth model did not exhibit s-shaped behavior. The authors replied that the small numbers did not show the whole pattern. A related question asked what the equilibrium condition of the system is and what drives it. Because the model has a short time horizon, equilibrium has not yet been explored. Finally, a broader question asked about marketing efforts to improve HIV prevention program recruitment, a policy recommendation that the authors will take into consideration.

Dana Meadows Award Ceremony

Joel Rahn, chair of the award committee, presented the 2006 Dana Meadows Award for the best paper presented by a student at the System Dynamics Society conference. The award is given annually in honor of Dana Meadows, whose gifted teaching and thoughtful work on social and environmental issues has inspired system dynamists and many others. The award includes $500 for conference registration and travel and a book prize from Pegasus Communications.

The 2006 winner is Özge Karanfil from the Centre for Nonlinear Dynamics, Department of Physiology, McGill University, for her paper “A Dynamic Simulator for the Management of Disorders of the Body Water Metabolism.” Her paper deals with the body’s intricate self-regulation of fluids, specifically water intoxication resulting from intravenous infusions in hospital patients. Rahn called Karanfil’s work “exemplary in meeting the high standards of the Dana Meadows award.” Congratulations!

Honorable mention went to Jeroen Struben from the MIT Sloan School of Management; Burcu Tan from the Combens School of Business at the University of Texas at Austin; and H. Willem Geert Paff from Delft University of Technology.

Conference Closing

When Yaman Barlas invited conference chair Jac Vennix to give his closing remarks, Vennix approached the stage putting on his jacket and waving good-bye. He thanked everyone for an “inspiring and interesting conference,” noting that our conference attendance has grown considerably from the forty system dynamists who attended the last conference in Holland only sixteen years ago.
Alan Graham announced a new annual award, the **System Dynamics Society Application Award**, for the best paper presented at the conference describing a beneficial application of system dynamics. To qualify, the paper must describe an actual demonstrated benefit resulting from the use of system dynamics, and it must be co-authored by someone from the organization that benefited from the work. The award is intended to highlight “system dynamics doing good in the real world.” Papers may be submitted to Graham by April 15 of each year.

Society President Michael Radzicki thanked all the people whose hard work had produced a very successful conference. He specifically mentioned Bob Eberlein for the web-based submission and refereeing system, workshop chair Jack Homer, program chair Andreas Größler, conference chair Jac Vennix, organizing chair Etienne Rouwette, and, last but not least, executive director and conference manager Roberta Spencer.

Jac Vennix had the last word. He thanked all of the student volunteers, the gracious staff from the Nijmegen School of Management at Radboud University, all the helpful volunteers who had manned the registration desk and the Saturday satchel-stuffers. Looking back over the conference, Vennix noted that the highlight had been Jay Forrester’s induction into the prestigious Organizational Research Hall of Fame. Finally, he invited all to attend the conference in Boston next year commemorating the fiftieth anniversary of the field of system dynamics. “See you there!”

Debra Lyneis

**Post Conference Survey**

If you attended the 2006 Conference and have not yet filled out a Post Conference Survey, there is still time. If you have any comments you would like to share about the conference, please feel free to complete and send in anonymously the “**System Dynamics Conference Satisfaction Survey**.” The survey (in .pdf and .doc format) can be found on the Society website. Click on the gray button “2006 Conference” and then find the link “Post Conference Survey.” The direct address is [http://www.systemdynamics.org/conf2006/survey.pdf](http://www.systemdynamics.org/conf2006/survey.pdf) (or .doc. The completed form may be mailed to Etienne Rouwette, Radboud University Nijmegen, PO Box 9108, 6500 HK Nijmegen, The Netherlands or to the Society office. Additionally, comments may be sent to the Society office at system.dynamics@albany.edu.

Web Proceedings

The final version of the **web proceedings** was published October 15th. We have provided a link and an ISBN number. Additionally there will be instructions as well as a printable file for a CD label should you decide to download the proceedings to a CD. The contents of the printed abstract proceedings book are also available on the conference website.

Printed Abstract Proceedings Error

Unfortunately, there were merging **errors in the Printed Abstract Proceedings** for 2006. To correct these errors, first, please go to page 79 for the abstract titled “A System Dynamics Model of an ERP Application Designed to Produce a Transformation of IS Business Processes.” This abstract is associated with Michael S. Kennedy from London South Bank University; the contact information printed in the abstract proceedings book is incorrect. Next, go to page 98 for the abstract titled “Combining Relativism with Logic and Empirical Knowledge: Integration of PIMS with System Dynamics.” This abstract should list Andreas Hadjis from Cyprus College (ahadjis@cycollege.ac.cy) as the first author. To complete the corrections, please go to the Index (page 156) section H to add entry “Hadjis, Andreas, page 98” then go to section K (page 157) to change “Kennedy, Michael H.” to “Kennedy, Michael S.” for page 79.

Letters from Conference Participants

The Conference was super good! I really enjoyed it.

*Món Liu*

Once again, thank you for everything. This connection has just heightened my skills, enthusiasm, and interest.

*Mari Novák*

Thank you very much for the System Dynamics Society Nijmegen 2006 Conference conducted. It was a fantastic experience which I would always remember.

*Mahmood Alborzi*

The conference in Nijmegen was an exceptional experience. It was interesting to see how much connected daily business is to system dynamics and I am really looking forward to digging into the subject further in the near future. See you--at the latest--next year in Boston.

*Ralf Lippold*

Thanks so much for the great job by you, the staff and volunteers in Nijmegen. Every aspect of the conference and Policy Council meetings was well planned and executed. Nijmegen is a gem of a college town, urban center, and...
historic city. We always felt safe as we walked the streets, rode the bus or went for a drive. Wherever we went, we were rewarded with a wonderful cultural and personal experience. To have the city council co-host the lovely (and delicious) dinner on Tuesday made us feel a bit like visiting royalty. The conference is always a challenge to navigate -- so many great papers and speakers, so little time. But that's a challenge I look forward to with each conference and am never disappointed. Thanks again for the heroic effort and terrific results.

Jim Thompson

I want to thank you for all the work at Nijmegen, one of the conferences I have enjoyed most indeed! My best wishes and hopefully see you in Boston!

Camilo Olaya

Chapter and SIG News

Our Chapters and Special Interest Groups are growing! The Society currently has sixteen chapters: Australasia, Brazil, China, Economic Dynamics, Egypt, Hellenic, Italy, Japan, Korea, Latin America, Pakistan, Psychology, Russian, Student, Swiss, and the United Kingdom. There are currently six Special Interest Groups: Business, Education, Environmental Dynamics, Health Policy, Information Science and Information Systems, and Security. To find the lists of Chapters and SIGs, their representatives, websites and contact information, go to the Society Activities page on the Society website.

For information on how to start a chapter, please contact Ginny Wiley, VP Chapter Activities, at ginnyw@pegasuscom.com. For information on how to start a special interest group, please contact Deborah Campbell, VP of Member Activities, at deborah-campbell@comcast.net.

Australasia Chapter

As of July 2006, the Australasia Chapter of the System Dynamics Society has about 45 members from across the region. This is up from approximately 33 members in 2001. In terms of geographical spread, we have 28 members in Australia, 9 in New Zealand, 2 in Singapore, and 1 member in Indonesia.

In February 2006, the chapter held a one-day Research Colloquium in Sydney that attracted about 25 attendees (many chapter members and several potential recruits) from all over Australia and even a few from New Zealand. The event was organised to provide a forum for those submitting papers to the ISDC to get comments and suggestions for improving their work prior to submitting their papers. Of course, an informal get-together the evening before the colloquium was appropriately held at a terrace bar next to the Opera House overlooking Sydney Harbour. A big thank you to Geoff McDonnell and Mark Heffernan for organising the event and to Evans & Peck for sponsoring and hosting the colloquium in their Sydney offices.

In April 2006, John Morecroft gave two research seminars that were attended by several chapter members. The opportunity to check out the Australian surf was a key attraction for John’s visit to Sydney, and the waves did not disappoint him.

The Chapter is now sharing space on the HPSIG Wikipedia. Updates about chapter activities, discussion threads, seminars, conference announcements, and PhD and PostDoc opportunities are now being posted on the Wiki. Thanks to Geoff McDonnell and Mark Heffernan for hosting and maintaining the Wiki.

Finally, the Accelerated Learning Lab was launched in April 2006 at AGSM (Australian Graduate School of Management) in Sydney. The Lab combines basic research and executive training with a focus on accelerating the development of CEO-capable senior executives. Simulation microworlds, generic structures, and system dynamics modelling instruction all play prominent roles in the research agenda. Several chapter members attended to official launch of the Lab and the Lab’s seminar series is open to all chapter members.

To view slides of the Australasia Chapter Poster Session click here.

Shayne Gary

Brazil Chapter

The Brazilian Chapter (BC-SDS) meeting didn’t take place at the time and place it was scheduled for by the System Dynamics Society. That occurred because some of the members had to do presentations almost at the same time as the meeting. Instead of that we had many informal meetings where we discussed the main goal for this year, which is to have the first International Conference in System Dynamics in Brazil. That is scheduled to happen from
October 18th to the 21st, in Brasília.

The Brazilian Chapter members presents at the Nijmegen Conference were: Aldo Zagonel, Fernando H. Mazzuli, Leonardo Reis, Niraldo Nascimento, Paulo Gonçalves, and Ricardo Matos Chaim. The main topic discussed was the participation of international speakers (live and remote presentations over Internet).

Many contacts were made which resulted in the participation of the following researchers in the Brazilian Conference:

1. Kim Warren (remote)  8. Özge Karanfil (remote)
2. Andy Ford (remote)  9. Yaman Barlas (remote)
3. Bob Eberlein (remote)  10. Justin Lyon (remote)
4. Jim Hines (live)  11. Martin Schaffernicht (remote)
5. Juan Martín Garcia (live)  12. Mike Radzicki (remote)
7. Nathaniel Osgood (remote)  14. Aldo Zagonel (remote)

Other topics discussed were about the future of the Brazilian Chapter and the dissemination of system dynamics in Brazil.

Some actions were considered very important to implement after the conference:

- Development of the BC-Society website
- Creation of a newsletter for the Brazilian Chapter
- Increase the relationship with the Latin America Chapter
- Prepare the elections for the new Committee Members of the Third Executive Board of BC-SDS for the next 2 year term from April 2007 to March 2009, according to our bylaws.

Niraldo do Nascimento

Economics Chapter

The Economics Chapter of the System Dynamics Society brings together academics and practitioners who are interested in the application of system dynamics to problems in economic science. The chapter has 71 members, who work on such topics as monetary and fiscal policy, finance, economic development, transportation economics, and information economics. Several Chapter members are also very active in developing new curricula for teaching economics using system dynamics.

The Chapter convenes regularly during System Dynamics Conferences. In 2006, we met during the conference in Nijmegen. Moreover, in April 2006, several members flew to Phoenix, Arizona to present their work at the annual meeting of the Association for Institutionalist Thought (AFIT). The AFIT conference is a premier international meeting place for “heterodox” economists. The chapter organized two system dynamics sessions in Phoenix. Our papers were well received.

Prior to the conference in Nijmegen, Michael Reilly and Oleg Pavlov worked on printing a small batch of custom-made t-shirts with economics chapter “flying turtle”) insignia.

The Economics Chapter maintains a website (http://www.wpi.edu/~econsd) and uses a mailing list as its primary means of communication. Those wishing to join the mailing list can find instructions for doing so on the Chapter website. Last August, Lars Weber and his student Susan Voigt started a Wiki site for the chapter. It’s available at http://en.wikipedia.org/wiki/Economics_Chapter_of_the_System_Dynamics_Society.

The Chapter is currently in the process of compiling a comprehensive economics-related system dynamics bibliography. Please send us your entries.

David Wheat was elected President-Elect of the Chapter. David will become President in July 2007. At the present, the “troika” of officers is: Oleg Pavlov (President), Burkhard Schade (Past-President), David Wheat (President-Elect).

Oleg V. Pavlov

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Italian Chapter

Annual Report (2005-2006): The main activity of the System Dynamics Italian Chapter (SYDIC) has been designing and building the new website of the Chapter which is already on-line (www.systemdynamics.it). The site was designed and developed involving both Engineering faculty students of Rome “Tor Vergata” University and BSc Communication Sciences faculty students of Rome “La Sapienza” University. The SYDIC website has the aim to involve all the members in order to heavily and continuously interact by putting in common each other’s experiences.

The other important event of 2005-2006 academic year for the diffusion of system dynamics in Italy is the starting year of the brand new system dynamics course for advanced degree (II° level “Laurea”) students at Communication Sciences faculty- Rome University “La Sapienza”. The course, led by Habib Sedehi, aims to introduce the system dynamics methodology and development of simulation modelling.

In addition, as in the past years, there has been continuous academic activity in the field. The principal studies are the following, divided into the three geographical country areas:

North:
University of Milano “Bicocca” – Faculty of Computer Science – Thesis in System Dynamics applied in study of Flies' Life Cycle
University of Piacenza “La Cattolica” – Master of Management in the Network Economy – Business Simulation course
University of Padova – Faculty of Statistics – Integrative lessons to Simulation Course

Thanks to Michael’s perseverance and his financial backing, the t-shirts were printed. Even though Michael could not attend the conference, he shipped several t-shirts to Nijmegen. During the meeting, two t-shirts were raffled off. The winners were Vladimir Shiryaev and Andrey Koblov from Russia. Please contact Michael Reilly (reillycm@cox.net) if you have further questions about t-shirts.

Vladimir Shiryaev, Michael Radzicki, Andrey Koblov, and Oleg Pavlov.
University of Bologna – Faculty of Computer Sciences – Advanced degree in Information Technology & Management - Full course in System Dynamics & Strategy use of System Dynamics methodology

Research activity in System Dynamics at the Department of Computer Sciences

National Research Projects for 2004-2007 involving System Dynamics:

• Dynamics and Performance Determinants in Clusters of Firms: A Computational Approach (PRIN 2004)
• The evolution of clusters of firms: emerging technological and organizational architectures

Centre:
University of Pisa – Faculty of Computer Sciences – Department of Environmental Sciences – Full course in Environmental modelling with use of system dynamics

University of Rome “La Sapienza” – Faculty of Communication Sciences – Advance degree in Enterprise Communication – Full course in System Theory and Dynamic Modelling
Research and Thesis on use of system dynamics in different fields; Communication, Marketing, Project Management, Human Resource planning and e-Learning.

University of Rome “La Sapienza” – Master at Faculty of Statistics Sciences – Department of Data Intelligence and Strategic Decisions – Integrative lessons in system dynamics

University of Rome “Tor Vergata” – Faculty of Engineering – Department of Enterprise Engineering – use of system dynamics methodology in enterprise production processes
Research and Thesis in system dynamics in different areas; Operations Management, Business, CRM, Logistics & Transportation, Finance, e-Learning, Software Project Management

South
University of Palermo – Faculty of Political Sciences – Master in Managing business growth through System Dynamics and Accounting Models - A strategic control perspective

1 Roberto Berchi
2 Edoardo Mollona
3 Giorgio Gallo
4 Habib Sedehi
5 Stefano Armenia
6 Carmine Bianchi

Habib Sedehi
Latin America Chapter

The meeting was meant to develop a reflection concerning the major challenges the chapter has to meet in order to fulfill its purpose: to enhance the number of system dynamicists in the Spanish-speaking world. These challenges are presented by the following causal loop diagram (which is meant to support discussion only).
There are several factors that may be seen as adverse:

The Chapter spans over a group of countries and a wide geographical area; by consequence there are many divergent pressures and needs that make it difficult to cooperate. Also, there are very few opportunities to have face-to-face communication, which makes us depend more on the Internet. But the Spanish mail list is less attractive than the English one, since there are many more people connected to the latter. However, only use of the Spanish list can enhance its attractiveness (the positive feedback loop will either act as vicious or as virtuous loop). It was proposed that Chapter members should always at least send their messages to the Spanish list, too.

The “Revista de Dinámica de Sistemas” is going into its second year and is seen as an important instrument of the Chapter: it allows publication of system dynamics work and at the same time it communicates this work to a potentially large population. However, as a new review, it is not (yet) included in an index database, as even local databases require a minimum track history. Not even to speak of the System Dynamics Review’s greater attractiveness as publication outlet (for the authors). Again, only more use of the “revista” will bring about an upswing of attractiveness. In order to help, several activities were decided:

1. The existence of the “revista” has to be communicated to a broader audience, using general purpose newspapers, Internet and personal contacts.
2. The “revista” will apply for the LATINDEX database as soon as possible; based on this process, we will strive to be recognized by the SCIELO database (which for several Spanish-speaking and Portuguese speaking countries is something like the local ISI).
3. The “revista” will accept articles in Portuguese (and members of the Brazilian Chapter will referee).

There are few active Chapter members (in relation to the Society’s membership and in relation to the Latin-American population). This means that there is little “word-of-mouth” and also little marketing. However, in order to make new members, we have to generate a pool of interested people. How shall we go about this task?

The first activity is that we will systematically search unknown dynamicists: we know there are people out there working with system dynamics but they do not participate in the Chapter nor are they members of the Society. We can only suppose that they do not find membership an interesting option, but as long as we do not know who they are, we cannot find out how to be more attractive. So we started an initiative called “Operación San Andrés” whose members will work on this.
We believe that Spanish system dynamics material would help to generate interest, for example in bookstores. We feel that there is not a sufficient quantity of Spanish system dynamics-related material. This has to do with the fact that as long as there is no sufficiently large demand, editors will not be interested in producing this kind of material. So there has to be more than just the “revista” and the newsletter. There are several threads:

1. Translate school material: I have already translated the “Shape of change” lessons, which are currently on my website but will be sent to the Creative Learning Exchange shortly. More material (such as the book by Diana Fisher) will be translated. It is tremendously important to boost system dynamics in schools: its results will launch a self-reinforcing process and also build a system dynamics-literate population in the future.

2. There is currently a draft version of a system dynamics textbook specifically tailored to the local context (dedicating a substantial effort to fundamentals like causality, polarity and stock-and-flow thinking); having been written by one of us, it will be shared now and we will try to generate a broadly used textbook that will be attractive for commercial editors. This is important for system dynamics training in higher education, which generates the human capital for being able to offer system dynamics projects (thus starting another positive feedback loop).

3. Finally, there has to be material directed to the general public. Part of this is games and simulators, which allow newcomers a very tangible way to connect to system dynamics. The most known of these games is probably the Beer Game, which is currently distributed in the English language by the Society. In Latin America, some have bought the original Beer Game, but many have copied it or re-elaborated it in Spanish language. This is an adverse development, since it lowers the revenues of the Society and means that we do not know who uses the Beer Game and with whom. In order to reverse this, the Chapter could produce a Spanish version of the Beer Game and distribute it through its members, together with detailed instructions for facilitators; we would thus gain information about its users and also receive payments; this second aspect has still to be defined, since it means creating a legal structure capable of receiving the payments, and also it has to be defined if part of this shall be transferred to the Society. Certainly this should be settled during the Cancún conference in November.

The topic was raised if membership in the Chapter should be paid for. This would have at least two advantages: there would be some money to be converted into member services, and also this would be a positive signal (in many places, the fact that something is free means that it is worthless). However (just as in the Beer Game case) this would also mean some more bureaucracy. This issue will be discussed at the Latin-American Conference in November.

1 This name stems from the fact that the two members working on this – Mónica Altamirano and Camilo Olaya – are from Nicaragua and Colombia, respectively. The island of San Andrés was at issue in a border conflict between the two countries, but is nowadays seen as an opportunity to achieve mutual understanding between them (thanks for this explanation to Camilo Olaya).

Martin Schaffernicht with Camilo Olaya

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Pakistan Chapter

To view the August e-Newsletter of the Pakistan Chapter, including job opportunities, how to join, contact information and much more, click: Pakistan_e-Newsletter_Aug_06.pdf

Imtiaz Yusuf

Russia Chapter

During the Society conference in Nijmegen, Holland, our chapter presented a poster and held a chapter meeting attended by nine people. Our membership is growing: during the last year we acquired six new members with diverse backgrounds and a firm interest in promoting system dynamics in Russia. One of these members is Professor Dmitry Kavtaradze from the Moscow State University. He has been involved in the development of simulation games for educational purposes for many years. Another new member is Alexey Voinov from the University of Vermont. He also has a substantial experience with system dynamics and his website is offering an online course on system dynamics. We would like to find resources to produce the Russian version of this useful online tool.

The chapter's main objective is to rejuvenate our website and to turn it into the portal of information about system dynamics for Russian-speaking specialists, students and interested representatives from other fields. XJTek has become our official website sponsor and we hope that this partnership will be beneficial for our site.

We are planning to organise system dynamics courses in May of 2007 at Moscow State University. These courses are likely to take place after the conference on “Simulations and models: Management of natural resources.” The goal of these short courses (1-2 weeks) is the introduction of systems dynamics using simulation games for managers or various organisations, teachers and representatives from governmental organisations and NPOs.

Leeza Osipenko

Student Chapter

The Student Chapter has the primary objective of bringing together PhD students who are involved in system dynamics research and giving them the opportunity to raise key questions and/or concerns related to their research and discuss these in depth in a constructive and enjoyable atmosphere. Since 2000, the main activity of the chapter has been to organize a PhD Colloquium in conjunction with the yearly System Dynamics Conference. The objectives of
the PhD Colloquium are to bring together PhD students working on foundations, techniques, tools, and applications in system dynamics and to provide opportunities to present and discuss their research in a constructive atmosphere. It has been organized by PhD students and held as a full-day event on the Sunday before the conference every year for the last seven years.

The 7th PhD Colloquium took place on 28th of July, 2006. Eight students presented their work in plenary sessions which were followed by half-hour workshops to discuss the raised issues and problems in more detail. The poster session, in which ten PhD students presented their current state of research, started directly after the plenary sessions. Yaman Barlas concluded the students’ presentations with his interesting speech about validity, quality and improvement of system dynamics models. Approximately 70 people attended the colloquium and many were actively engaged in discussions. The papers presented at the PhD Colloquium will remain accessible through the Student Chapter website which has been updated recently (www.sdstudentchapter.org). Thank you to everyone who contributed to make the day an interesting and vivid event. To read a “First Timer’s” report on the PhD Colloquium, see the Session Reports section of the newsletter.

Approximately 20 people participated in the latest Student Chapter meeting, taking place in the late afternoon after the PhD Colloquium in Nijmegen, Sunday the 28th of July 2006. Özge Pala, Radboud Universiteit Nijmegen, and Brice Dutée, University College Dublin/Ecole Centrale Paris, chaired the meeting, but both did not want to continue their work as members of the policy council of the Student Chapter. A new Student Chapter committee was elected:

• President, Matteo Pedercini, University of Bergen, Norway
• Chapter Representative and PhD Colloquium 2007 Organizer, Stefan N. Groesser, University of St. Gallen/University of Berne, both Switzerland
• PhD Colloquium 2007 Organizer, Chintan Vaishnav, MIT, USA
• Committee Member, Ines Winz, University of Auckland, New Zealand
• Committee Member, Andrea Bassi, University of Bergen, Norway

The main focus areas for the new Student Chapter committee will be to organize the 2007 PhD Colloquium in Boston, update the Student Chapter website, and establish a quarterly newsletter. The website (www.sdstudentchapter.org) provides more details.

Stefan Groesser

Swiss Chapter

The Swiss Chapter consists of researchers, educators, consultants, and practitioners in the corporate and public sectors. Approximately 110 people currently receive our emails.

In late 2005 we introduced a membership fee whereas we granted a discount to members of the International System Dynamics Society. To date more than twenty persons have paid the membership fee for 2006.

The activities of the Swiss Chapter include:

• Chapter meetings at least three times a year. The number of participants in chapter meetings has been around ten ever since we first met in 2003 (although there are distinct oscillations). In chapter meetings we usually combine a presentation about system dynamics in action with the discussion of organizational issues.
• Round table for students in the field of system dynamics and related disciplines every three months. The location of the round table meeting alternates between the University of St. Gallen and the University of Lugano.
• Modeling workshops preceding the official chapter meetings. In the course of these two-hour workshops we present a business case which provides the opportunity for hands-on modeling practice.
• Additional, irregular activities involve enhancing academic and consulting competencies as well as educational programs.

Special activities in 2005 and 2006 included:

• The revision and completion of our homepage: www.systemdynamics-swisschapter.ch
• The revision of our bylaws. The chapter bylaws are now better aligned to the Swiss law under which we are regulated.
• The presentation of the Swiss chapter at the special chapter and SIG poster session at the Nijmegen conference. (Swisschapter_poster.pdf)
• The elaboration of a summary of the Nijmegen conference for our chapter members. The summary contains general information about the conference and three reports: the conference from the perspective of a PhD student, from the perspective of a researcher and from the perspective of a practitioner.

Since late 2005 the University of St. Gallen (webpage) and the University of Lugano (management of the annual membership fees and accounting) have provided institutional support: Birgit Kopainsky and Thomas Beck

UK Chapter
Website: There is a new revamped website at www.systemdynamics.org.uk. The site sets out all our activities and future plans. It is now considerably smarter and easy to update.

Annual Gathering at Harrogate: In 2007 (1-2 February) the gathering will be themed around “System Dynamics Reaching Out”. With developments in web-based conferencing technology it is now possible to communicate model insights with clients and colleagues in a virtual mode. This event will explore the capabilities now available – and what might be expected in the future.

- Michael Bean will talk on how simulations can be broadcast over the web.
- Bob Thurlby from BT will describe his company's use of system dynamics to engage clients in the utilities sector.
- Khalid Saeed will appear from the USA by weblink.
- Alfredo Moscardini will talk on his experiences with Egyptian clients and
- Christina Spencer will demonstrate the Jane Sloan strategy dynamics microworld.

This promises to be an exciting and highly informative meeting and we look forward to a good attendance.

Networking Meeting: Our successful first networking meeting in 2005 is to be repeated as a Christmas drinks party on 12th December 2006. Again it will be in London. Venue & date to be advised.

Nijmegen Conference: Around 35 UK delegates were present according to the System Dynamics Society list. The six Chapter Policy Council members present tried to meet with as many as possible (apologies if we missed you!). The Chapter hosted a poster board depicting our range of activities. This was a new initiative from the organisers of the conference.

Comments to: Brian Dangerfield (Chapter Liaison) b.c.dangerfield@salford.ac.uk or Rod Brown (Secretary) secretary@systemdynamics.org.uk

Brian Dangerfield

Business Special Interest Group

The Business SIG held its second business meeting and roundtable discussion at the recent System Dynamics Conference in Nijmegen. Several new members participated, encouraged by the poster session held earlier in the day. Our membership continues to grow, with about 60 members representing academia, business, and consulting. Members come from a great many countries around the world. We remain in contact currently via a Yahoo group site and email list.

Our discussion was primarily an extension of the brainstorming session held last year in Boston. Our goal was to develop a short list of high-impact activities for the members of this SIG to tackle. We determined that a prevailing problem is the difficulty of inculcating system dynamics as a planning and visualization tool into the corporate world. Three major initiatives are underway to address this issue:

1. Include a business usage track in the program of the 25th International System Dynamics Conference next year in Boston. Topics that may be considered include how businesses have adopted system dynamics; how system dynamics has been taught to the business community, especially its leaders; and the success of system dynamics models in predicting outcomes of strategic decisions. Members of the SIG are searching their contact lists for people who may provide relevant, meaningful insights into system dynamics in the business community.

2. Prepare a business dynamics review article for the upcoming special edition of System Dynamics Review. System dynamics methodologies have been applied to a wide range of business issues and concerns. Since, at its roots, system dynamics is a business tool, it seems appropriate that members of this SIG take on the challenge of illustrating these applications and the benefits derived from using system dynamics.

3. Plan for a roundtable meeting in Boston to discuss a significant issue associated with system dynamics within the business community. Members are generating ideas for a topic that will attract significant participation and provoke stirring dialogue.

Anyone interested in joining this SIG or in helping with the activities outlined above, please contact me at jboyersds@yahoo.com.

Jeff Boyer

Environmental Special Interest Group (E-SIG)

The Environmental Special Interest Group (E-SIG) of the System Dynamics Society held two activities at the 24th ISDC in Nijmegen, The Netherlands: the annual administrative meeting and a discussion roundtable. The E-SIG
also participated in the new Chapter/SIG session of the conference.

**Administrative Meeting**
The Administrative Meeting was chaired by Anastássios Perdicoúlis, and attended by circa 10 people. The following resolutions were made:

1. The E-SIG website maintains its provisional logo. The webmaster, Ines Winz, may explore the possibility for a Wiki type of website.
2. Anastássios Perdicoúlis concluded his three-year service to the E-SIG. Allyson Beall was nominated by Richard Dudley as a new officer, and was elected by majority. The current E-SIG officer list is:
   - Richard Dudley: (representative) third year ends at the meeting in 2007
   - Tom Forest: third year ends at the meeting in 2008
   - Allyson Beall: third year ends at the meeting in 2009

**Roundtable**
The roundtable discussion was chaired by Anastássios Perdicoúlis, and attended by circa 15 people. The theme was “E-SIG Activities,” and the following resolutions were made:

1. The E-SIG shall register past and present activities of individual and collective members, in the form of projects, publications, or scientific areas/domains. This information should be directed from the members to the E-SIG webmaster (Ines Winz), who will update the website accordingly.
2. Members may indicate their plans for future activities either on the E-SIG website or through the Sdsustain discussion list, in a way to facilitate collaboration and synergy.
3. Collaborations of E-SIG members, within the System Dynamics Society and beyond, may include data exchange, discussions, publications, academic supervision, etc.

**Poster**
The E-SIG participated in the Chapter/SIG poster session with a contribution from Anastássios Perdicoúlis, illustrating one application of system dynamics in the theme Environment. The poster, “Contributions of SFD and CLD to the Impact Assessment Process”, shall be made available online from the Society. Future participations in the Chapter/SIG poster session give the opportunity to the E-SIG to organize and demonstrate system dynamics work in the theme of its special interest.

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![Tasso Perdicoúlis, Ines Winz and Richard Dudley were......](image1)

![Where we wished to be!](image2)

**Anastássios (Tasso) Perdicoúlis**

**Health Policy Special Interest Group (HPSIG)**
The highlight for the Health Policy Special Interest Group (HPSIG) was a Special Convened Session on the Sunday afternoon preceding the ISDC. The session began with presentations of six papers that addressed various aspects of health reform at the local, regional, state, and national level. There was also a brief presentation on recent Dutch experience with health reform. These presentations were followed by a discussion of common issues facing those who attempt reform of health care systems. The final portion of the meeting was a discussion of future directions for the HPSIG and possible topics for a session at the 2007 ISDC. These included:

- Looking at some of the same topics across different countries. We could solicit country-specific papers on a topic, using the same template to facilitate comparisons.
- Considering financing at a National level, but capacity issues at a local level to help deal with differences in geographical distribution of resources. Ways of increasing capacity might include tapping non-traditional resources and streamlining the care delivery process. We could try to address these issues by working with policymakers at multiple levels.
- Two topics that were suggested as ways we could help to move care “upstream” toward more prevention of illness. One would be promoting the design of systems that partner health care with related social services. The other would look at effects of the environment on health care and vulnerability to illness and how adverse effects of the environment could be reduced. If we pursue either of these topics, we would have to better define what we mean by upstream interventions.
- Systems thinking training for health professionals was suggested as an additional function that the HPSIG might serve. In general, people felt that the HPSIG should be reaching out to the mainstream health community in order to have greater influence on policy.

We agreed to continue thinking about these and other topics and to communicate our ideas by email in order to plan for next year’s conference.

At the conclusion of the session, Gary Hirsch was elected President of the HPSIG for 2006-2007 and David Rees was elected Vice President.

Gary Hirsch

Click to view the report of the related special convened session, click: “Dynamics of Health Reform”.

Information Science and Information Systems Special Interest Group (iSIG)

The Information Science Special Interest Group (iSIG) was officially recognized by the System Dynamics Society in June 2006. The objective of the group is the advancement of the application of system dynamics to information science and information systems related problems. iSIG encourages research, networking and advocacy within the system dynamics community and in other select academic and professional communities that focus on information science and information systems research and practice. The group met during the annual meeting in Nijmegen. The group maintains a mailing list and plans to start a website soon. Please contact Vedat Diker, Luis Luna-Reyes, or Oleg Pavlov for further information.

Oleg Pavlov

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Announcements and Call for Papers

The 12th Australia New Zealand Systems Society Conference

- Sustaining our Social and Natural Capital
- 3rd - 6th December 2006
- Carrington Hotel, Katoomba
  New South Wales Australia

For more information go to the Australia and New Zealand Chapter's conference page at: http://www.hpsig.com/index.php?title=ANZSYS

Worcester Polytechnic Institute Adds On-line Class to Spring 2007 Schedule

We are pleased to announce that we have added the System Dynamics Foundations course to our Spring, 2007 distance learning offerings. The Systems Dynamics Foundations course is the first course of the WPI System Dynamics certificate and degree programs. This course explores the counter-intuitive dynamics of complex organizations and how managers can make the difference between success and failure. This course will be taught by Professor Jim Hines.

• Audit students are welcome at a 50% reduced tuition rate - which gives you full exposure to all course materials.
• Take courses for credit if you are considering certificate or degree.

Please share the good news — tell a co-worker or friend about this great opportunity!!

Latin America Chapter Newsletter and Conference

The Spanish newsletter of the Latin America Chapter is out and available at:
(it is just over 1GB, please be patient while the file opens.)

It includes a report and photos from the 2006 System Dynamics Society conference in Nijmegen as well as the announcement of the 4th Latin American Conference of System Dynamics to be held November 7-9 in Cancún (Mexico).

For more information, contact Martin Schaffernicht, Universidad de Talca, Chile. (martin@utalca.cl)
Classes start January 15, 2007. Visit WPI Distance Learning Registration to register today.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
<th>Faculty</th>
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<tbody>
<tr>
<td>24499</td>
<td>SD550</td>
<td>System Dynamics Foundation: Managing Complexity</td>
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<td>Hines</td>
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<tr>
<td>23973</td>
<td>SD551</td>
<td>Model and Experimental Analysis</td>
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<td>23974</td>
<td>SD554</td>
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<td>23976</td>
<td>SD561</td>
<td>Environmental Dynamics</td>
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(course descriptions can be found at [http://www.wpi.edu/Academics/Depts/SSPS/Graduate/sdcourses.html#sd550](http://www.wpi.edu/Academics/Depts/SSPS/Graduate/sdcourses.html#sd550))

Questions? Contact WPI Distance Learning  Email: pshelley@wpi.edu  Phone: 508-831-6738  Website: www.online.wpi.edu

Click here to view or print flyer with all the above details.

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**2007 International System Dynamics Conference Boston, Massachusetts, USA**

2007 marks the 25th annual conference of the System Dynamics Society and the 50th anniversary of the founding of the field.

In celebration, the conference will feature a number of special events marking these important milestones. The conference will bring together more than 500 people working in system dynamics and systems thinking. Presentations by practitioners and world leaders in the field will cover a wide variety of topics. Join us for this wonderful occasion on July 29 – August 2, 2007!

**Local Host:** System Dynamics Group, Massachusetts Institute of Technology, Sloan School of Management, Cambridge, Massachusetts, USA

**Location and Venue:** Boston can be reached easily by train, plane and car. Parking for a fee will be available onsite.

**Program:** The conference program will consist of invited and contributed sessions and workshops demonstrating the state of the art in the theory and application of system dynamics. In
addition, panel discussions, special interest group sessions, student colloquia, the modeling assistance workshop, events of historic interest, vendor displays, exhibits, demonstrations, Society business meetings and other related activities will be scheduled. The conference schedule will provide time for relaxed social and professional interaction. The conference will bring together diverse perspectives on the application of system dynamics to important issues in the theory of complex dynamic systems and the practical use of these tools to address critical real-world challenges.

### Deadlines and Key Dates

<table>
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<th>Date</th>
<th>Event</th>
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<td>January 2, 2007</td>
<td>Opening date for paper submissions and workshop and session proposals.</td>
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<tr>
<td>March 26, 2007</td>
<td>Paper submission deadline. Workshop and session proposals due.</td>
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<tr>
<td>May 16, 2007</td>
<td>Notification of acceptance.</td>
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<tr>
<td>May 23, 2007</td>
<td>Final abstracts due for Printed Abstract Proceedings.</td>
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<tr>
<td>June 6, 2007</td>
<td>Presenter registration deadline. Papers of unregistered designated presenters will be removed from the program.</td>
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<tr>
<td>June 15, 2007</td>
<td>Tentative program schedule.</td>
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<td>June 21, 2007</td>
<td>Conference registration fee increase and deadline for hotel reservations.</td>
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<tr>
<td>July 29, 2007</td>
<td>PhD Colloquium, Policy Council Meeting.</td>
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<tr>
<td>July 30, 2007</td>
<td>Boston Conference Opening!</td>
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</tbody>
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### Contacts

**Conference Chair:**
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Policy Council Holds Summer Meetings in Nijmegen

Minutes of the Meeting of the Policy Council and the General Business Meeting can be found in their entirety by clicking the “Governance” button on the System Dynamics Society website. Please visit the website to learn about the business discussed and to view the complete reports and information presented.

Motions approved at the Policy Council Meeting:

- Greece proposal for the 2008 conference
- Albuquerque proposal for 2009 conference
- Proposed 2007 Budget
- Establish Psychology Chapter
- Nominating Committee for 2007 openings

2009 - Albuquerque, New Mexico, USA

The Policy Council has chosen Albuquerque and Sandia National Laboratories as the host of the 2009 Conference, subject to confirmation at the Winter PC Meeting next January. The Albuquerque proposal, presented by Len Maleczynski and Aldo Zagonel highlighted the uniqueness and attractiveness of the proposed venue, offered a high-level program committee headed by Andy Ford, and presented reasonable accessibility and financials. Some of the highlights of the proposal are the volume of system dynamics activity taking place at the National Labs, the special cultural environment of New Mexico, and numerous points of attraction in proximity of the Conference Hotel—located in Albuquerque’s Historic Old Town. It is expected that the 2009 Conference in Albuquerque will achieve high attendance and significant participation by experienced practitioners. In order to enhance the quality of the experience, the organizers will strive to develop partnerships, particularly with international research institutions, other National Labs, and Southwestern academic and private organizations, as well as identify local sponsors as a means to reduce costs.

For more information on the Albuquerque Conference, see the Conference Proposal Poster (2009_proposal_poster.pdf) and accompanying Fact Sheet (2009_factsheet.pdf).

Aldo Zagonel

Members of the 2009 Conference Committee gathered in Nijmegen to celebrate the PC decision and to begin planning for an exciting conference. Invited guests included Jim Lyneis (who could not attend), Roberta Spencer, Yaman Barlas, and Rod MacDonald. From left to right, Roberta, Ed Anderson, Len Maleczynski, Yaman, Krys Stave, Andy Ford, Aldo Zagonel, Jim Ellison, Tom Corbet, Mike Dwyer, Nacho Martinez, and Rod. Three members of the Program Committee, Dave Ford, Jack Homer and Steve Conrad, were not in attendance.
No one is authorized to use Society membership or conference lists
Mike Radzicki will form a committee to explore the relationship with ISSS (International Society for the Systems Sciences) and report back to the Policy Council
Pacific Rim conference by 2011

Motions approved electronically via Winter 2006 Policy Council E-Meeting:

- Nominees for Society officers and PC member posts
- Nominations for new VP posts
- Conference scholarships
- Conference program guidelines
- Revised Conference Site Selection Timetable
- Conference Program Revision -- Drop CDs
- Establish the Information Science and Information Systems SIG (iSIG)

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- Bolide Pty. Ltd.
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- CALIBRE
- City of Nijmegenen
- Decision Dynamics, Inc.
- Delft University of Technology
- Deutsche Lufthansa AG
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- Forio Business Simulations
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- GE Insurance Solutions
- General Motors
- Georgia-Pacific Corp.
- Global Strategy Dynamics Ltd.
- Hall, Vasil & Dowd, CPA's
- International Society for the Systems Sciences
- ise systems
- John Wiley & Sons, Ltd.
- Kamer van Koophandel Centraal Gelderland (Chamber of Commerce)
- Lane Press of Albany
- Ledet Enterprises, Inc.
- LISTO bvba

Publication and Contact Information

The System Dynamics Society publishes the System Dynamics Newsletter four times a year.
Editors: Roberta L. Spencer, Robin S. Langer, and Jennifer I. Rowe

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The End