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Welcome to ISSS 2010

We are pleased to welcome you to Waterloo for the 54th Annual Conference of the International Society for Systems Sciences on the theme “Governance for a Resilient Planet”. I hope you will leave Waterloo with new ideas, new friendships and a renewed appreciation of the potential for systems sciences to contribute to our understanding and our capability to create a sustainable future.

Our morning keynotes will address aspects of the theme. Monday keynotes will focus on governance, law and accountancy; Tuesdays on resilience and adaptation, particularly in the world of organizations; Wednesdays on the world of biology and public health; Thursday on design and individual responses and Friday on the future... the incoming presidential address of Dr. Jennifer Wilby and the student prize paper. We are planning to leave ample time for questions in the morning to seed further discussion throughout the day.

This year we will offer free public lectures and a demonstration in the evening. Michael Ben-Eli will speak Monday evening and Pille Bunnell will speak Tuesday evening. On Wednesday evening Gabriele Harrer will demonstrate Ecopolicy – a computer game based on Frederick Vester’s biocybernetics. We will also have the opportunity to enjoy another aspect of communication with Abbey North Drummers who will lead us in participative percussion experiences in the evenings after the conclusion of the regular programme.

It is interesting to reflect on how many things have changed since the founding of the Society in 1956 and how many recur in the areas of governance and communication. In the context of the Cold War, 1956 saw the Suez Crisis and the Hungarian Revolution. Israel and Palestine were in the news as was Sudan among other countries undergoing decolonization. That year also saw the opening of the submarine trans-Atlantic telephone cable and moves by the IATA to standardize the alphabet for pilots and air traffic controllers.

The Cold War is over but the Middle East, Sudan and other former colonies remain flash points. Many of the seeds of current conflicts in governance were sown in the fifties, shaped by the Cold War and by privileges and boundaries that were established according to expediency. Communications technology and its integration has developed to an extent unimaginable fifty-four years ago but the ability to get the right information to the right people in a timely manner has not kept up, whether it concerns environmental, financial or social vulnerabilities.

This year’s theme addresses these issues as it acknowledges the consequences of past decisions. Our governance structures and the popular understanding of their possibilities and limitations lag far behind the challenges we face from global problems. Sometimes it seems as if little has changed in governance structures since the inception of the

Society. However, among some organizations, there has been more transparency, more democracy and more and broader accountability across social and environmental measures as well as financial ones. The activities of corporate social responsibility are part of this as are efforts by governments to solicit the opinions of the governed in more effective ways.

There is much more to be done as few approaches as yet look at whole systems and the complex and integrated network of relationships and transactions that produce the issues we face every day. From the beginning, systems sciences have been addressing concepts that are just now beginning to be seen by many to be central to achieving humane and sustainable results.

Concepts like assuring that the reward systems in use do not reward short term gain at the expense of long term collateral damage, making sure that all the knowledge is in the room when making important decisions and having some appreciation of the role played by scale. In nature you do not find 'too big to fail'. Such monstrosities do not survive in the first place. But in social terms, our governance structures have not prevented some organizations to become so prominent that when things go wrong the unpalatable choice has been to download the consequences of their bad decisions onto the public. The public is learning about systems the hard way. Financial failures on a grand scale, an oil spill that has incalculable costs and a myriad of other infections of the body politic pose increasing risks to those far outside their boundaries.

Let's remember that systems sciences are needed to understand and address these issues. They and we have a great deal to contribute. When and how that recognition will come cannot be predicted but it will come because the world is made up of systems and only systemic approaches have requisite variety to meet the challenges we face.

So be of good cheer. Network like mad, tweet, blog and otherwise take advantage of Wilfred Laurier's wifi capability. Above all, extend yourselves and enjoy yourselves remembering that the most valuable resources on offer are the personal connections you can make and the ideas you can share. Get up early for the Round Table and remember the pub will be open late. Take advantage of these few days in July to advance that new idea to a receptive audience and to ask that question that's been puzzling you.

It has been an honour to serve as your president this year and I thank you.

Allenna Leonard
President, ISSS, 2009-2010

Sunday: July 18, 2010, Pre-Conference Workshops

REGISTRATION DESK OPEN 12:00 – 17:00 (Lobby, Bricker Academic Bldg)

07:45 to 08:45 ISSS Roundtable Discussion (Lounge, Bricker Residence)

10:00 – 12:30 Pre-conference Workshops		
1.	Modelling Bayesian Networks, Continuing Day 2...Practising development of models in your own area of interest; interacting with each other via the website for model verification, refinement and updating. <i>Ockie Bosch and Carl Smith</i>	Bricker Academic Building Room 111
10:00 – 16:00 Pre-conference Workshops		
1.	Vester Sensitivity Modelling Malik Management Centre, Switzerland <i>Gabriele Harrer</i>	Bricker Academic Building Room 112
2.	Modeling Support for Disaster Prevention and Recovery - Systemic Challenges for First Responders <i>Gerhard Chroust</i>	Bricker Academic Building Room 113
13:00 – 16:00 Pre-conference Workshops		
1.	Global Governance and a World Without War <i>Ken Burkhardt</i>	Bricker Academic Building Room 110
2.	Traditional Chinese Medicine Healthcare Protection Program - a possible missing component in the systemic thinking of the health governance for a resilient planet <i>Thomas Wong</i>	Bricker Academic Building Room 111
3.	The Student SIG Introductory Meeting/Workshop <i>Nicholas Magliocca</i>	Bricker Academic Building Room 202

17:30 – 20:00 Reception and Roundtables

This year, the ISSS Reception will include a facilitated introduction to the society, and opportunities to meet and talk with the leaders of individual SIGs (special integration groups) of the society. Facilitated by Alexander and Kathia Castro Laszlo.

This session is designed to accomplish two primary objectives:

1. to share with Conference Participants information about each SIG from their respective Chairs in an open and interactive setting, and
2. to stimulate cross-pollination and the interpenetration of ideas among and between the SIGs

Accordingly the session will be run as follows:

- ⊙ Alexander and Kathia will set the stage with general introductory comments and a message of welcome.
- ⊙ SIG Chairs will assemble on stage and each will be provided with no more than 3 minutes to present the theme and focus of their respective SIG. This portion will be conducted in the spirit and tradition of soap-box oratory in a market place of ideas.
- ⊙ SIG Chairs will then be invited to comment on, make connections with, and otherwise explore the implicit and explicit systemic relations between and among their SIG and the others. This portion will be conducted in the spirit of a modified closed fishbowl conversation ([http://en.wikipedia.org/wiki/Fishbowl_\(conversation\)](http://en.wikipedia.org/wiki/Fishbowl_(conversation))).
- ⊙ The final portion of this session will involve audience participation with an open microphone available for conference participants to pose questions, make comments or suggestions, or otherwise interact with the SIG Chairs.
- ⊙ The session will conclude with closing remarks by the facilitators, and **socialising** for evening!

The Reception will also feature a session by The Abbey North Drummers – a participative percussion group

Monday: July 19, 2010

Theme: Governance

REGISTRATION DESK OPEN 08:00 – 17:00 (Bricker Academic Bldg, Lobby)

7:45 to 8:45 ISSS Roundtable Discussion (Bricker Residence Lounge)

09:00 Plenary Session (Bricker Academic Bldg, Room 101)	
09:00	Conference Opening and Welcome
09:15	Chair of Plenary: Allenna Leonard
	Governance in the Relative When Dr Allenna Leonard, President ISSS, 2009-10
	Accosting the Government Challenge Dr Javier Livas
10:45 Tea/Coffee (Bricker Ground Floor Lobby) – Poster Viewing	
11:15	Governance and Finance for a Sustainable Planet Alan Willis and Mark van Clieaf
12:00	Question Time
12:30 Lunch (Wilfrid Laurier Dining Hall)	

14:00 1- 4 Parallel Sessions			
1	2	3	4
<p>Bricker Academic Building Room 110</p> <p>Evolutionary Development Chair(s): Alexander and Kathia Castro Laszlo</p> <p>1487 From Systems Thinking to Systems Being: The Embodiment of Evolutionary Leadership <i>Laszlo, Kathia Castro</i></p> <p>1338 (1337) Mechanism and Medievalism in Contemporary Social Theory: Systems Suggestions for Transformation <i>Hanson, Barbara</i></p> <p>1473 (1474) Systems of Belief More Than Reality in Socio-Economic Evolution <i>Hilton, Brian John</i></p>	<p>Bricker Academic Building Room 111</p> <p>Critical Systems Theory and Practice Chair: Todd Bowers</p> <p>1313 (1502) Triple Task and the Philosophers Stone: Discovering a Methodology for Systemic and Reflective Participation <i>Bell, Simon George; Morse, Stephen</i></p> <p>1465 (1466) Ontological Support for Multiparadigm Multimethodologies: Isomorphic Process–Structures and the Critical Moment <i>Bowers, Todd D.</i></p> <p>1505 'Holistic Approach' and 'Reductionist Approach' <i>Ngano, Jean Paul</i></p>	<p>Bricker Academic Building Room 112</p> <p>Organizational Change Chair: Isaias Badillo Pina</p> <p>1365 Building Community Resilience in the Face of Peak Oil and Climate Change: Meditations on the Transition Town Movement and Paradigmatic Change <i>Buse, Chris; Hasdell, Rebecca</i></p> <p>1373 (1412) Implementing an Ethical Merchandising Code in a Community Market <i>Vodonick, E. John</i></p> <p>1455 (1459) Fallacy and Ostentation of Corporate Social Responsibility (in Some Companies) <i>Barrera, Ricardo; Frias, Ricardo Andres</i></p>	<p>Bricker Academic Building Room 113</p> <p>Systems Modeling and Simulation Chair: Janet Singer</p> <p>1385 (1386) Towards a Holistic Approach for Modeling Financial Volatility <i>Morales-Matamoros, Oswaldo; Contreras- Troya, Teresa I.; Mota-Hernández, Cinthya I.; Trueba-Rios, Beatriz</i></p> <p>1387 (1388) Structural Equation Model for the Multidimensional Measurement of the Poverty in Mexico <i>Flores-Jimenez, Pedro; Morales- Matamoros, Oswaldo; Tejeida-Padilla, Ricardo</i></p> <p>1322 (1405) Secure Communications: Chaotic Synchronization on Rössler Circuit. <i>Cisneros Tamayo, Ricardo; Hernández, Alejandro Vivas; Pacheco, David Plascencia; Bojorges, Nidia Escamilla</i></p>
15:30 Tea/Coffee (Bricker Ground Floor Lobby) – Poster Viewing			

16:00 1- 4 Parallel Sessions			
1	2	3	4
<p>Bricker Academic Building Room 110 Evolutionary Development Chair(s): Alexander and Kathia Castro Laszlo</p> <p>1479 Creating a Generative Dialogue Platform By Integrating the Essence of the Model United Nations and the World Café <i>Hsin, Haydn; Li, Ming-Fen; Lin, Kingkong</i></p> <p>1340 (1394) Innovation through Knowledge Science and Knowledge Management Supported By Soft Systems Methodologies <i>Avalos, Elvira; León Vega, Cirilo</i></p> <p>1345 (1397) Systemic Design for the Recycling of Solid and Liquid Organic Wastes and the Hydroponic Growth of Organic Food: A Natural Cycle of Death and Life <i>Peon-Escalante, Ignacio E; Turpin, Silvie Marion; Sanchez-Gongora, Maria Antonieta</i></p>	<p>Bricker Academic Building Room 111 Designing Educational Systems Chair(s): Ockie Bosch</p> <p>1354 (1392) Designing a Class to Teach Multi Viewpoints <i>Shirasaka, Seiko; Kohtake, Nachiko</i></p> <p>1421 (1488) Towards a Global-Systems Steering Vision That Is Simple Enough, But Not Too Simple: Symviability <i>Boyd, Gary; Zemen, Vladimir</i></p> <p>1482 Governance Best Practices Begins At Home <i>Zohar Harel, Tamar</i></p>	<p>Bricker Academic Building Room 112 Organizational Transformation and Social Change Chair: Isaias Badillo Pina</p> <p>1407 (1464) Resilience, a Necessary Property for the Housing Problem of Ushuaia: the Inherent Factor for the Governance <i>Frias, Ricardo Andres; Gessaga, Tariana Maia</i></p> <p>1362 (1507) Enacting Wholeness-Infinity Theory to Foster Wholeness Praxis of Social Enterprise for Global Sustainability <i>Lin, King Kong; Li, Ming-Fen</i></p> <p>1472 Intellectual Communism Encourages the Individuals' Creativity and Capitalism's Innovation: Systems Thinking From Hegel, Lessig and Luhman <i>Takahashi, Kazuyuki Ikko</i></p>	<p>Bricker Academic Building Room 113 Service Systems Science Chair(s): Janet Singer</p> <p>1443 (1378) Value Co-Creation Model of Service Innovation: Symbiotic Hypergame Analysis <i>Novani, Santi; Kijima, Kyoichi</i></p> <p>Pernegg Presentation and Discussion <i>David Ing, Gary Metcalf, Kyoichi Kijima, Jennifer Wilby, Todd Bowers</i></p>
Dinners available on campus or local restaurants			
19:30 Evening Plenary – Open Lecture, Bricker Academic Building, Room 101			
19:30 to 21:00	Rethinking Everything - Michael Ben Eii Followed by Abbey North Drummers – participative percussion group		

Tuesday: July 20, 2010

Theme: Resilience

REGISTRATION DESK OPEN 08:00 – 17:00 (Lobby, Bricker Academic Bldg)

07:45 to 08:45 ISSS Roundtable Discussion (Lounge, Bricker Residence)

09:00 Plenary Session (Bricker Academic Bldg, Room 101)

09:00	<p>Chair of Plenary: Debora Hammond</p> <p>Exploring the Adjacent Possible: Scenario Development for a Resilient Future Thomas Homer Dixon</p> <p>The Ludwig von Bertalanffy Lecture: Systems Thinking Research Rediscovered: Ludwig von Bertalanffy and the Society for General System's Research's Relevance in the 21st Century Stephen Haines</p>
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10:30 Tea/Coffee (Bricker Ground Floor Lobby) – Poster Viewing

11:00	<p>Advanced Syntegration for Meeting the Challenges of the Great Societal Transformation 21 As Illustrated by the Practical Example of an Austrian Province Fredmund Malik</p> <p>Measuring Citizen Satisfaction Roy Wiseman</p>
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12:30 Lunch (Wilfrid Laurier Dining Hall)

14:00 1- 4 Parallel Sessions			
1	2	3	4
<p>Bricker Academic Building Room 110</p> <p>Evolutionary Development Chair(s): Alexander and Kathia Castro Laszlo</p> <p>1462 Fostering the Collective Wisdom of Communities with the Quintessence of Hero's Journey <i>Sung, Pei-Shan</i></p> <p>1343 (1424) Psychological Panarchy: Steps to an Ecology of Thought <i>Varey, Will</i></p> <p>1486 Texturizing Emergent Reality: the Theory and Practice of Evolutionary Ichemy <i>Laszlo, Alexander</i></p>	<p>Bricker Academic Building Room 111</p> <p>Organizational Transformation and Social Change Chair: Tamar Zohar Harel</p> <p>1470 Collaborative Discovery of the Structure of Concerns: Understanding and Navigating Complex Problem Systems <i>Weigand, Kirk; Jones, Peter; Flanagan, Thomas</i></p> <p>1410 (1461) Systems Thinking for Strategic Development <i>Gregory, Amanda J.</i></p> <p>1420 The Yin and Yang of Change – Systemic Efficacy in Change Management <i>Klein, Louis; Wang, Tao</i></p>	<p>Bricker Academic Building Room 112</p> <p>Designing Educational Systems Chair(s): Ockie Bosch</p> <p>1370 (1401) Educational Curriculum for Multi- Disciplinary System Design and Management <i>Kohtake, Naohiko; Maeno, Takashi; Nishimura, Hidekazu; Shirasaka, Seiko; Ohkami, Yoshiaki</i></p> <p>1335 How to Make Systems Thinking become a Main Stream in Society? <i>Nguyen, Nam Cao; Maani, Kambiz; Bosch, Ockie</i></p> <p>1480 (1485) General Systems Essentials: an Introductory Course for a Modern Generalist Curriculum <i>Vesterby, Vincent</i></p>	<p>Bricker Academic Building Room 113</p> <p>Living Systems Analysis Chair: James Simms</p> <p>1314 (1349) The Possibilities of Mapping Natural Systems into Organizational Systems - Part 1 <i>Salwa, Dominika Maria</i></p> <p>1353 (1402) The 2010 Earthquakes in Haiti and Chile: A Comparative Systemic Analysis <i>Aceves, Francisco J; Audefroy, Joel; Alvarado, Jesus</i></p> <p>1427 Principles for Making Soft Sciences Hard: the Newton Model <i>Simms, James R.</i></p>
15:30 Tea/Coffee (Bricker Ground Floor Lobby) – Poster Viewing			

16:00 Workshops		
1	2	3
Bricker Academic Building Room 110 Meet with the IFSR What you need to know about publications: journal ranking, papers, and publishers. A presentation by the IFSR.	Bricker Academic Building Room 111 An informal discussion about Relational Science and how it applies to everyday contexts, issues, and familiar situations.	Bricker Academic Building Room 202 Student SIG Discussion Group Nicholas Magliocca
Dinners available on campus or local restaurants		
19:30 Evening Plenary – Open Lecture, Bricker Academic Building, Room 101		
19:30 – 21:00	Chair of Evening Plenary: Allenna Leonard Resilience and Robustness: A Dynamic View of Conservation and Change Pille Bunnell Followed by Abbey North Drummers – participative percussion group	

Wednesday: July 21, 2010
Theme: Life and Health

REGISTRATION DESK OPEN 08:00 – 17:00 (Lobby, Bricker Academic Bldg)

07:45 to 08:45 ISSS Roundtable Discussion (Lounge, Bricker Residence)

09:00 Plenary Session (Bricker Academic Bldg, Room 101)

09:00	Chair of Plenary: Ockie Bosch Food Policy for a Resilient Future Debra Hammond Surfing the Pandemic Wave: Poise, Passion and Managing Insoluble Problems David Waltner-Toews
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10:30 Tea/Coffee (Bricker Ground Floor Lobby) – Poster Viewing

11:00	Rights, Responsibilities and Resilience, or, Auntie Phyllis and the Bloody Great Fork Ron Cottam Question Time
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12:30 Lunch (Wilfrid Laurier Dining Hall)

13:45 1- 4 Parallel Sessions			
1	2	3	4
<p>Bricker Academic Building Room 110</p> <p>Socio-Ecological Systems Chair: Jon Li</p> <p>1450 (1454) A System That Works: Building a Decentralized Global Political Economy Using the Viable System Model <i>Li, Jon</i></p> <p>1356 Toward a General Theory of Land-Use Systems <i>Magliocca, Nicholas</i></p> <p>1445 (1491) Associations for the Reciprocal and Mutual Sharing of Advantages and Disadvantages <i>Bricage, Pierre</i></p> <p>1368 (1429) A Complex Adaptive Systems Approach for the Green Growth <i>Kwon, Hyuk Kihl</i></p>	<p>Bricker Academic Building Room 111</p> <p>Systems Applications for Business and Industry Chair: David Ing</p> <p>1358 (1436) Total System Intervention for System Failures and Its Application to ICT Systems <i>Nakamura, Takafumi; Kijima, Kyoichi</i></p> <p>1413 A Factors Defining Economic Organizations in Relationship to the Groups that Make Them Up <i>Henderson, Mary E.</i></p> <p>1484 Project Management Performance Assessment on the Attainment of Construction Sustainability: Knowledge-Based System Approach <i>Corona-Suarez, Gilberto A.; Arcudia-Abad, Carlos E.; Loria-Arcila, Jose H.</i></p>	<p>Bricker Academic Building Room 112</p> <p>What is Life and Living Chair(s): John Kineman and Judith Rosen</p> <p>1463 Not 2, But 3 : Always! <i>Cottam, Ron; Ranson, Willy; Vounckx, Roger</i></p> <p>1317 (1391) Information and Living Things <i>Arango, Juan David</i></p> <p>1419 (1492) Know Thyself: Applications for Anticipatory Systems Theory in Medicine and Psychology <i>Rosen, Judith</i></p> <p>1501 The Origins of Natural Systems by Means of Contextual Relation <i>Kineman, John</i></p>	<p>Bricker Academic Building Room 113</p> <p>Health and Systems Thinking Chair: Thomas Wong</p> <p>1352 (1399) The A H1N1 Influenza Pandemic: A Systemic Analysis of Its Genesis, Evolution, and Socio-Economic, Cultural and Health Consequences <i>Aceves, Francisco J; Valdes, Mario A; Alvarado, Jesus</i></p> <p>1446 (1447) Knowledge Inheritance in Traditional Chinese Medicine (TCM) <i>Gu, Jifa; Gao, Rui; Li, Lantao; Zhu, Zhengxiang; Song, Wuqi</i></p> <p>1477 The Quest for a General Information Gathering Process for Diagnosis At the Macroscopic Level and the Microscopic Level - the Traditional Chinese Medicine Eight Principle Differential Diagnostic-Cure Process <i>Wong, Thomas Sui Leung; Huang, Yan</i></p> <p>1360 Pandemic Influenza in Metropolitan Seoul Area with a Well Developed Public Transportation: Individual-Based Simulation with Korean Data <i>Kim, Chansoo; Chung, Hwangwon; Oh, Jung-Soo</i></p>
15:45 Tea/Coffee (Bricker Ground Floor Lobby) – Poster Viewing			

16.00 1- 4 Parallel Sessions			
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<p>Bricker Academic Building Room 110</p> <p>Human Systems Inquiry Chair: Shankar Sankaran</p> <p>1324 (1414) Leadership of Nonprofit Organizations in the Aged and Community Care Sector in Australia <i>Sankaran, Shankar; Cartwright, Colleen; Kelly, Jacqueline; Shaw, Kelly; Soar, Jeffrey</i></p> <p>1363 (1449) Enacting Wholeness-Praxis Communities for Transforming Global Unsustainability with Collective Wholeness Consciousness <i>Li, Ming-fen; Lin, Kingkong</i></p>	<p>Bricker Academic Building Room 111</p> <p>Designing Educational Systems Chair: Ockie Bosch</p> <p>1351 (1393) The Hard Facts of Soft Social Systems: Boulding's Typology Elaborated to Explain Behavior in Schools and Workplaces <i>Gabriele, Susan Farr</i></p> <p>1503 (1504) The 'Maribor Concept' of Systems Education: Specialization without Over- specialization <i>Zenko, Zdenka; Mulej, Matjaz</i></p>	<p>Bricker Academic Building Room 112</p> <p>Spirituality and Systems Chair: Thomas Wong</p> <p>1433 Dynamic Co-Creation <i>MacGill, Victor Ronald David</i></p> <p>1478 Entropy Debt, Entropy Cycling and Karma - the Teaching of Buddha in Terms of System Theory <i>Wong, Thomas Sui Leung; Huang, Yan</i></p>	<p>Bricker Academic Building Room 113</p> <p>Systems and Mental Health Chair(s): Pamela Buckle Henning and Tamar Zohar Harel</p> <p>1333 (1364) Disequilibrium, Development, and Resilience through Adult Life <i>Buckle Henning, Pamela</i></p> <p>1341 The Influence of Systems on John Bowlby's Work in Attachment Theory <i>Metcalf, Gary S.</i></p>

17:00 Workshops			
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Bricker Academic Building Room 110 Project Wadi Attir: A Model Sustainable Desert Community Michael Ben Eli	Bricker Academic Building Room 111 IASCYS Discussion of Membership Criteria Matjaz Mulej	Bricker Academic Building Room 112 Living Systems Analysis: Making Soft Systems Hard James R. Simms	Bricker Academic Building Room 202 Student SIG Discussion Group Nicholas Magliocca
Dinners available on campus or local restaurants			
19:15 – 20:15	EcoPolicy Game, It's a cyberbetic world -- play your way to a new understanding of our complex world! Room 110, Bricker Academic Bldg		
19:15 – 20:30	ISSS Council Meeting (all SIG Chairs, Board, Trustees, national and regional chairs to attend), Wilf Pub		
20:30 – onwards	Past Presidents' and Students' Fireside Chat, Hawks Nest, on campus in the Fred Nichols Campus Center		

Thursday: July 22, 2010

Theme: Design

REGISTRATION DESK OPEN 08:00 – 17:00 (Lobby, Bricker Academic Bldg)

07:45 to 08:45 ISSS Roundtable Discussion (Lounge, Bricker Residence)

09:00 Plenary Session (Bricker Academic Bldg, Room 101)	
09:00	<p>Chair of Plenary: Gary Metcalf</p> <p>Fear for Sustainability: A Transdisciplinary Approach</p> <p>Jacob Sperber, Restoring the Positive Functions of Fear</p> <p>Jeremy Coplan: Have Genetically Fearless Agents Led us Astray?</p> <p>Markus Schwaninger: Reframing Fear as a Trigger for Restoring Sustainability</p>
11:00 Tea/Coffee (Bricker Ground Floor Lobby) – Poster Viewing	
11:30	<p>Design, Systems and Cybernetics</p> <p>Ranulph Glanville</p>
12:15	<p>Question Time</p>
12:30 Lunch (Wilfrid Laurier Dining Hall)	

14:00 1- 4 Parallel Sessions			
1	2	3	4
<p>Bricker Academic Building Room 110</p> <p>Socio-Ecological Systems Chair(s): Jon Li</p> <p>1342 (1379) Conscious Purpose in 2010: Bateson's Prescient Warning <i>Guddemi, Phillip V</i></p> <p>1481 Social Networks Are Effective Adaptive Mechanisms to High Uncertainty in Desert Livelihood and Ecosystems in Central Australia Maru, Yiheyis Taddele</p> <p>1334 (1415) Closing the Loop: Systems Thinking Led Sustainable Sanitation Project in Australia <i>Sankaran, Shankar; Abey Suriya, Kumi; Gray, Janice; Kochenko, Anthony</i></p>	<p>Bricker Academic Building Room 111</p> <p>Systems Applications for Business and Industry Chair: David Ing</p> <p>1382 (1384) The Soft Systems Methodology on the Implementing of a GPS System, in the Trucking Companies <i>Elizalde-Medrano, Adrian; Tejeida-Padilla, Ricardo; Orduñez-Zavala, Enrique; Mendez-Diaz, Jorge</i></p> <p>1403 (1404) Viable Systems Model and Quality of Hospitality Services <i>Briones-Juarez, Abraham; Tejeida-Padilla, Ricardo; Badillo-Piña, Isaias José; Morales-Matamoros, Oswaldo</i></p> <p>1398 (1400) Analyzing the Bullwhip Effect in After-Sales Spare Parts Supply Chains in Telecom Firms, a Complex System Approach <i>Tejeida-Padilla, Ricardo; Flores-Cadena, Mauricio; Morales-Matamoros, Oswaldo</i></p>	<p>Bricker Academic Building Room 112</p> <p>Systems Engineering/Modeling and Simulation Chair: Janet Singer</p> <p>1377 (1432) Rainfall Use to Improve the Sustainability of the Hydraulic System in the Valley of Mexico <i>Badillo-Piña, Isaias José; Orduñez-Zavala, Enrique; Tejeida-Padilla, Ricardo</i></p> <p>1425 (1431) Different Types of Misperception Regarding Benevolence <i>Kawabe, Shutaro; Kobayashi, Norimasa</i></p> <p>1318 (1371) The Intelligent Scenario Selection in Dynamic Hoist Scheduling Problem: the Real-Life Electroplating Line Case <i>Kujawski, Krzysztof; Świątek, Jerzy</i></p>	<p>Bricker Academic Building Room 113</p> <p>System Dynamics/Cybernetics Chair(s): Allenna Leonard</p> <p>1350 (1369) A Cybernetic Approach to Hurricane Hazard Management on O'ahu, Hawai'i <i>Reissberg, Anja</i></p> <p>1361 (1437) System Dynamics of the Relations Between Two Koreas Under the Roh Moo-Hyun Administration <i>Sim, Youn Soo</i></p> <p>1320 (1489) The Sensitivity Model of Prof. Vester - A Biocybernetic Approach for a Sustainable Control and Regulation of Complex Systems <i>Harrer, Gabriele Rosa Maria</i></p>
<p>15:30 Tea/Coffee (Bricker Ground Floor Lobby) – Poster Viewing</p>			

16:00 1- 4 Parallel Sessions			
1	2	3	4
<p>Bricker Academic Building Room 110</p> <p>Socio-Ecological Systems Chair(s): Jon Li</p> <p>1416 Systems Methodologies, Complexity, and Resource and Environmental Management <i>Slocombe, Scott</i></p> <p>1355 (1435) Group Development: A Complex Adaptive Systems Perspective <i>Edson, Mary C</i></p> <p>1409 (1497) Systemic Insights into the Management of Ecosystem Services in the Marine Environment <i>Atkins, Jonathan P.; Burdon, Daryl; Elliott, Mike; Gregory, A.J.</i></p> <p>1319 How to Lock the Hood on the Economy <i>Smith, Jeffery J</i></p>	<p>Bricker Academic Building Room 111</p> <p>Systems Applications for Business and Industry Chair(s): David Ing</p> <p>1367 (1439) Improving Resilience of Critical Human Systems in CBRN Emergencies: Challenges for First Responders <i>Chroust, G.; Rainer, K; Sturm, N; Roth, M; Ziehesberger, P.</i></p> <p>1483 Educating Senior Executives in a Novel Strategic Paradigm: The Role of 'Systems Thinking' in Framing the Content and Pedagogy of the Sustainable Enterprise Academy <i>Zohar, Asaf</i></p> <p>1476 Service Systems Education in a Reflexive Approach: Designing a Collaborative Coproducing Curriculum Online <i>Ing, David; Metcalf, Gary</i></p>	<p>Bricker Academic Building Room 112</p> <p>Information Systems Design and Information Technology Chair: Roberto Kampfner</p> <p>1389 (1441) Study of Intelligent Control of an Arm Robot Equipped with a C-MOS Camera Using a New Type of Image Processing <i>Sato, Yoshishige</i></p> <p>1417 (1423) Computer-Based Information Systems As a Means of Automating the Use of Knowledge About Information Processing in Complex Systems <i>Kampfner, Roberto R.</i></p> <p>1332 (1490) Management Technology for Mexican Satellite System <i>Velázquez Lozada, Erick</i></p>	<p>Bricker Academic Building Room 113</p> <p>Systemic Approaches to Conflict and Crises Chair(s): Dennis Finlayson</p> <p>1331 (1438) A Comparison of the Prochaska Cycle of Change and the Holling Adaptive Cycles <i>MacGill, Victor Ronald David</i></p> <p>1494 (1495) Volunteering and Linking Roles in (Enabling and Sustaining the Grassroots Base Of) Resilient Global Governance: A Systemic Model <i>Finlayson, Dennis E.</i></p> <p>1346 (1396) A Holistic Design for the Self-Construction of the Core of a Modular Small House and its Services for Disaster Zones <i>Peon-Escalante, Ignacio E; Audefroy, Joel; Flores, David</i></p> <p>1496 Enabling Resilient Governance: Canada's Role in Haiti? <i>Finlayson, Dennis E.</i></p>
19:00 Conference Dinner			
18:30 for 19:00		ISSS CONFERENCE DINNER Buffet in the Turret Room, Wilfrid Laurier University	

Friday: July 23, 2010

Theme: Reflections

REGISTRATION DESK OPEN 08:00 – 13:00 (Lobby, Bricker Academic Bldg)

07:45 to 08:45 ISSS Roundtable Discussion (Lounge, Bricker Residence)

09:00 Plenary Session (Bricker Academic Bldg, Room 101)	
09:00	Chair of Plenary: Allenna Leonard Systems Thinkers Think about Systems Education under the Austrian (Ash) Clouds Report of the Education DES SIG discussions - Professor Ockie Bosch Feedback from the Student SIG - Nicholas Magliocca The ISSS Roundtable at 10 Years - Susan Gabriele
10:30 Tea/Coffee (Bricker Ground Floor Lobby) – Poster Viewing	
11:00	Vickers Award Student Presentation SIG Feedback - Alexander and Kathia Castro Laszlo Jennifer Wilby, ISSS President 2010/11 Invitation and presentation: Next Conference ISSS Annual General Meeting
12:30 Close of Conference	

Breakout rooms will still be available for any groups who want to continue conversations into the afternoon.

Plenary Speakers

MONDAY

Allenna Leonard

Governance in the Relative When

To explore governance is to engage in a form of time travel. Western government structures were designed in the 18th century – long before humankind developed the capacity to effectively destroy itself through conflict or environmental damage. Family structures and the church, even in the west, encompass models from the 21st century all the way back to the 11th. Large scale business models date from the 19th century. Society means different things to different people depending on the social organizations in which they are embedded.

In my talk last year as incoming president, I made a case for a series of mainly informal local to global viability indices to draw together the information at hand and to identify the gaps. They would be organized according to the Viable System Model, or another comprehensive template and fleshed out by organized discourse using group processes such as the Syntegration.

The next step is to look at how organizational assumptions might change if we were to begin to take the discoveries, technologies and new sets of relationship and connectivity on board since the furniture of governance was put in place. How would governance look if requisite variety, non-transitivity, the fluid motion of shared subjectivity and the capacity for self-organization were considered?

Human experience today and the risks it runs are taking place very much in the present. The global village is an amalgam that somehow must learn to work together to achieve sustainability and a version of stability that welcomes innovation and nurtures human development.

Javier Livas

Accosting the Governance Challenge

The governance challenge that was foreseen by Stafford Beer is here. The First World sees the problem in terms of terrorism, finance, energy and world climate. The third world sees the problem in terms of overpopulation, insecurity, lack of water, disease, ignorance and unemployment. In order to meet it, we have to build bridges to connect Law and Management Cybernetics. Law has been the intuitive application of control laws: attorneys designed the modern democratic state without the help of Management Cybernetics and the Viable System Model. However, the State and business corporations have not responded well to the challenge of complexity. We must recognize that Management Cybernetics can translate Political Science, Economics and Law in terms of the Viable System Model. Memetic evolution goes hand in hand with societal evolution. Law and Cybernetics must embrace each other and it is up to us to build the bridge that allows this to happen.

Alan Willis and Mark van Clieaf

Governance and Finance for a Sustainable Planet

The current trajectory of humanity, globalization and economic prosperity is not sustainable. Globalization and the growing global middle class, especially in emerging markets such as China & India, are putting significant stresses on the true long-term sustainability of the planet.

Effective governance at multiple levels to create clearly aligned accountability for organizing human affairs is not working well due to failure to connect to the larger system. These disconnects occur, for example, at the level of the business entity, especially the corporation, at the level of global finance and capital markets, including institutional investors such as pension funds, at the level of national governments and sovereign bodies – democratic or otherwise – and at the level of regional and international institutions, treaties, laws and regulations.

The most recent failure of banking, finance and capital markets worldwide identifies how a lack of integrated global systems thinking and systems governance at multiple levels contributed to the recent collapse of credit markets and risk to global prosperity.

The current global economic system is designed for Boom and Bust due to linear and short-term thinking and accountability design. Unless these systemic problems are fixed with the benefit of systems thinking rather than piecemeal band-aid solutions, similar or worse future crises are inevitable.

Global finance, capital markets and investment are the fuel for economies, consumerism and corporate growth. Yet the recent crises in these same systems reveal grave disconnects within them and with the broader global, societal context within which they function. They and their leaders, and the national and international policy setters that set the rules for finance, markets and investment fail to understand these institutions from a systems perspective and accordingly are unable to make wise policy choices for the long term.

As an example, the seizing of the credit markets had the unintended consequence of halting investment in cleaner energy from which to create a lower carbon future for a sustainable planet.

This session, with findings from recent research studies, will identify how the application of systems thinking to analyzing the recent governance and global credit crisis can point the ways towards the design of better governance for a viable, sustainable, and resilient planet. The session will show how the application of systems thinking to multi-level governance can create a true north for the long-term sustainability and resilience of the planet.

In particular, the session will cover:

- The unsustainability of current economic theory and the assumptions upon which it is based
- Globalization and the need for a Shift in Consumption and Global Citizen Values impacting the global system
- The need for sustainable corporations, their corporate governance and why a new charter for corporations is needed
- How the systems failure of multiple levels of governance and capital markets is creating a threat to the planet, especially the breakdown and disconnects of governance at 5 Levels in these systems
- How poor accountability, incentive systems design and risk management with regard to financial product innovation contributed to the 2007 - 2008 global credit crisis
- The need to recognize the 5 Levels of Corporate Governance & Risk Management: the system complexity of the enterprise and the implications for directorship and good corporate governance
- How corporate boards and institutional investors are confusing accountability design required for Sustainable Capitalism and Finance with a system for pay delivery and the risks to longer-term prosperity for the planet
- Why the mismatch in accountability, incentive systems and risk management systems in the global banking system, post credit crisis, is actually worse now in 2010, and what regulators, pension funds, corporate boards and management need to do to apply systems thinking to fix systemic breakdowns and systemic risks to ensure long term sustainability.

Michael Ben Eli – Special Invited Evening Open Lecture

Rethinking Everything

Transforming society and the world's economy to a sustainable basis presents the most significant challenge of our time. This challenge is unprecedented in scope. It requires a fundamental shift in consciousness as well as in action. It calls for a fresh vision, a new dream and new approaches and practices for shaping an evolving new reality. If we are to achieve the necessary change it has become increasingly urgent to outgrow limitations of many existing constraints, all representing realities which have changed and are no longer valid. A deep, world-wide reorientation, individual as well as collective, is essential with genuine breakthroughs in a number of related dimensions: in technology, in the structure of the economy, in the functioning of financial markets, in governance, in values, in imagination and in behavior. This presentation will explore the connection between system thinking, the cybernetic concept of change and the required transformation to sustainability as an enduring state and primary organizing principle on our planet.

TUESDAY

Thomas Homer Dixon

Exploring the Adjacent Possible: Scenario Development for a Resilient Future

Humankind creates and critically depends upon technological, economic, political, and socio-ecological systems that are becoming steadily more complex. Their rising complexity makes these systems increasingly opaque to observers and managers and contributes to unexpected interactions among system components. Both these phenomena in turn engender pervasive uncertainty about future system behavior. In a world increasingly characterized by unknown unknowns, how do we best think about the future? This talk will review how different forms of scenario analysis can be used to explore near and intermediate futures in branching space-time - what Stuart Kauffman has called the "adjacent possible."

Stephen Haines

The Ludwig von Bertalanffy Lecture: Systems Thinking Research Rediscovered: Ludwig von Bertalanffy and the Society for General System's Research's Relevance in the 21st Century

This paper ties the roots of Systems Thinking to its crucial relevance for the future by reviewing the influence and work of the Society for General Systems Research (GSR). It is important to understand the history of Systems Thinking and its original definition that is the Foundation of ISSS. This definition is often lost to the detriment of many current practitioners who lack foundational theory. An understanding of the Systems Thinking Approach as the Core Technology of the Haines Centre addresses the recent failure of the economy and rejuvenates many professional, management with practical applications.

The father of Living Systems Thinking and founder of the Society for General Systems Research (later the ISSS) was Austrian Ludwig von Bertalanffy. When Bertalanffy helped formed the GSR in 1954, his goal was to find a unity of science for all complex living things on earth.

The result is Systems Thinking, both an old and new orientation to life. It is the "natural way the world works," giving a simpler, yet holistic view of individuals, teams and organizations as they survive and thrive in today's complex and dynamic global environment. The holistic outcome-oriented approach to Systems Thinking distinguishes it from other narrow and fragmented analytical approaches to life and work. While critical thinking is an important practice, Systems Thinking extends and revolutionizes it in a more extensive and practical way.

Four interrelated main concepts help clarify and simplify how we view our complex world. These concepts— or strands of DNA that compose Systems Thinking— provide a broader mental map to see, think, understand, diagnose and act more effectively.

1. The first DNA strand is the Seven Levels of Living Systems: cell, organ, organism, group, organization, society and supranational system. The paper will focus on the three levels that affect organizations— individuals, teams and organization— and their three levels of collision: one-on-one, team-to-team, and organization-to-environment.

2. The second concept is the Twelve Natural Laws of Living Systems on Earth. These laws, organized into internal and external strands of life— help to point out natural similarities in humans at all Seven Levels. They also aid in comparing Best Practices with traditional human and organization dynamics.

3. The third strand is the ABCs of the Systems Thinking framework. These five Phases provide a simple yet comprehensive approach to integrative and holistic Systems Thinking. The application of these concepts is Strategic Thinking, a “backward thinking” approach that starts with the desired future, then works backwards to develop plans, strategies and actions to “close the gap” and reach desired outcomes.

4. The fourth DNA strand is The Rollercoaster of Change™, the natural and historical reaction to any desired change. This individual and physiological reaction to change is normal and highly predictable. By anticipating natural reactions, a Systems Thinking approach prepares practitioners for every hurdle they might face in implementation.

With the recent failure of the economy, there has never been a better time to return to the basics. This paper focuses on returning to fundamentals that are often forgotten, in order to replace the cycle of failure with a cycle of success. By returning to the roots of Systems Thinking, practitioners can examine and build on past successes, launching their own cycles of success in whatever ISSS sub-group they join.

Fredmund Malik

Advanced Syntegration for Meeting the Challenges of the Great Societal Transformation 21 – As Illustrated by the Practical Example of an Austrian Province

The Syntegration Method is the cybernetic management tool to meet the most complex challenges of any organization within days instead of months as needed with conventional measures by increasing exponentially its problem solving, consensus building, decision making and implementation capacity. Syntegration releases human energy, and in addition to the immediate results turns around the mood of people from resignation to new hopes, from lethargy to optimism and often creates a determined will and almost a “fighting” spirit for achievement.

It does so by using a brainlike cybernetic communications process in order to fully exploit the intelligence, creativity, knowledge, information and human energy of the largest number of people necessary to meet a challenge up to 40 persons and multiples thereof by interconnecting them in a completely new way by using the laws cybernetics enabling 40 individual minds to cooperate like one coherent single mind. How Syntegrity works and what it achieves is illustrated by the example of one of the provinces of the Republic of Austria, one of the central European states.

Roy Wiseman

Measuring Citizen Satisfaction

For more than ten years, the Institute for Citizen Centred Service (ICCS) has been measuring citizen and business satisfaction with the services provided by all three orders of government in Canada – and has developed an understanding of the expectations and drivers for client satisfaction with government services. In recent years, this has been integrated into an overall theory of the public sector service value chain (based on the private sector service-profit chain), which is gaining increasing acceptance by governments in Canada and internationally. At the same time, work on Canadian Governments Reference Models across all orders of government in Canada have developed a standard vocabulary for defining and describing the programs and

services that governments provide, as well as an approach for measuring their efficiency, effectiveness and quality – which goes beyond mere customer satisfaction. Together, these initiatives are leading to an integrated model of government service. This presentation will describe the work completed to date, as well as activities still under way that will continue to develop these models.

Pille Bunnell – Special Invited Evening Open Lecture

Resilience and Robustness: A Dynamic View of Conservation and Change

Robustness is generally referred to as: the ability of a system to remain unchanged when some aspect of the world external to the system changes, usually rapidly and unexpectedly. Thus, a force may be seen to be resisted. Resilience is generally referred to the ability of a system to recover its integrity or identity after having undergone a change imposed on it from the outside. Both these terms rely on an observer distinguishing a system as such in the first place, and further on choosing what aspects of that system comprise its “core” identity that remains unchanged or is recovered. Both these terms also implicitly assume that some degree of variation in both system and medium is normal, but that some is extraordinary enough to invoke the notion of resistance or recovery. Furthermore, change of any sort implies an observer specified time constant in both the external change and the response of the system. Thus resilience and robustness are both attributions made by the observer under a more or less specified set of expectations.

In this presentation I will use animations to illustrate some of the systems dynamics that may be implicated in generating the flow of changes that evoke the attributions of resilience and robustness. I intend to make evocative and perhaps poetic reference to the related ideas of conservation, adaptation and evolution. I will conclude with reflections on why we find all these notions relevant and useful to how we live.

WEDNESDAY

Debora Hammond

Food Policy for a Resilient Future

In planning for a resilient future, perhaps the most critical issue that needs to be addressed is that of assuring an adequate food supply. In response to an increasing awareness of and concern with food security, many communities have been establishing food policy councils and conducting food assessments in an effort to develop strategies for cultivating a more secure and resilient food system. In parallel with this trend is a growing interest in nurturing and supporting more localized food production, as evidenced in the increasing popularity of farmers markets, school and community gardens, and community supported agriculture. This paper will highlight some of the more exciting developments in this area and explore some implications of these food-related initiatives.

David Waltner Toews

Surfing the Pandemic Wave: Poise, Passion and Managing Insoluble Problems

Health – that aspired-to “state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” - is an outcome of how we govern our interactions with social-ecological complexity. Disease is what happens when we fail. Recent disease outbreaks, epidemics and pandemics are important events on their own terms. However, they are perhaps more important for what they tell us about relationships between how we set and strive for conflicting social goals, and the genetically programmed aspirations of the millions of other amazing species with whom we share the planet. From changing disease patterns we can learn the skills and tools necessary to select and monitor critical changes in our social and natural environments, and to manage our way, quickly, nimbly and intelligently into a sustainable future.

Ron Cottam

Rights, Responsibilities and Resilience, or, Auntie Phyllis and the Bloody Great Fork

The evolution of human societies has been punctuated by a progressive multiplicity of declarations of the *rights*, which more or less rigidly defined groups of humans, citizens or organisms could claim. The very idea of *equilibrium* in any dynamic environment depends on a balance between counteracting influences. The United Nations General Assembly's *Universal Declaration of Human Rights* in 1948 was itself an important step forward, but where is the *Universal Declaration of Human Responsibilities*? [The establishment of such a document has indeed been addressed, most recently by the InterAction Council of Former Heads of State and Government, but it remains, unfortunately, without any overt consequences.]

This question of equilibrium is fundamental to any concept of *resilience*, which although lacking a clear definition for human society as a whole does imply a sense of continuity or temporal sustainability. Sadly, although Spiritually-based movements have long focused on the advisability of pro/contra relational equilibria, Science has traditionally taken a view that the *experimenter* controls his or her *subject*, and that the relationship must of pragmatic and philosophic necessity be unidirectional. This imbalance did begin to break down during the twentieth century, with the introduction of quantum theory, but only within limited areas of investigation.

Arguably, a turning point in the drift of global human attention towards recognition of the importance of environmental equilibrium was Rachel Carson's publication in 1962 of *Silent Spring*, but it is only comparatively recently that fear of global warming has really begun to exercise our intellect. Fascinatingly, if unsurprisingly, most discussion of this possibly imminent phenomenon focuses on 'who is to blame', rather than whether the alleged causes should be addressed independently of whether catastrophe will follow or not.

Science has journeyed onward in an unstated assumption that analysis and synthesis are symmetrical. For an extensive consideration of this relationship in the context of living organisms see Robert Rosen's 1991 book *Life Itself: A Comprehensive Inquiry into the Nature, Origin, and Fabrication of Life*.

The long-held belief that it will ultimately be possible to establish a Theory of Everything from examination of the properties of elementary particles bears witness to this supposition; the macroscopic complexity of Nature indicates that such a belief is farcical.

Although the more exact sciences have begun to move out of their 'comfort zone' of near-equilibrium quasi-linearity by tackling chaos and less-than-deterministic systems, they have yet to meet up with biology coming in the other direction. Inorganic nature can be addressed reasonably successfully by either digital or analog techniques, but life establishes multi-scalar systems based on compromise between the two and on variable relationships between local scalar and global non-scalar characters. Until now this has had very little impact on Science in general, particularly in the present socio-commercial climate where *analog is bad* and *digital is good*.

The central issue for any overarching view of Nature, society and of their interaction is one of scale. How does, or should, an individual or group relate to local society in general or to planetary resilience? How do, or should, *rights* and *responsibilities* be integrated into a scheme which accepts the complexity of multi-scalar organisms and multi-scalar societies on a multi-scalar planet? This is, or should be, the central theme of any approach to *resilience*. But should it be a question, which only concerns *governance* as a top-down 'leave it to the politicians' approach? Contextually identified concepts of *top-down* and *bottom-up* design or control abound in our surroundings, but neither of them can ever be efficiently viable on its own, nor can the two be simplistically integrated into a mono-rational system for which analysis and synthesis are asymmetrical.

Careful examination of naturally-generated 'hierarchical' systems leads to a recognition that purely scale-local organization can never be sufficient to guarantee *any* form of resilience in the face of either external *or* internal perturbation, never mind guaranteeing a resilience which can sustain 'health and happiness' for a system's constituent elements. Inter-scalar transit in a multi-scalar system depends on global properties, which themselves depend on local phenomena,

whether for an individual or a society. The reader should note that by 'hierarchical' we are looking towards systems that are neither uniquely top-down nor bottom-up in their organizational style.

So, it seems that in addressing the resilience of our mono-rational multi-scalar societies, of multi-scalar organisms, on a multi-scalar planet, it would be reasonable to first think carefully about how multi-scalar natural systems operate. Will this be sufficient? No, although it will probably help somewhat. But maybe an important first step would be to address, in our own lives, and therefore at a very small scale, the balance between rights and responsibilities, which will be necessary to support effectiveness of any future governance that, for all our sakes, targets resilient dynamic socio-planetary equilibrium. From small acorns do tall oak trees grow.

THURSDAY

Panel: Fear for Sustainability – A Transdisciplinary Approach

Jacob Sperber: *Restoring the Positive Functions of Fear*

Jeremy Coplan: *Have Genetically Fearless Agents Led Us Astray?*

Markus Schwaninger: *Reframing Fear as a Trigger for Restoring Sustainability*

Is fear / anxiety an emotion that inhibits or fosters the sustainability of our planet? To be meaningful this question has to be modified right away: Can fear be a factor for the enhancement of sustainability? If so, how? Fear, if it is pathological, can paralyze. But in its healthy forms, it can stimulate coping behavior.

We are approaching this topic in a trans-disciplinary way: Three disciplinary perspectives bundled by one frame of reference, and are represented by the speakers:

- **Jacob Sperber**, psychiatrist, Nassau University Medical Center, New York
- **Jeremy Coplan**, neuropsychiatrist, State University of New York, Downstate
- **Markus Schwaninger**, social system theorist, University of St. Gallen

Our common frame of reference is the code of system theory. Our assumption is that it is this shared code that provides the concepts, which make the connection between these different "worlds" possible. Therewith, mutual understanding and genuine progress in the collective endeavour should be induced. That symphonic quality is what distinguishes a trans-disciplinary discourse from a merely interdisciplinary exchange.

Restoring the positive functions of fear: Jacob Sperber

What are the connections between human emotions and public policy?

Addressing such a broad question makes advisable the application of systems theory and cybernetic models because the question involves multiple, intersecting, complex subsystems. The diverse factors influencing human behavior can be modeled as three intersecting, complex subsystems:

- human behavior in the natural selection system over long periods of time (macro),
- the ontogenesis (gene by environment) of an individual's traits for human relatedness (relationship systems) in a single individual's lifetime (micro), and
- the socio-cultural system context in which they both occur (meso).

The elusive character of human fear derives in part from the fact that the neurocircuits which modulate fear reactions and fear-based behaviors evolved in the very long-term, macro system level of evolution. The circuits give rise, however, to patterned behaviors as the expression of temperament and personality traits of the individual, in relation to stressors in the individual's current social context.

By application of systems and cybernetic perspectives, we can clearly demonstrate how many of our predominant individual traits and social patterns are "accidental" and not the product of purposeful biologic or cultural progress. We can then confront the need for critical reappraisal of

our fears and for systems-based social policies. Specifically, we can construct an integrated understanding of current manifestations of fearfulness as useful warnings about the dangers of non-sustainable policy trends, and of fearlessness as irrational disregard of crucial alarms.

Have genetically fearless agents led us astray? Jeremy Coplan

Based on comparison of cranial shapes and corresponding neural morphometry, we will argue that compared to Neandertals, humans evolved a brain well suited for high cortical connectivity with less restraint of emotions, which may underlie human creativity but also excess anxiety or impulsivity. In humans, our data suggest that high intelligence co-evolved with high anxiety in some, and with minimal anxiety in others with white matter as one plausible neural substrate. Inherited traits that favor involuntary imposition of evolved avoidance behavioral patterns, may limit potentially dangerous social contact or situations with implications for evolved sustainability. However, loosened cortical restraint of emotional centers may have laid the groundwork for a neural substrate of human imagination through relative independence of cortical and limbic representations of salient environmental stimuli. Coupled with high intelligence, the impulsive phenotype, stripped of anxious cognitions, may, through errant failure to detect danger, risk the sustainability of the entire society. Serotonin-related genes in primates may provide a basis for dichotomous anxious phenotypes with behavioral and neurobiological correlates.

Reframing fear as a trigger for restoring sustainability: Markus Schwaninger

Can fear contribute to a sustainable world? It will be shown that humanity may find its way out of the crisis with the help of fear. The point is that the crisis is not an economic one; it is a more sophisticated pattern than the economists tend to assume: This is a systemic crisis, and that is what makes it intractable. The causal structure underlying the behaviors, which are manifest in different domains, of which the economy is only one, is a network of multiple causalities which act in loops, show delays and are not very sensitive to parameter changes. That implies that the system itself generates the instabilities, in simple words: the mess is "homemade". The system that is in crisis now, is made up in a way that crises must occur, again and again. A closer look shows that the economic, social and ecological spheres are not at all separate. They are intertwined, which makes most policies obsolete. Fear per se is not the best advisor, but the adaptive function of fear can trigger new collective behaviors toward sustainability, as will be demonstrated with the help of a System Dynamics model.

Finally the loop will be closed, by a joint, synthetic statement of the three speakers.

Ranulph Glanville

Design, Systems and Cybernetics

In this presentation, I will explore some similarities and differences between design, systems and cybernetics, in order to learn something of the mutuality between them, and to better understand how design (reflected in the cybernetic concept of conversation), in particular, can offer a distinct way of looking at the world and of approaching problems to those we have recently assumed are universal. I will also explore some of the conditions surrounding this approach, which require both a particular type of behaviour, and a different way of valuing the outcome than it often thought to be the only possibility, nowadays.

FRIDAY

Susan Gabriele

The ISSS Roundtable at 10 Years

This is our tenth year to convene the Daily Morning Reflection RoundTable during the annual weeklong conference of the International Society of Systems Sciences. As the designer, I feel very privileged to have been welcomed by you, and to have found a home with you for myself, and for my labor of love, the Reflection RoundTable. At this time, I will take a few minutes to revisit our journey and look toward the future in six steps.

Where we started. Our first ISSS Morning RoundTable was at Asilomar in 1999. It followed a pilot study at ACC/ISI (the Asilomar Conversation Community affiliate of the International Systems Institute) under the tutelage of Bela Banathy Senior.

What we started. We used a RoundTable Guide or script composed of inspirational and informational short texts— Facilitator Guide, Our Format, Our Purposes, and Guidelines for Listening, Responding and Speaking. Each day, we read these aloud for five minutes. The leader of the day then suggested a topic. This left 55 minutes for individual comments and reflections—time distributed among all equally.

Why we started. This format was very compelling and appealing as a potential new tool for accelerated learning, community building and systemic renewal of social systems. In a nutshell, we believe and our experience supports that: Just as we break the sound barrier when we travel faster than the speed of sound, we break the communication barrier when we hear 30+ authentic viewpoints in 55 minutes.

Where we are today. Today, we have held a total of ten weeklong morning RoundTables at ISSS. In the RoundTable format, we have added a new short text to read aloud, our Social Systems Theory Rationale. Also, others have been willing to host in my absence. I appreciated Janet McIntyre, who was RoundTable host in Australia.

Proposed next steps. Perhaps we can go to Phase 2. In other words, we can replace the introductory readings with some ISSS readings, e.g., Origin and Purpose of the ISSS, Our Logo, taken from our ISSS website.

Taking it home. It would please me to help any of you add RoundTables back home in your workplaces, schools and communities. Don't hesitate to contact me!

Ockie Bosch

Report from Special Workshops on Designing Systems Education: Systems Thinkers Think about Systems Education under the Austrian (Ash) Clouds **Ockie Bosch*, Kambiz Maani, Janet McIntyre, Günther Ossimitz, Magnus Ramage, and Vince Vesterby**

The fragmented nature of systems education with multiple traditions, expressed in very different ways at different institutions, led to a group of Systems Thinkers to discuss and create generic curricula for education and learning about systems for the generalist and specialist tracks. An active network of systems educators and stakeholders who can benefit from enhanced systems education in having to deal with complex issues, was also explored. In this presentation some guidelines for designing introductory and advanced courses will be discussed. The *Introduction to Systemic Thinking and Practice* course is intended as an introductory course for students from all disciplines. The *Advanced Systemic Thinking and Practice* course is intended as a more advanced course for students who are faced with complex issues that require a trans-disciplinary and integrated approach. The designs contain a set of key systems concepts and frameworks relevant to the appropriate level, along with some indicative tools and methods, which will enable students to explore the concepts. The value of a *Global Network of Systems Educators* will also be discussed and how this network could help to fulfil the needs of managers, policy makers and

society in general. An example will be given of how the integration of this network with the UQ-UNESCO/MAB Global Learning Laboratories NET could lead to the ability of more people (decision- and policy makers in Governments, managers, planners, businesses, etc.) could practice systems thinking in establishing Learning Labs for managing complex issues – all of these contributing to Systems Thinking becoming a more mainstream part of a sustainable society.

Nicholas Magliocca

Report and presentations from Student SIG

Challenges facing today's researchers and practitioners may be very different in scale, timing, and nature, but all have one thing in common: complexity. Systems science and thinking provides the tools necessary to manage the complexity of today's problems. Although systems approaches and systemic thinking are gaining wider acceptance, it is not always clear how to integrate systems ideas into everyday research and practice. This can be particularly true for students and/or researchers new to systems science and thinking. The experiences of the Student SIG in this week will be presented, reporting ongoing discussions centered around challenges that participants have faced in integrating systems approaches into their own research and/or practice, any systems theories they have found particularly useful, and ways to harmonize systems approaches with more conventional modes of thinking and research.

Alexander and Kathia Castro Laszlo

Report of the SIG Discussions

This year, the ISSS Reception will include a facilitated introduction to the society and opportunities to meet and talk with the leaders of individual SIGs. We asked SIG Chairs, to familiarize themselves with the plan for this session and come prepared for lively interaction to build bridges across the research domains represented by their SIGs.

The session was designed to accomplish two primary objectives:

- to share with Conference Participants information about each SIG from their respective Chairs in an open and interactive setting, and
- to stimulate cross-pollination and the interpenetration of ideas among and between the SIGs

This plenary session will report on the results of this activity!

Jennifer Wilby

More than the Sum of the Parts – Invitation and Presentation for ISSS2011

In 1956, Kenneth Boulding, in his *Skeleton of Science*, wrote of the need for ever increasing complex methods and approaches for ever increasing levels of complex systems, reflecting that different disciplines are bodies of knowledge that focus on the investigation of particular units, at particular scales. In 1990, Julie Klein wrote of “a subtle restructuring of knowledge”, changing “the way we think about the way we think” and yet, after all these years, although intuitively it may be recognised that more than any one single discipline is needed to address complex systems, there is still ambiguity about the principles and processes of interdisciplinary working and the capabilities needed for the people who do so. Hence, our research and practice, and the people involved, must work to connect and transcend the individual disciplines and the temptations of using approaches that are not designed or capable of managing the scale of the complexity in a perceived mess. These complex ‘messy’ issues require acknowledgement and commitment to the advantages of interdisciplinary research and practice while also exploring and debating the problems experienced by the people involved in this research, and the issues inherent in the development of the theory and practice of our approaches: this will be the theme for the 55th conference of ISSS.

Plenary Speakers' Biographies

Allenna Leonard

Under the auspices of the Complementary Set, Allenna Leonard consults, facilitates and teaches people in organisations to address their circumstances using concepts from cybernetics and systems thinking. She is based in Toronto and travels internationally. Allenna specialises in the approaches developed by her late partner Stafford Beer, especially his Viable Systems Model and Team Syntegrity process. Her Ph.D. was earned in Administration from the University of Maryland. She is a Past President of the American Society for Cybernetics and is currently President of the International Society for Systems Sciences. She would like to see the potential of this field fully utilized to improve the state of social systems around the world.



Javier Livas

Javier Livas is an attorney born in Monterrey, Mexico. He has an MBA and is a disciple of Stafford Beer. He has embraced Cybernetics as the science behind Law and has applied cybernetic thinking to many aspects of the Law and the State. He has written "The Cybernetic State" and other books, and translated "The US Constitution and The Great Law of Peace". He has many videos on YOUTUBE about cybernetic management topics, and he has been an activist for democracy, transparency and freedom in Mexico. Married to Alma Nora Garza for nearly 40 years; he has 4 children, and 5 grandchildren. Golf handicap, 9. (www.javierlivas.com <<http://www.javierlivas.com>>)



Mark Van Cleef

Mark Van Cleef is Managing Director of MVC Associates International, a leading organizational consultancy applying Work Level principles and analytic tools to create customer and shareholder value. His work with Boards and Executive Management focuses on executive scorecard design, enterprise performance management, design of optimal management structures, CEO succession planning, Pay for Performance and Internal Pay Equity design.

His 20 years of consulting experience covers a broad range of industries from Consumer Marketing, Marketing Services, Financial Services, Technology, Healthcare, Energy, Utilities, Telecom, working worldwide.

Mark's research and consulting, on Work Levels, Lean Management Structure Design, and the 5 Levels of CEO Work, 5 Levels of CEO

Capability and the link to shareholder and societal value are recognized worldwide by Boards, Institutional Investors and the business media.

His applied research on scope and scale in General Management leadership roles from President to Group CEO to Global CEO has led numerous corporations to optimal organization design to drive growth in shareholder value, and in their CEO / Executive succession planning, leadership



assessment, selection and leadership development. This research includes over 500 interviews at Board, Global CEO, Group CEO, Business Unit President and VP&GM levels on the differences in job design to create differential value between these roles, and their requisite leadership competencies.

MVC Associates International has made a direct link between enterprise valuation, and the % of Enterprise Value that is Future Growth (FG) value embedded in stock price and the expectations for future growth and innovation. This Future Growth value has a direct impact on the level of innovation and level of strategic capability required of CEO roles and executive teams, and enterprise organization structure (Work Levels) required to drive sustained growth in enterprise valuation.

He brings over 30 years experience in sales and marketing leadership roles, and consulting experience including a number of years with Price Waterhouse in their Business Strategy and Executive Search Consulting Practices. His early career was in advertising, graphic design, direct marketing and marketing services industries.

Alan Willis



Alan is an independent consultant on business reporting, sustainability and corporate governance. He is a Chartered Accountant and former partner in one of the major international accounting firms. Alan is senior advisor to the Canadian Institute of Chartered Accountants on sustainability and corporate responsibility.

Alan was a founding member of the Global Reporting Initiative's Steering Committee from its beginning in 1997 until 2002, and chaired its Verification Working Group. Alan authored two background papers for Canada's National Round Table on the Environment and the Economy Task Force on Capital Markets and Sustainability in 2007.

Last fall he was an opening plenary speaker about Pathways to Sustainability – Implications for 21st. century Business at the annual forum of a major US business association. In December 2008 and 2009 he represented Canada's Chartered Accountants at the Prince of

Wales' Forum on Accounting for Sustainability at St. James's Palace in London and as a result is now involved in the formation of the International Integrated Reporting Committee.

For the Canadian Institute of Chartered Accountants, Alan has researched and authored or co-authored numerous publications in the last 15 years for boards of directors, CEOs and financial executives on topics relating to corporate governance, risk and internal control, sustainability, climate change, the business value of stakeholder relations, and improving the management's discussion and analysis (MD&A) component of financial reporting.

Alan has been a student and advocate of systems thinking since hearing and meeting the late Stafford Beer at an accounting conference in Canada in 1972; he met Stafford again in 1993 at a gathering of the leaders of the World Business Academy (including the late Willis Harman).

Alan is a member of the International Corporate Governance Network and its committee on Non-Financial Business Reporting, and of the Sustainability Experts Advisory Panel of the International Federation of Accountants. He is an active participant in the Corporation2020 initiative, for which he authored a 2007 Summit Paper on Transforming Corporate Reporting.

Alan lives with his wife Mary near Toronto, Ontario.

Michael Ben Eli



Michael Ben-Eli is founder of the Sustainability Laboratory, established in order to develop and demonstrate breakthrough approaches to sustainability practices, expanding prospects and producing positive, life affirming impacts on people and ecosystems in all parts of the world.

An international management consultant, Michael pioneered applications of Systems Thinking and Cybernetics in management and organization. Over the years he worked on synthesizing strategy issues in many parts of the world and in diverse institutional settings, ranging from small high technology firms to multinational enterprises, manufacturing companies, financial institutions, health care and educational organizations, government agencies, NGOs, and international multilateral organizations.

In recent years, he has focused primarily on issues related to sustainability and sustainable development, working to help inspire leaders in business, government, community, and youth accelerate a peaceful transition to a sustainable future.

Dr. Ben-Eli graduated from the Architectural Association in London and later received a Ph.D. from the Institute of Cybernetics at Brunel University, where he studied under Gordon Pask. He was a close associate of R. Buckminster Fuller, with whom he collaborated on projects involving research on advanced structural systems and exploration of issues related to the management of technology and world resources for the advantage of all.

Thomas Homer Dixon



Thomas Homer-Dixon holds the Centre for International Governance Innovation Chair of Global Systems at the Balsillie School of International Affairs in Waterloo, Canada, and is a Professor in the Centre for Environment and Business in the Faculty of Environment, University of Waterloo. He was born in Victoria, British Columbia, in 1956 and grew up in a rural area outside the city. In 1980 he received his BA in Political Science from Carleton University in Ottawa. After completing his PhD in Political Science in 1989 at MIT in Cambridge, Massachusetts—where he studied international relations, defense and arms control policy, cognitive science, and conflict theory—he moved to the University of Toronto and, in the subsequent eight years, led several international research projects examining the links between environmental stress and violence in developing countries. Recently,

his research has focused on threats to global security in the 21st century and on how societies adapt to complex economic, ecological, and technological change. His work is highly interdisciplinary, drawing on political science, economics, environmental studies, geography, cognitive science, social psychology, and complex systems theory. Dr. Homer-Dixon teaches undergraduate and graduate courses on environmental security; causes of war, revolution, and ethnic conflict; international relations; and complexity theory. In 1999 he received the University of Toronto's Northrop Frye Teaching Award for integrating teaching and research. His writings have appeared in leading scholarly journals, popular magazines, and newspapers, including *International Studies Quarterly*, *International Security*, *Foreign Policy*, *Foreign Affairs*, *Scientific American*, *The New York Times*, *The Washington Post*, and *The Financial Times*. His books include *The Upside of Down: Catastrophe, Creativity, and the Renewal of Civilization* (Knopf, Island Press, 2006); *The Ingenuity Gap* (Knopf, Jonathan Cape, 2000), which won the 2001 Governor General's Non-fiction Award; *Environment, Scarcity, and Violence* (Princeton, 1999), which received the 2000 Lynton Keith Caldwell Prize from the American Political Science Association; and, coedited with Jessica Blitt, *Ecoviolence: Links among Environment, Population, and Security* (Rowman & Littlefield, 1998).

Stephen Haines



For more than 30 years, Stephen G. Haines has led the development and expansion of The Science of Systems Thinking, "the natural way the world works". It is a practical discipline that views organizational issues in their natural and biological contexts (environments). He currently travels the world, speaking on Strategic Management and Systems Thinking, presenting seminars, and writing books and articles.

As a former U.S. Naval officer, Stephen flew Navy jets, piloted ships, and served off Vietnam. He was a member of the famed U.S. Naval Academy class of 1968, that graduated many prominent leaders in today's world of business, government, the military, and industry.

His corporate career included tenure as Executive Vice President of ICA, a diversified, \$14 billion nationwide financial services firm and Senior Vice President of Freddie Mac, a \$32 billion financial institution. He was also President of University Associates Consulting and Training Services in San Diego, CA.

Steve has been a member of eight top management teams in the United States and abroad, with corporate responsibilities for all aspects of organizational functions, including planning, operations, marketing, PR, communications, finance, HR, training, and facilities. His career has also included executive positions with MCI, Exxon, Sunoco, and Marriott Corporation.

Steve has taught over 80 different kinds of seminars and is in demand as an insightful and passionate keynote presenter at conferences worldwide—with a special emphasis on CEO and Board issues. He is a premier TEC Organization Resource Chairperson (groups of 15 CEOs) with over 75 presentations to his credit. He has also been the co-leader of the prestigious Banff Centre for Management's two-week senior executive and leadership development course.

His personal interests include family, community service, sports, sailing, travel, photography, art, and design. Today, Stephen maintains a busy world-wide schedule of keynote presentations, consulting, conducting seminars, and writing books in the continually evolving study of Strategic and Enterprise-Wide Change from a "Systems" point of view.

Fredmund Malik



Prof. Dr. Fredmund Malik, international management expert, entrepreneur and professor for corporate management and governance, is founder and chairman of Malik Management, St. Gallen, Switzerland. The many-times awarded author of a dozen bestselling books, including the classic "Managing, Performing, Living", is a regular columnist in opinion-forming media and one of the most influential management pioneers.

With about 300 employees, plus international subsidiaries and partnership networks, Malik Management is the world's leading provider of advanced wholistic management systems, leadership and governance solutions. We educate, train and counsel thousands of executives every year in advanced general management expertise and set the standards for the professionalism of the top executive function. The Malik Wholistic Management Systems® are the world's most effective instruments for reliable functioning and navigation of organizations under the complex conditions and dynamic changes of today's globalized world. The centerpiece is the Malik Syntegration Method®, the revolutionary innovation for solving an organization's toughest challenges. Syntegration amplifies manifold the leadership capacity of top management.

Roy Wiseman



Roy Wiseman joined the Region of Peel in 1975 and became Director, Information and Technology and Services in 1986. He was named as the Region's first Chief Information Officer (CIO) in 2003.

Roy has a BA philosophy from the University of Toronto and a Masters in Public Administration from York University. He is a long-time member of the Board of Directors and Past President of the Municipal Information Systems Association (MISA) of Ontario, current President of the Institute for Citizen Centred Service, Municipal Co-Chair of the Service Mapping Subcommittee of the Joint Councils and Project Director for the Municipal Reference Model version 2 (MRMv2) project. In the recent past, Roy was a founding member of the Board of Directors for MISA/ASIM Canada, municipal representative on the Public Sector CIO Council, Municipal Co-Chair of the Lac Carling Conference on Electronic

Government, member of the Board for Regional Networks for Ontario, and Past Chair of the Showcase Ontario Awards Panel. Roy is a regular contributor of articles on municipal technology to MISA Municipal Interface and other publications. In May of 2007, Roy became the first municipal recipient of the Heintzman Leadership Award, which recognizes outstanding leadership within the public sector in promoting citizen-centred service.

Dr Pille Bunnell



Dr. Pille Bunnell is a systems ecologist who specialised in the integration and explanation of complex concerns for domain specialists, policy makers, students, and the public. As the Director of Environmental Literacy with an international consulting firm she conducted integrative projects in the framework of Adaptive Environmental Management; dealing with concerns ranging from fisheries, wildlife and forestry, to land use management, energy use, and climate change. Over the last decade she has shifted her focus to cybernetics, investigating the relation between complex systems, human understanding, and human activities. Pille is currently particularly interested in the systemic nature of arising

and evolving systems, the manner in which we distinguish and constitute our worlds in multiple relational domains, and the ethical and durability implications of different manners of human languaging and living. The latter is the focus of her teaching in a Masters of Environmental Management program at Royal Roads University.

After six years as President and Past President of the American Society of Cybernetics, she remains active with the society and serves on the editorial boards of Cybernetics and Human Knowing and Constructivist Foundations. In 2007 the ASC awarded Pille with the Norbert Wiener Medal for her contributions to Cybernetics.

Pille likes to integrate the evocative with the explanatory, and hence crosses or blurs the boundaries between art and science. Inherent in this is a desire for intricacy and depth for contextually appropriate ethical behaviour in all our relations with the worlds we thus bring forth.

Debora Hammond



Debora Hammond is Professor of Interdisciplinary Studies at Sonoma State University, Past-President of the International Society for the Systems Sciences, and newly appointed Director of the Organization Development MA Program at Sonoma State.

David Waltner-Toews



David Waltner-Toews is Professor in the Department of Population Medicine at the University of Guelph, and founding president of Veterinarians without Borders/ Vétérinaires sans Frontières – Canada (www.vwb-vsfc.ca), and of the Network for Ecosystem Sustainability and Health (www.nesh.ca). He has also been a founding member of the Communities of Practice for Ecosystem Approaches to Health in Canada (www.copeh-canada.org). Waltner-Toews' areas of expertise are the epidemiology of food and waterborne diseases, zoonoses (diseases other animals share with people), global change and emerging diseases, "one health", and ecosystem approaches to health. He has collaborated on research and teaching in Africa, Asia and Latin America.

His texts include "Ecosystem Sustainability and Health: a practical approach" (Cambridge University Press, 2004), "The Ecosystem Approach: Complexity, Uncertainty, and Managing for Sustainability" (with Nina-Marie Lister and the late James Kay, Columbia University Press, 2008), and "Integrated Assessment of Health and Sustainability of Agroecosystems" (with Thomas Gitau and Margaret Gitau, Taylor and Francis/CRC Press, 2008). Besides being an author on more than 100 peer-reviewed scholarly papers, he has published half a dozen books of poetry, a collection of recipes and dramatic monologues ("The Complete Tante Tina: Mennonite Blues and Recipes"), an award-winning collection of short stories ("One Foot in Heaven"), a murder mystery ("Fear of Landing"), and three books of popular science, including a natural and cultural history of zoonoses, ("The Chickens Fight Back: Pandemic Panics and Deadly Diseases that Jump from Animals to People", 2007), and one on the ecological and cultural context for foodborne diseases, ("Food, Sex and Salmonella: Why our Food is Making us Sick", 2008).

Ron Cottam



Ron Cottam received his first degree and PhD in Applied Physics from the University of Durham, UK, and in 1971 he transferred to the Department of Metallurgy at the University of Leuven, Belgium. Moving away from academic work, he then spent twelve years in commercial organizations and as an independent consultant developing techniques for the enhancement of audio presence in music reproduction. He joined the Department of Electronics and Information Processing of the Vrije Universiteit Brussel in 1983. In 1984 he joined IMEC, since when he has been associated with work on chemical sensors, optical computing, computational theory, and most recently since 1991 on the development of hierarchical architectures for the implementation of lifelike processes in ULSI beyond 2020. He leads the IMEC Evolutionary Processing Group (EVOL), and has authored and co-authored papers on solid-state

physics, ultrasonic techniques, computational emergence, natural semiotics, hierarchical evolutionary systems, complexity and anticipatory computation, and has contributed to numerous international conferences, journals and books.

Jacob Sperber



Jacob Sperber, M.D. is the Vice Chair for Education & Training, and the Residency Training Director, in the Department of Psychiatry & Behavioral Sciences at Nassau University Medical Center, East Meadow, New York. In addition to overseeing the psychiatry residency and medical student rotations from three medical schools, he also heads the curriculum for psychotherapies training and lectures on the neurobiology of addiction.

Licensed to practice in New York and California, he graduated from the Columbia College of Physicians and Surgeons in 1975 and has his B.A. from the University of California, Berkeley, 1968. He is an Assistant Clinical Professor of Psychiatry at the Mt. Sinai School of Medicine.

Jeremy Coplan



Jeremy Coplan, M.D. is a Professor in the Department of Psychiatry, Director of the Nonhuman Primate Laboratory and Director of the Division of Neuropsychopharmacology at SUNY-Downstate Medical Center. He has focused on the development of a nonhuman primate model of early life stress, termed variable foraging demand. Long-term biobehavioral sequelae in offspring raised by mothers exposed to unpredictable foraging subsequently persist across the life-cycle. More recently, his group has documented the presence of a nonhuman primate form of the metabolic syndrome and central correlates following early life stress. Dr Coplan has been productive in translational clinical studies examining the biology of

anxiety, including panic disorder and mood disorders in humans. A parallel line of investigation examines the role of hippocampal neurogenesis in depression and the therapeutic mechanisms of antidepressant treatment. He has authored over 100 peer-reviewed articles, has received several NIH grants, and is the current recipient of three investigator-initiated Pharma grants. He is a mentor to two NIH-sponsored K-awardees, Dr Daniel Cukor and Dr. Tarique Perera. NIH support is being pursued to examine the interaction of early life stress and the serotonin transporter gene on neurotrophic gene expression and neurogenesis.

Markus Schwaninger



Markus Schwaninger is a Professor of Management at the University of St. Gallen (HSG). His research focus is on long-term challenges to society. His current research concentrates on harnessing system science to improve organizations. He has been strongly committed in trans-disciplinary research projects, and in a synthesis of theory and applied research. He has taught many generations of students and PhD candidates in the field of Organizational Cybernetics and System Dynamics. His scholarly achievements have included contributions to organizational modeling and design, organizational intelligence, transformation and learning, corporate and societal sustainability. These are documented in more than 200 publications, the latest book being "Intelligent Organizations" (2nd edition), Springer, 2009. He is committed in international organizations, e.g., as a director, World Organization of Systems and Cybernetics; managing editor, System Dynamics Review;

member of the policy council, System Dynamics Society, USA (elected per 2011), and conference chair of the upcoming 2012 System Dynamics Conference in Switzerland.

Ranulph Glanville



Ranulph Glanville studied architecture at the Architectural Association School in London 1964 to 1971, and was perhaps the worst architecture student ever: he spent all his time with avant garde music. Naturally, he was invited back to teach! Meanwhile, Gordon Pask seduced him into doing a PhD in cybernetics at Brunel University. After that, he did another PhD, in human learning with Laurie Thomas, also at Brunel. He has earned his living teaching architecture, design, art and occasionally cybernetics and human learning. In 2006 he was awarded a higher doctorate in recognition of his research. He left a permanent teaching post at the University of Portsmouth in 1995 to become an independent academic helping develop research programmes, specially in the general area of design, and "filling in holes". He has published more than 300 papers, is on the editorial board of 8 journals and 4 societies, including being current president of the American Society for Cybernetics. He is a professor in London (The Bartlett/UCL and Industrial Design Engineering/RCA), Brussels and Ghent (St Lucas Architecture) and Melbourne (RMIT University School of Architecture + Design), and maintains a practice covering architecture, visual and time based work, music, performance and writing (papers).

Susan Farr Gabriele



Sue Gabriele has long experience in the education field. She had a 20-year career as a secondary classroom teacher, which included duties as mentor teacher, department chair, and materials developer. She left public school teaching to begin an educational doctoral program in language, literacy and learning, or classroom theory, at the University of Southern California. Upshifting to school organization theory, she transferred to the University of California at Los Angeles. She finally arrived at systems theory and completed her journey at Saybrook Graduate School where she was awarded her Ph.D. in "Human Science: Social and Institutional Change" under the tutelage of Bela Banathy, Sr. Her dissertation, "The RoundTable for School Learning and Planning Groups: Planting a Seed for Systemic Renewal," is the foundation of the ISSS Morning RoundTable. She currently coaches RoundTables in school classrooms and faculty meetings, workplaces, and other systems communities. Further information can be found through *Gabriele Educational Material and Systems (GEMS)* at www.gemslarning.com.

Ockie Bosch



Professor Ockie Bosch is Head of the School of Integrative Systems at The University of Queensland, Australia; Chair of the International Committee for Systems Education (under auspices of ISSS and IFSR); member of the Noosa Biosphere Education and Research & Development Board; member of the Academic Board of his University; Vice-President Conferences and Membership of the International Society for the Systems Sciences and represents The University of Queensland in the Australian Universities Council for Environmental Deans and Directors. Professor Bosch specialises in the area of Systems Thinking for Sustainable Development; the application of systems theory in practice; the development of evolving information systems as mechanisms for knowledge dissemination and collaborative learning; and the development of processes for linking science with management and policy making. In his current role he leads and co-ordinates several

initiatives for developing inter-disciplinary educational and research programmes. The educational programs focus especially on linking various fields of study (e.g. sustainable agricultural production systems, Food Safety and Security, Business, Resilient Communities, Systems Engineering and Natural Resource Management systems) to a systems core.

Nicholas Magliocca



Nick is currently a doctoral student at the University of Maryland, Baltimore County in the Department of Geography and Environmental Systems. He earned his Master's of Environmental Management at Duke University and my Bachelor's of Science at the University of California, San Diego. Nick's research focuses on building a systemic understanding of coupled human-natural systems. In particular, I am interested in understanding how patterns of land-use and land-cover change emerge from human alterations of natural processes and the resulting feedbacks. Study systems of interest include those undergoing agricultural to urban conversion, typically known as urban sprawl, and those in which protective measures, such as wildfire suppression or flood/storm impact controls, can lead to long-term instability.

Website: <http://sites.google.com/site/nicholasmagliocca>

Alexander and Kathia Castro Laszlo



Alexander Laszlo and Kathia C. Laszlo are Co-Founders of Syntony Quest. They are tenured Core Faculty members at the Graduate School of Business Administration & Leadership (EGADE) of the Monterrey Institute of Technology in Mexico, where they co-teach MBA and Doctoral courses on strategy, systems thinking, and sustainability. They taught as faculty members in both the MBA in Sustainable Business at Bainbridge Graduate Institute and the MBA in Sustainable Management at the Presidio School of Management since the first year of operation of each program. Currently, they are Adjunct Faculty Members in the MBA in Sustainable Entrepreneurship program of the Green MBA at Dominican University as well as in the Leadership of Sustainable Systems program at both the Master's and Doctoral levels at Saybrook Graduate School & Research Center and at Sonoma State University in the Master's in Organization Development program. They serve on the Board of Directors of the Unity Foundation and on the Sages Advisory Panel of the Council for Global Education, are Members of the General Evolution Research Group, and are Fellows of the International Systems Institute where they have served as Representatives to the TransCultural Council. They Co-Chair the Special Integration Group on *Evolutionary Development* for the International Society for the Systems Sciences, of which they are past Vice-Presidents and former Board Members. In 2002, Kathia and Alexander received the *Förderpreis Akademischer Klub* award of the University of St. Gallen, Switzerland, for their work in social innovation and sustainable development, and were finalists for the 2003 *Beyond Gray Pinstripes* award of the World Resources Institute and the Aspen Institute for their academic work in sustainable business.

Jennifer Wilby



Jennifer Wilby received a BA in Political Science in 1978 from the University of California, Riverside, and a MSc in Cybernetic Systems from San Jose State University in 1992, followed by a MPH in Public Health from the University of Leeds, and a PhD in Management Systems at the University of Hull. She has worked in urban planning, database programming and textbook publishing before moving to the UK in 1992 to begin doctoral research at the University of Hull. She has also worked at the University of Lincoln, and for 5 years as a Research Fellow at the University of York in the Centre for Reviews and Dissemination, undertaking systematic reviews of health care interventions. She is currently a lecturer and researcher in management systems in The Business School, University of Hull. She has held several positions within the International Society for the Systems Sciences (ISSS), has been

Honorary Treasurer and executive board member of ARCISS (The Association of Research Centres in the Social Sciences), and is a member of the boards of the UKSS (United Kingdom Systems Society) and UK Complexity Society. In 1995 she received the Sir Geoffrey Vickers Memorial Award. Jennifer is currently President-Elect of ISSS.

Workshop Abstracts

ISSS 2010 Welcome Reception and SIG Activities **Sunday, 6 – 9 pm, Science Courtyard, Science Building** Facilitated by **Alexander and Kathia Castro Laszlo**

This session is designed to accomplish two primary objectives:

- to share with Conference Participants information about each SIG from their respective Chairs in an open and interactive setting, and
- to stimulate cross-pollination and the interpenetration of ideas among and between the SIGs

Accordingly the session will be run as follows:

- Alexander and Kathia will set the stage with general introductory comments and a message of welcome.
- SIG Chairs will assemble on stage and each will be provided with no more than 3 minutes to present the theme and focus of their respective SIG. This portion will be conducted in the spirit and tradition of soap-box oratory in a market place of ideas.
- SIG Chairs will then be invited to comment on, make connections with, and otherwise explore the implicit and explicit systemic relations between and among their SIG and the others. This portion will be conducted in the spirit of a modified closed fishbowl conversation ([http://en.wikipedia.org/wiki/Fishbowl_\(conversation\)](http://en.wikipedia.org/wiki/Fishbowl_(conversation))).
- The final portion of this session will involve audience participation with an open microphone available for conference participants to pose questions, make comments or suggestions, or otherwise interact with the SIG Chairs.
- The session will conclude with closing remarks by the facilitators, and **socialising** until close of evening!

Saturday Workshops

Workshop 1: Helping to make Systems Mainstream: Bringing Bayesian Networks to the World

10am to 4 pm

Bayesian networks are now used throughout the world as a systems modeling tool within a range of industries including health sciences, engineering, business and finance, information technology, mining and exploration, forensic science, environmental and resource management and social sciences. The popularity of Bayesian networks is spreading due to their flexibility, ability to integrate quantitative and qualitative data, and information (including experiential knowledge), ability to accommodate uncertainty and ability to support decision making through scenario analysis. Researchers use them to integrate knowledge and scientific understanding about systems, whilst managers use them as decision support tools and to improve the performance of systems that they are managing. DBL Interactive is a new decision support toolkit, developed by the University of Queensland, designed to allow researchers and managers to create and share Bayesian network models online, over the internet. It is specifically designed to support the collaborative development of decision support tools using Bayesian networks and the delivery of those tools to users anywhere in the world.

Dr Carl Smith and Professor Ockie Bosch from the School of Integrative Systems at The University of Queensland in Australia will run a preconference workshop to demonstrate the features of this systems thinking toolkit. You will learn how easy it is to develop a model, and how you can use the toolkit for participatory systems analysis, unravelling a complex issue and develop a system that can be used for decision making, scenario testing or understanding the system better.

Who can benefit?

- Students from all disciplinary backgrounds
- Researchers involved in any area of interest, environment, agriculture and land management, to business, social systems, engineering, health sciences and organizational development.
- Systems thinkers dealing with complex issues
- Consultants

This is a unique tool for systems thinkers and a unique opportunity to learn about the background theory and how to use it directly from the developers.

Fees:

Attending the workshop only: \$90

Attending as part of the full ISSS conference: no additional cost.

Any fees due will be collected at the workshop.

Workshop 2: System theory and our mind - the concentration and purification technique for our mind as taught by Buddha, a mental healthcare protection program for the harmonic governance for a resilient planet

1pm to 4pm

We use our body to experience the world around us but our mind is the one who is observing and making the decisions to change the world. System theory sees the world composed of the observer, the decision maker, the system, the environment, the boundary and the relationships between them. And there are two opposite forces in the world that constantly interacting with each other, creating the flow of energy, matter and information between systems and the environment. On one hand we have the disorder force governed by the second law of thermodynamics that drive everything into a equilibrium state with maximum entropy. On the other hand we have the organizational force governed by the constraints of a system that drive the system into a particular steady state with a low entropy.

Our mind is both the observer and the decision maker with a major problem. Throughout our life we have been looking for sanctification that brings happiness. Our government have been relying on economics to achieve this but 80% of the time we are dissatisfied with the people and situations around us, bringing craving, aversion and ignorance into our minds and creating all sorts of problems in our society. This is called suffering in the teaching of Buddha, and he offered us with a three-step solution for our mind. In this workshop we investigate the systemic view of these three step namely self-protection, concentration and purification of our mind.

Death is the end of our lives or just the beginning of another new life? A system undergoes a transition of system state during death, but will the system continue in other forms at another places? Or will it just terminate totally? What are the possible new system states and are they sustainable? In this workshop we will investigate the sustainability of Heaven, Hell, Earth and Nibbana (null). And we investigate the way to prepare ourselves to transit into these states.

The governance of materialism around us are achieved through economics, and the governance of materialism within us are achieved through healthcare. The governance of spiritualism around us is achieved through religion, but how about the governance of spiritualism within us (our mind and mental contents)? We investigate a 10-day Vipassana mental healthcare program for people of all religions including scientific communities. It is believed such a program could bring happiness, peacefulness and harmony for our community. Led by: Thomas S L Wong.

Sunday Workshops

Workshop 1: Helping to make Systems Mainstream: Bringing Bayesian Networks to the World

Continues ... Sunday July 18, 10 am to 12:30 p.m., Bricker Academic Building

Workshop 3: "Vester Sensitivity Modelling"

Sunday, July 18, 10 am to 4 pm, Bricker Academic Bldg, Room 111

"Vester Sensitivity Modelling" allows Holistic Capturing and Understanding of Interrelationships and Their Cybernetic Patterns. Its Biocybernetic Orientation Guides the User Towards the Development of Resilient Systems. The complex problems and dynamic changes of our global environment – nature, technology, economy and humanity - are strongly interconnected. In order to understand these manifold interdependencies the systemic understanding of their behaviour is required. New methodologies help integrating the different perspectives to cope with a rapidly changing world. Building system models allows finding out how a system functions and how it can be designed towards adaptability and robustness in order to create resilience.

Prof. Frederic Vester (1925-2003), the German Systems Researcher, Biocybernetician and Member of the Club of Rome, has developed his "Sensitivity Model" in continuous feedback with management and planning projects. This user-friendly instrument helps managers, planners and politicians and individuals to build up system models for all kinds of complex systems. Carried out manually or with its computerized tools, the methodology offers a systemic and systematic guideline. Gabriele Harrer, 18 years collaborator of Frederic Vester has wide experience in many applications of the Sensitivity Model. Her workshop gives an introduction and practical exercise of the main steps of building up a System Model in short time. With an objective and structured process the participants are building up a valid and understandable system model, which answers the following questions:

What is the System in Focus? What are the main and system relevant variables and influence factors? How strong are the interconnections? What are the feedback cycles and what do they tell us about the cybernetic behaviour of the system? What is his the pattern of the system? How do internal or external changes affect its robustness or sensitivity? Where are the white spots? Will the planned measures guide towards a viable and resilient system? The participants can follow these guidelines directly in their practical field of interest. The workshop will give also an outlook in the experiences of Malik Management combining the Sensitivity Model with Stafford Beers "Syntegration" and "Viable System Model".

Led by: Gabriele Rosa Maria Harrer.

Fees:

Attending the workshop only: \$90

Attending as part of the full ISSS conference: no additional cost.

Any fees due will be collected at the workshop.

Workshop 4: Global Governance and a World Without War

July 18, 1 - 4 p.m. Bricker Academic Building, Room 110

A pre-conference workshop of the International Society for the Systems Sciences (ISSS) on Sunday, 1 pm to 4 pm, July 18, 2010, in the Bricker Academic Building, Room 110, Wilfrid Laurier University, 75 University Avenue West, Waterloo, ON, Canada, N2L 3C5

War is an ever-increasing global problem for several reasons. While the military traditionally was for security, the number, strength, speed and accuracy of delivery of today's weapons make defense difficult if not impossible, and therefore the weapons available to armies or terrorists create insecurity. The cost of these potent weapons and of the defense against them is prohibitive, and the environmental damage of a war is unacceptable too. Therefore, security through armed peace is no longer an option. Unfortunately, the misconception of security through strength still prevails. In reality, security does not depend on the military strength itself, but on the

difference in military strength between opponents. Thus, the quest for security through being stronger than the opponent is the intrinsic cause for the deadly arms race.

History shows that security is possible through the force of law. Governed entities often have an acceptable level of internal peace. Municipalities, non-failed states, and more recently the multinational entity of the European Union demonstrate that humans can live in peace within properly governed entities. This workshop will seek to show how available global communication and transport technology could make global governance and, through it, global peace feasible. Using systemic analysis, the societal architecture required for global governance supplying global legislation, jurisprudence, and executive needs will be explored, and recommendations for reforms of the UN system will be developed.

Co-sponsors of this workshop:

- The Global Issues Project of Science for Peace and the Canadian Pugwash
- International Society for the Systems Sciences (ISSS)
- Project Ploughshares (to be confirmed)
- World Federalist Movement - Canada
- UN Association of Canada (to be confirmed)
- ISSS Systemic Approaches to Conflict and Crises SIG
- ISSS Living Systems Analysis (to be confirmed)

All participants at the ISSS meeting, members of the co-sponsoring societies and of the general public are invited to participate and to contribute short statements of their ideas on the topic. A pre-conference workshop blog will carry statements submitted in electronic form. Admission to the workshop is free for those registered for the ISSS Conference. A special registration fee of \$ 30 is available to those not registered in the full ISSS Conference. For more information contact:

Helmut Burkhardt (Global Issues Project Science for Peace/Pugwash)

Helmut.Burkhardt@bell.net,) or

Dennis Finlayson (ISSS) **dfinlaysonworld@yahoo.co.uk**

Fees:

Attending the workshop only: \$30

Attending as part of the full ISSS conference: no additional cost.

Any fees due will be collected at the workshop.

FOR FURTHER INFORMATION ON THIS WORKSHOP PLEASE EMAIL:

helmut.burkhardt@bell.net

**Workshop 5: Modeling Support for Disaster Prevention and Recovery:
Systemic Challenges for First Responders**

July 18, 10am to 4pm.

Motivation for the Workshop: Natural and man made disasters have always threatened people. In the last decades both the awareness of threats and the occurrence of actual disasters (many of them man-made or at least triggered by human activities) has grown.

- Today's disasters usually endanger considerable more persons and larger areas in more diversified ways.
- Society has a basic interest to ensure that its environment behaves like a dependable system (providing safety, reliability, availability, security, maintainability, survivability, etc.). This implies the necessity of avoiding, eliminating or at least mitigating the negative impacts of disasters in order to re-establish dependability as fast as possible.
- In today's complex world a holistic, systemic approach is needed for training and supporting First Responders (i.e. fire brigades, ambulance services, police forces) with respect to interventions in the case of incidents.

Workshop objective: In this workshop we will try to identify methods, best practices and software tools which are helpful in training and supporting First Responders.

We intend to look at the problems of training and interventions in a systemic way, considering all types of stakeholders with respect to both short time and long-term issues and problems.

Prime application of software tools will be the modeling of scenarios and environments, simulating disasters and reactions, providing simulation-based training, and using the predictive power of simulation in real disaster interventions.

Key targeted technologies will be System Dynamics tools and Virtual/Augmented/Mixed Reality systems but other techniques should also be included.

We will correlate the proposed methods and tools to the needs of First Responders (an initial list of needs will be supplied to registered participants of the workshop).

We hope to include in this workshop participants from many different fields, from First Responders, from computer experts, psychologists, human factor specialists, etc.

No Cost to Any Participants

Workshop 6: Traditional Chinese Medicine Healthcare Protection Program - a possible missing component in the systemic thinking of the health governance for a resilient planet

July 18th, 1 - 4 pm, Bricker Academic Building

Reductionism was the major scientific view before World War II, its development leads to industrial revolution and modern medicine. Traditional medicine like Traditional Chinese Medicine, Ayurvedic Medicine, Homeopathy, Naturopathy, and Western Herbal Medicine was then considered as alternative medicine because they are seem incompatible with reductionism and allopathic medicine. However, reductionism was found to be a incomplete scientific view after world war II and a more holistic scientific view was developed namely system theory.

Systemic thinking is to consider both the system and the environment when analyzing or maintaining a system, or its environment. When analyzing a particular component within a system, all other components should be considered as well.

Traditional medicine has been analyzed with the incomplete scientific theory for logical explanations of its medical theory and practice, resulting in confusion and misunderstanding. This workshop will demonstrate a method to use system theory to investigate the holistic nature of a particular traditional medicine namely Traditional Chinese Medicine. It is believed that all other traditional and alternative medicine could be better understood in this holistic scientific view of system theory. The Taichi Yin-Yang system theory was developed when combining both the traditional Chinese thinking and the systemic thinking. Taichi is considered as the organizational force in the universe, and the Yin-Yang combo is considered as the log2 information gathering process, the current state determination process, and the steady state regulation process.

According to the Taichi Yin-Yang system theory, the Taichi (Yin, Yang) structure should be used in all analysis. The possible analyses of the health system are:

- Health (physical, mental) - the Cold-Hot spectrum
- Health (chronic, acute) - the Deficient-Excess spectrum
- Health (external hygiene protection, internal healthcare protection) - the Superficial-Internal spectrum

Our resilient planet produced lots of complicated health problems but our government did not have a holistic healthcare system. This workshop will demonstrate a possible solution to the missing component of the healthcare system, namely Traditional Chinese Medicine Healthcare Protection Program, which is simple and effective for promoting in the community. Helping the poor with money will never be enough, but helping the poor to make money themselves is a more permanent solution and may even have a positive feedback to the helper. An internal healthcare program should teach the community how to take up the responsibility of their own health in a simple and effective manner. The Traditional Chinese Medicine Healthcare Protection Program composed of three components:

- the TCM diet on how to choose food from the Cold-Hot food spectrum,
- the TCM Taichi exercise therapy on how to regulate our body and Chi (Qi) from the fully Open-Close movement spectrum,
- the TCM 24h healthcare lifestyle on how to use our health wisely for work and fun from the Human-Environment spectrum. Led by: Thomas S L Wong and Yan Huang ISSS@EC-Balance.org

Tuesday Workshops

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INTERNATIONAL FEDERATION FOR SYSTEMS RESEARCH



What is the IFSR?

Founded in 1980 the IFSR is a Federation of societies involved in Systems Research. Currently it has 36 members from 24 countries, comprising all continents. It does not have individual members.

What is its purpose?

To stimulate all activities in the scientific study of systems

To coordinate systems activities at the international level.

To organize, support, and sponsor research and development in systems research

To develop international publications

To define and promote standards of competence

What are current activities of the IFSR?

Publish the Journal of Systems Research and Behavioral Science Organize the Fuschl/Pernegg Conversations (biannually)

Create the Internat. Academy of Systems and Cybernetics Sciences

SPublish the IFSR Book Series

Publish the IFSR Newsletter

Maintain the IFSR Web Site (www.ifsr.org)

Support conferences of member societies (e.g. Ashby lecture at EMCSR)

Who manages the IFSR?

The IFSR is managed by an Executive Committee consisting of a President, up to 3 Vice Presidents, and a Secretary General. They are biannually elected by the Membership Board consisting of 2 representatives from each member society.

If you work in the systems area ... talk to us, join us!

www.ifsr.org or Gerhard.Chroust@jku.at

An Informal discussion about Relational Science and how it applies to everyday contexts, issues, and familiar situations.

Judith Rosen and Dennis Finlayson

What is "Relational Science"? It's the alternate mode of approach to "Reductionist Science". Reductionism is the mode by which systems are dismantled into smaller components for study; Relational Science is the mode by which systems are studied using methods that leave them intact. The main focus of the relational approach is to consider how the organization of the system influences the nature, the behavior, and the capacities of the system as a whole. It looks at the relations between interacting components as components, themselves-- equal in importance to the material components. In particular, it asks different kinds of questions, such as: What impact do the relations have on causal outcomes? How do changes in the relations impact changes in outcomes? The Butterfly Effect is a relational effect and offers an example of the hidden power that has been at work and continues to be at work, all around us, every day. Come join an informal discussion which applies these concepts and methods to all sorts of topics, from cars and traffic to computers and the internet, human health and physiology, even global

warming... Discussion conducted by Dennis Finlayson and Judith Rosen, based on scientific work by Robert Rosen (Theoretical Biologist and one of the Past Presidents of the ISSS).

Wednesday Workshops

Wednesday Afternoon

Project Wadi Attir: A Model Sustainable Desert Community

Michael Ben Eli

Project Wadi Attir, a Bedouin, community-based enterprise in the Negev desert of Israel, seeks to develop and demonstrate a model for sustainable, organic farming operation, adapted to an arid environment. It is designed to combine Bedouin aspirations, values and experience, with sustainability principles and cutting edge approaches to renewable energy production, resource recycling and arid land stewardship.

The project was initiated in order to showcase a breakthrough approach to environmentally sound sustainable development, which could impact the Middle East region as well as other parts of the world. It is a joint initiative of the Sustainability Laboratory, a US-based non-profit and the Hura Municipal Council, the governing body of a local Bedouin township.

Since its inception in early 2008, the project has attracted a significant group of partners representing key sectors of Israeli society, including academia, local civil society organizations, government, and private industry, making it a unique, exciting and diverse undertaking.

Living Systems Analysis Workshop: Making Soft Sciences Hard

James R Simms

This will be a workshop to discuss the development of the fundamental principles of a science of life and society, for principles that are equivalent to those of the natural sciences, such as physics and chemistry. The natural sciences are typified by identification of universal phenomena, relations among these phenomena, and fundamental measures and units of measure for these phenomena. It is shown that knowledge, information, energy, matter, and behavior are universal phenomena of life, and that there are relations among these phenomena. Units of measure for these phenomena are developed. The principles of life and social sciences were developed using the natural sciences development model.

A Workshop to Present the Criteria for Membership in The International Academy of Systems and Cybernetics Sciences (IASCYS)

Matjaz Mulej

(As passed by IFSR Board on 07 April 2010 when IASCYS was established and its first members were elected)

Candidates must fulfill SEVENTY SCORES from the following 11 CRITERIA for membership in the IASCYS. Then, the IFSR member association is entitled to submit application of its member with proving documents to the IFSR Board. The decision on new membership should be up to the IFSR Board's IASCYS Executive Committee.

Criteria are quite precise and demanding to be appreciated by and appealing to the best scientists in the world in the area of systems and cybernetics (S&C) theories and applications, and closely related fields in which IFSR member associations are active.

Criteria make a system (= network of interdependent components) and include:

Author of a renown theory in systems thinking and cybernetics, or sciences with clear historic roots in them, such as the ones in the International Encyclopedia of Systems and Cybernetics

(Charles François, editor; Munich, Saur, 2004), or other renown encyclopedias related to cybernetics and systems theory, such as UNESCO-EOLSS (Encyclopedia of Life Support Systems), etc. An author's first renown theory may get 10 scores, the second 5 scores; the total scores in this criterion may be no more than 15.

a) Author or coauthor of twenty scientific journal articles in the ISCI/ISSCI cited journals on systems thinking and cybernetics, or sciences with clear historic roots in them, such as Systems Research (and Behavioral Science), Cybernetics and Systems, Kybernetes, Systems Practice and Action Research, etc. Journals on the official list cover topics such as in Encyclopedia in criterion one. Every article may get 0.5 scores, the total scores in this criterion may be no more than 20.

b) A scientific article in 2.a) journals, but no more than ten, can be replaced with two articles published in other journals, or two chapters in books in topics of 2.a), while each article can get 0.25 scores, or with three scientific conference papers, which can get 0.10 scores each, if accepted after a usual blind review process of international conferences (co-)sponsored by IFSR member associations with international scientific boards and contributions, or other similar conferences and published in conference proceedings. The total score in this criterion may be no more than 5.

Author enjoying twenty citations in journals such as the ones mentioned in criterion two, according to official international statistics of citations. Each citation in 2.a) journals may get 0.2 scores. Each citation in group 2.b) publications may get 0.1 score. The total score for these items may be no more than 15.

Having a second or more doctorates is considered equivalent to 5 scores. Honorary doctorates do not count, unless awarded for extra-ordinary achievement in S&C and/or their application.

Organizer – chair or co-chair of ten international conferences with a usual blind review process and international scientific boards and contributions, that are (co-)sponsored by one or more IFSR member association/s. For each conference the chair can get 1.0 score, the co-chair may get 0.8 scores, the total scores in this criterion may be no more than 15.

Editor or co-editor of an international journal, such as the ones mentioned in criterion two and cited by ISCI and possibly (co-)published by one or more IFSR member association/s, serving for at least five years. Each year gives 2.0 scores. Other international journals related to cybernetics and systems research give 1.5 score for each year. The total score in this criterion may be no more than 15.

Teaching systems theory and cybernetics and/or their application/s, or sciences with clear historic roots in them, abroad or other renown universities for five semesters / terms. Consulting on such a basis to organizations abroad on five appointments is considered equivalent. One semester or consulting appointment abroad may get 1.0 score, in the same country 0.5 score, the total scores in this criterion may be no more than 15.

Practical application of systems theory and cybernetics, or sciences with clear historic roots in them, in several countries with clear benefits to its users, such as innovation. Five cases must be proven, at least. Each case may get 2.0 scores; the total scores in this criterion may be no more than 16.

Membership in a national or international Academy of Sciences (and Arts / Humanities), sometimes called Learned Societies, for five years. One membership per year may get 2.0 scores; the total scores in this criterion may be no more than 14.

Author or leading co-author of an internationally translated/published or well-selling book on systems theory and cybernetics or sciences with clear historic roots in them, such as the ones mentioned in criterion one. For one such published book one may get 10.0 scores, for the national publication 5.0 scores; the total score in this criterion may be no more than 15.

Active member of a IFSR member association or IFSR board or Executive Committee for five years, which means active service and/or active participation in its activities, such as conferences, journal editorial board, managing board, etc. For each of these activities one may get 2.0 scores per year; the total score in this criterion may be no more than 16.

If there are candidates for membership in IASCYS, who do not fulfill the above criteria, but have very special merits for development of the scientific and applied aspects of the systems and

cybernetics sciences, the IFSR Board may nominate them honorary members of ASCYS. Criteria in point 13 must apply.

Criteria for honorary membership of IASCYS may be added or replace criteria in points 1 – 10 above. They include:

13.1 Establishment and/or more than twenty years of office in an IFSR member association and/or IFSR.

13.2 Authorship of unique contributions such as The International Encyclopedia of Systems and Cybernetics, establishment and/or running a S&C related journal for 10 years at least, etc.

Procedure is the same as for all other member nominations, summarized in p. 15.

Data proving the candidate's achievements must be official, e.g. in university evidence, and certified by the IFSR member association that suggests its member to become IASCYS member. Data must be attached to the official application submitted to IFSR Board's IASCYS Executive Committee.

IASCYS EC consists of: Matjaz Mulej, president, JiFa Gu and Ranulph Glanville, vice-presidents and Jennifer Wilby, secretary. Their e-addresses are: mulej@uni-mb.si; jfgu@amss.ac.cn; ranulph@glanville.co.uk; isssoffice@dsl.pipex.com. Contact us for more information any time!

Wednesday Evening

Ecopolicy - It's a Cybernetic World... Play your way to a new understanding of our complex world.

The simulation- and strategy game was conceived by the German biocybernetician and environmental pioneer Frederic Vester as a contribution to the necessity of understanding the processes in complex systems. It makes the player governor in a fantasy-land called Cybernetia. The country is represented by eight areas of life: politics, production, environmental stress, quality of life, education and population. With their interlinkages by dynamic relations it shows that many things that we see separated are in fact interconnected. Often the unknown relations are more important as the things themselves.

Each decision of the player results in chains of effects and repercussions just as in real life. By getting acquainted with pattern recognition and a parallel processing of the interconnected levels of our reality, the player experiences how to develop relevant & future oriented decisions in order to achieve resilient systems. Last but not least, it's also fun. Illustrations, animations and music lead to the emotional message the game is supposed to fulfil.

For a few years, the software has been used in a Germany wide school contest, the "ecopolicyade", founded by engaged teachers. In 2009/2010 over 90,000 students participated, with finals in the German Parliament. The contest will be extended internationally, supported by Malik Management.

"With the ecopolicyade, a new generation of system-thinkers grows up. Our aim is to enable all children, but also politicians and manager, to learn to understand and to master complexity. Introducing a broad public to the findings of cybernetics is the basis for control and management of our society towards viability." Fredmund Malik

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Paper Abstracts

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TRIPLE TASK AND THE PHILOSOPHERS STONE: DISCOVERING A METHODOLOGY FOR SYSTEMIC AND REFLECTIVE PARTICIPATION

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The European Union Framework Package 7 project POINT (Policy Influence of Indicators) is exploring the use of indicators in several domains (most specifically sustainable development) in order to see how their value and ultimate usefulness can be maximised. One key aspect of POINT is to assess the ways in which groups and communities work to gain greatest use of information. Using an innovative methodology called 'Triple Task', the authors are applying a three cornered approach in order to gain an understanding as to how groups work, how they assesses themselves and how they appear to function from an external perspective.

In this paper, the three stages of Triple Task are described and explored. Task One is effectively an adapted 'soft systems' approach, encouraging a group to work together on problem identification and action planning. Task 2 is a reflective, 'outside in', external review of group dynamics, which makes use of the 'BECM' matrix for group systemic assessment first developed by the Systems Group at the UK Open University. Task 3 is an 'inside-out' self-reflective group analysis applying the well-known SYMLOG method.

By use of a tri-analysis involving both qualitative and quantitative approaches, the authors show how during Triple Task managed events a 'story' emerges of group learning and development and, how a potential diagnostic tool for educing purposeful group behaviour has emerged. The research is in its early stages, but following the analysis of numerous groups from a range of sectors from across the European Union the authors are gaining clarity over what features are most consistent between purposeful group behaviour and group makeup. This is leading towards the development of an 'Triple Task' heuristic device for measuring and even predicting the systemic and reflective capacities of specific groups and communities and this could in turn result in means for improving participative effectiveness in a wide range of social engagements. .

Keywords: Triple Task, soft system, reflective practice, stakeholder participation, Symlog

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THE POSSIBILITIES OF MAPPING NATURAL SYSTEMS INTO ORGANIZATIONAL SYSTEMS – PART 1

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The presented 1st part of the paper is based on a four-year-long research on two categories of living systems: natural systems and organizational systems. Natural systems - as a part of biological world - were defined as a set of living organisms and interrelations between them, organizational systems - as a part of human system - as a set of organizations and interrelations between them.

The main idea which inclined the author to the research was the assumption that organizational systems became more and more complex on one side but on the other reveal lots of weaknesses as the whole (general example: the paradoxes of globalization).

One of the nature focused futurist, K. Kelly, said that organizations are starting to take on the complexity of natural systems and at that point they become out of our control. The natural

thinking is: if we want to understand the complexity of organizational system and be able to steer it, we need to understand natural systems first; they might be a great model of what organizational systems, or even the whole human system, is starting to be. Through the comparison of both systems we might come to final ideas of what to concentrate on. The strategic point would be the ability to model organizational and human system according to natural determination of systems construction.

Nature was always inspiring for humans, but usually in its specific parts. This research was a general and wide system analysis of the construction of nature as a whole in the context of mapping its solutions into organizational and human world.

This paper, as part 1 of the research, is concentrated on: methodological aspects of mapping process of two categories of systems, description of natural and organizational systems. Finally it presents the main outcome, which is the facet for both system analysis. The facet is four dimensional, according to function, structure, process and context of each system in their four levels of emergent properties. It shows the construction of natural and organizational world and makes the simple basis for further research and analysis.

1317

INFORMATION AND LIVING THINGS

Juan David Arango

What is the origin of everything we see around us? What is that which is called life or the fact that there is complex matter “organized” in an improbable physical state and that it perceives its environment in non-physical manner. Rocks can grasp their environment in a physical way and transfer energy from themselves to their environment. This complex organized matter grasps another “world”, as it grasps the environment in an “informational” way, and acquires an awareness of its environment, neither physical nor material, that aids the management of its improbable physical state. This awareness is called information.

Is this informational ability, which allows the complex organized matter to “process” and adapt to its surroundings, what we call life? Many examples in nature support the idea that the ability to “process” and adapt to surroundings is exclusive to those beings called “living.”

Let’s affirm life exists. Let’s also affirm that organized matter, with its informational ability, perceives something non-physical: information. This holds that apart from the physical world, for living beings, there exists a world of information. This world is not matter and exists differently for each one of these living beings. This way (informational ability) of each living thing, creates a compilation of perceptions, particular truth, which is unique to and only exists in the mind of each living being.

The material world, which is comprised of everything that exists, is called general truth, or universe. This general truth limits our informational world and reminds us that to maintain the improbable physical state, optimal use of information is necessary. So matter is universal, its interpretations: multiple. There is at least one for each particular truth.

A particular truth is formed by unique perceptions, which for exposure to other living beings require a specific process: communication. Perceptions of the general truth are complex and humans have generated important concepts (amount, time, color, shape) or tools (language) that allow us to share these perceptions in seemingly universal ways. Communication facilitates the formation of the conventional truth, the truth of groups of living beings that shared and validated their particular truths. Therefore, the world of information has a conventional truth too, made up of perceptions shared through groups of living beings

Each perception in a particular truth contains multiple elements. Each element is a datum (Word, red, round, few, day), which is represented or substituted in the particular truth and communicated, using codes and matter. To form the idea of what we perceive, information, we collect this data and obtain a perception within the conventional truth.

This information, particular truth, unites with other information (if allowed) in the living being, usually biological (directing the behavior of the being), to determine a way to continue this complex matter’s (living being) existence in the material world, the general truth. The ability of this

being to combine external and internal information to continue its improbable physical (and/or organized and/or chaotic) state called life, or to end it if so chosen, is the ultimate decision. The decision making process can be peripheral or remote. The peripheral is tactical. It deals with decisions concerning concrete topics, which happened or are likely to occur. The remote is strategic. It deals with decisions concerning abstract ideas, which have not happened and whose occurrence is uncertain.

So, the origin of everything we see around us is our informational ability, a characteristic of living beings (from the informational standpoint, as another question involves the origin of matter itself.) And we can say that what we call life is the ability of complex matter to process information with its informational ability.

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THE INTELLIGENT SCENARIO SELECTION IN DYNAMIC HOIST SCHEDULING PROBLEM: THE REAL-LIFE ELECTROPLATING LINE CASE

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The electroplating production lines are a type of flexible manufacturing systems where items are processed chemically in tanks while transport between tanks is performed by automated hoists. Therefore, scheduling in such systems is called the hoist scheduling problem. Some applications require production of many item types in real-time. It is referred as the dynamic hoist scheduling problem. It requires a scheduling system, which will create schedules in real-time. The scheduling system is driven by orders. An order consists of a queue of new items designated to be produced next. The order is specified at some not known in advance time. The scheduling system meets the real-time requirement when it manages to find, feasible schedule for current and new items in time that allows implementing such schedule. The intelligent scenario selection method is a hybrid algorithm that bases on several heuristics and machine learning. At the beginning the algorithm uses a classification method to select the most suitable way of producing a next item type, basing on current line situation and order properties. Next, heuristic constraint propagation is performed in order to find the best timings by using shift and unfold operations. Then, a heuristic hoist routing algorithm is applied for successive shifts. When the algorithm finds a feasible routing, the schedule is ready. If the scheduling system manages to perform presented calculations in sufficient time, the schedule is implemented to automatons and production continues with the new schedule.

A real-life production line located in Wrocław, Poland is considered as a use-case for testing and validating the proposed method. Two technological processes of chroming and nickeling are performed on this two-hoist production line. There are several historical runs to analyze as well as typical order compositions that can be used as problem generators for statistical analysis. Order compositions are defined as ratio item type ordering and probability of delays.

The paper goal is to present the intelligent scenario selection method in detail and present its work on real-life production line. The design of real-time scheduling system is described. A notion of order-driven scheduling is presented. An outline of scheduling algorithm is presented, emphasizing the scenario selection by classifier stage. The method is presented stage by stage on single historical run. Summary of other results is presented. To compare results, a several measures, like tank utilization and a hoist utilization are analyzed. For historical runs the results performance is compared with schedules used on Wrocław line. For generated results, as so-called parallelization ratio is used to present the efficiency of line.

CAN ECONOMIES BE ORGANIC? LOCKING THE HOOD ON THE ECONOMY

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Just as bodies have an autonomous system to handle the truly crucial functions -- breathe, beat the heart, digest the food -- so does society or the body politic have an autonomous system to free up humans from mundane yet vital tasks in order to turn their attention to things only humans can do (or do well), things like become conscious, create beauty, spend every conscious moment loving, etc. That autonomous system for human society is the economy.

Presently, human society does not utilize the autonomous capability of the economy. We interfere with it via custom and law, yielding unintended negative consequences.

But we do know enough already to let the economy work for us, instead of us working for it. The key is to follow the flow of money, noting specifically what we buy. Of the ways to categorize spending, one is dividing what we buy into goods and services produced by other humans and into things we value that were already here -- land, resources, EM spectrum, ecosystem services, etc. As even the mainstream business press notes, when the price of land rises, and we spend more for something nobody produced, we have less to spend on things that humans do produce, so that every decade or so, we must have recession.

Yet while we must spend good money on both human output and natural goods, having that result in recession is not irremedial. Indeed, during the 1970s recession, there were jurisdictions that actually attracted new businesses while neighboring towns were losing businesses (that's what a recession means for some firms -- bankruptcy). What did these places that prospered do differently? They redirected people's spending for land away from owners, so that land rent did not reward speculative withholding of prime sites from productive use, then into the public treasury and out again as benefits for the public. At the same time these governments recovered "rents", they cut taxes on people's efforts to produce value -- i.e., the taxes on buildings, sales, and earnings.

The purpose of applying systems science insights to economies is to try to solve some economic problems, such as recession, poverty, lack of leisure, environmental degradation, etc. Some scientists have noted that some complex systems maintain balance with feedback loops, both negative and positive. Both natural cycles operate in the embracing ecosystem and in the subsystem of economies. The pricing cycle, AKA the Law of Supply and Demand, follows the sine wave of a negative feedback loop, a pattern also found in the Prey/Predator Cycle, for example. The ascending part of the land-price cycle, first postulated by Homer Hoyt in a study of Chicago land values, later developed by British economist Fred Harrison, follows the spiral, the race to the top, of a positive feedback loop, a pattern also found in swarms, for example. Since such cycles and others can keep balance in ecosystems, and since economies are part of ecosystems, could economies also be allowed to follow such patterns and maintain balance? Specifically, what if public policy respected price? What if government did not distort price with taxes and subsidies? What if government did not allow distortion by monopoly or "givings" (private retention of publicly generated value)? Would economies then (which already provide a lot of good) cause less suffering? Specifically, would economies operate less like boom/bust and more like climb/glide? Would distribution be less skewed and the wealth/income gaps be less yawning? Would people be able to spend less time inside their economy, more time out? Would the human footprint contract to fit within ecological constraints? While no jurisdiction follows "geonomic" logic totally, all jurisdictions have different taxes, subsidies, standards, and enforcement.

Were government, society's agent, to quit funding special interests and instead pay citizens a dividend (a la Alaska's oil dividend), then its members would be empowered to explore ways to become more fully human, spelling the end of Economan but the birth of ... whatever human potential is capable of.

SYSTEMIC AND CYBERNETIC PLANNING AND MANAGEMENT WITH THE “SENSITIVITY MODEL PROF. VESTER®

Gabriele Rosa Maria Harrer, Malik Management Zentrum St. Gallen

How can we deal with complexity and complex systems in practical management and planning? The Sensitivity Model developed by Professor Frederic Vester and its computerized 'System Tools' on complex problems of economical and political planning and management is a theoretical approach and also practical planning tool which has been developed along many applications in management, planning and politics. The system oriented approach tackles with complexity on the basis of biocybernetics and leads towards the development of sustainable and viable systems.

The last decades, focussing on quantitative growth and spread of resources of all kind led to a critical systemic situation for our social, ecological and economical systems. Only a profound systemic thinking, systemic understanding and systemic acting may lead society towards tackling complexity and the development of viable, functioning systems. The Sensitivity Model Prof. Vester leads with its recursive and iterative, evolutionary approach and visualization of the cybernetics of a system - be this a city, a company or any other complex systems - to the understanding of the cybernetics of the system and to the development of system relevant measures. On the basis of cybernetic findings and 30 years of experience in practical applications e.g. in agriculture, car industry, communal planning, management, crisis intervention, military conflicts and education it shows a concrete way to understand the systems interconnections, to analyze feed back cycles, to identify critical levers, to develop system relevant solutions. Only with the integration of the participants of these complex systems real future oriented and viable solutions can be developed and implemented.

As an accompanying means the cybernetic simulation game “ecopolicy” allows a playful understanding of complexity. Ecopolicy was also developed by Frederic Vester. The player is governing a virtual country called Cybernetia. With his decisions to invest in different areas of life he playfully experiences to control and regulate a complex system. ecopolicy is used in a German-wide gaming contest of students and politicians, supported by the German “Bundeszentrale for political education“. In 2008/2009 over 90.000 students experienced systemic thinking and its useful consequences on management and decision-making. The contest continues in 2010 and will be enlarged in several countries to an international contest in systemic thinking.

Especially interesting is the approach of Malik Management to combine the Sensitivity Model with the other cybernetic approaches as Stafford Beers “Syntegration“ and “Viable System Diagnosis“.

Prof. Frederic Vester (1925-2003) has been a renowned German Systems Researcher. Beyond other activities in his “Studygroup for Biology and Environment“ he was a Member of the Club of Rome and published his findings in 17 books. His last book: “The Art of Interconnected Thinking. Ideas and tools for Tackling with Complexity“ was selected as a “New Report to the Club of Rome“ in 1999 and was finally translated into English language in 2007. Gabriele Harrer, has been collaborating with Frederic Vester for 20 years and is since 2006, after the integration of Frederic Vester's lifework into Malik Management St. Gallen. With Malik Management she is continuing this work as Senior Systems Expert. Additionally she is lecturing about the systems approach at various universities, e.g. Munich Military University, Zurich University for Applied Sciences.

The contribution will show an introduction into this approach and tools and a practical experience with the cybernetic simulation game.

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SECURE COMMUNICATIONS: CHAOTIC SYNCHRONIZATION ON RÖSSLER CIRCUIT

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In this paper is presented the analysis of Rössler's chaotic oscillator third order, analyzed with the Kirchhoff theory, moreover had been demonstrated that two chaotic systems that are seemingly random, it can be matched on one trajectory, using two nonlinear dynamics electronics circuits, in this case rossler circuit's (on transmitter and receiver), that gives rise to send information using chaotic signals. i.e. the signal is masked, providing information encryption at hardware level; the simulation, graphics, and other results are showing using the multisim software.

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LEADERSHIP OF NONPROFIT ORGANIZATIONS IN HEALTH AND COMMUNITY CARE

Shankar Sankaran

This paper will describe an organizational change program being envisaged to be carried out in two nonprofit organizations in Australia that are providing health and community care. A pilot project was carried out to secure a research grant from the Australian Federal Government to carry out a three year research project to to strengthen leadership in nonprofit organizations providing health and community care. The paper will summarise the findings from the pilot project and explain the process to be used in the main project and in particular systems thinking approaches used in these projects.

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A COMPARISON OF THE PROCHASKA CYCLE OF CHANGE AND THE HOLLING ADAPTIVE CYCLE, EXPLORING THEIR ABILITY TO COMPLEMENT EACH OTHER AND POSSIBLE APPLICATIONS TO WORK WITH OFFENDERS.

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The Prochaska Cycle of Change was developed in the field of cognitive behaviour and is used in areas such as nursing and criminal justice to effect behavioural changes in people. This proposes a cycle with the phases of pre-contemplation, contemplation, determination, action and maintenance. The Holling Adaptive Cycle was developed from research into ecological systems and is also used in such areas as financial and organisational systems. This model proposes a cycle of exploitation, conservation, release and reorganisation.

This paper attempts to map the two cycles on top of each other and explore how this mapping might enhance our understanding of both cycles. It further explores some possible implications for work with offenders. Resilience is a central concept of the adaptive cycle and in work with offenders. Just as building resilience helps natural and organisational system to be adaptive, so too building resilience will assist offenders to gain appropriate governance over themselves and avoid falling back into further offending.

Keywords: adaptive cycle, resilience, offender, cycle of change, desistance

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MANAGEMENT TECHNOLOGY FOR MEXICAN SATELLITE SYSTEM

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Systems and mobile communications are based on current satellite systems offer different transmission and reception of voice, audio, video, broadband data, etc..., Requiring satellite

systems provide an efficient service and the further development technologically. To achieve this, it is necessary to make a technology that allows management to make further proposals according to the needs of the country, public institutions, private and public. This involves managing the technological, political, social and economic development.

Identify the problem, the underlying causes of war and raise the solution strategies for technology management of the Mexican satellite system. Based on the rules, conventions and national regulations and international satellite systems to streamline communication of knowledge and practices related to the processes of creation, development, transfer and use of technology.

Keywords: Management, Technology, Satellite system.

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DISEQUILIBRIUM, DEVELOPMENT, AND RESILIENCE THROUGH ADULT LIFE

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In the field of mental health, resilience is known as a psychological characteristic intimately entwined with the experience of disequilibrium. Originally, the resilience literature focused on children; recently, psychologists are beginning to examine the resilience that arises – or doesn't – through the vicissitudes of adult life. The human life span can be seen as repeated experiences of stability, disequilibrium, and emergence of new abilities and worldviews. Simply put, psychological development happens beyond childhood. However, developmental theorists are divided on whether or not psychological development is inevitable throughout one's life. More important, the repeated experience of psychological disequilibrium in no way assures a person will develop resilience. This paper examines the affective experience of psychological development through adult life, and it what it means to be actively receptive to development in a way that optimizes the growth of resilience throughout adulthood.

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CLOSING THE LOOP - FOOD = WASTE = FOOD- A SUSTAINABLE SANITATION PROJECT

Shankar Sankaran, Kumi Abeyuriya, Janice Gray, Anthony Kochenko

This paper will explain a research project being carried out in Sydney, Australia at the University of Technology Sydney (UTS) highlighting the action research methodology and systems thinking principles being adopted in this project.

UTS is set to participate in an Australia-first action research project led by the Institute of Sustainable Futures (ISF) exploring the use of innovative urine diverting toilets in an institutional setting. A UTS Challenge Grant has been awarded to the project which will enable safe nutrient capture and reuse from urine diverting toilets installed on campus for a trial period.

The Challenge Grant has some enthusiastic industry partners including Sydney Water; the manufacturer Caroma Dorf; the Nursery and Garden Industry Association, government partners (NSW Department of Health, and City of Sydney) and the UTS Facilities Management Unit (FMU).

Previously, the only two other urine diversion trials in Australia are a small eco-village in Queensland and a peri-urban bushland community in Victoria.

Traditional sanitary systems are both water and energy intensive in collecting, transporting and treating sewage. Urine Diversion (UD) systems not only reduce these costs but also have the potential to provide phosphorus rich fertilizer to agriculture while at the same time removing it from wastewater where it can cause problems such as algal blooms and eutrophication of waterways.

As mineral phosphate deposits rapidly deplete and phosphorus underpins global food security, diverting urine to agriculture makes good sense. Yet to capture, value, and reuse urine requires a transformation in how we think about sewage. Multiple factors need to change including the

technologies, regulations, business models, and socio-cultural behaviours and habits of practice. Therefore stakeholder engagement and sophisticated visual communication tools will be vital to the success of the pilot.

This project presents a first in UD research by engaging a broad range of important stakeholders in the process of trialing UD systems. The project will provide work based learning opportunities for UTS students in engineering, project management, and design, as well as University of Western Sydney (UWS) students in agriculture and visual communication, and University of New South Wales (UNSW) students in environmental law. Close collaboration with our industry partners assures the research findings emerging from the pilot project will be industry relevant.

Providing a Challenge Grant for this pilot proves UTS's international reputation as an institution that really does foster innovation, creativity, technology and practice-based research. It also aligns with UTS's own Campus MasterPlan commitments to sustainability.

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HOW TO MAKE SYSTEMS THINKING BECOME A MAIN STREAM IN SOCIETY?

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Abstract: This paper investigates the existence of systems concepts and ideas in different cultures and civilisations throughout history. The similarities and differences between these concepts in western and eastern philosophies will be discussed. The paper examines ancient civilisations, Chinese Traditional Medicine, Yin and Yang, the five key elements of the Universe (metal, wood, water, fire, and earth), as well as indigenous cultures such as Maori (Earth Mother and Sky Father) and views and practices of Aboriginal people in Australia. The development and application of systems concepts and holistic thinking in various disciplines are reviewed. The paper links these perspectives to the state of the art of systems thinking and suggests ways in which the history of systems thinking can help its future development as an 'every day language' and main stream concept embedded in society.

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MECHANISM AND MEDIEVALISM IN CONTEMPORARY SOCIAL THEORY: SYSTEMS SUGGESTIONS FOR TRANSFORMATION

Barbara Hanson

This paper examines the possibilities for the transformation of social theory via basic systems epistemology. I argue that social theory has lagged behind theoretical development in other realms of scholarship and thinking in world cultures in part because of its implicit reliance on dialectic or oppositional epistemology that is an outgrowth of mechanism. Social theoretical activity of the past 50 years has oft criticized conceptions of modernity, science, objectivity, and reason as artifacts of Europe between the 1500s and 1700s. However, these critiques have failed to address how these ideas emerged in the context of dominant monotheistic religion in the Medieval or Middle Ages in formative Europe. Consequently social theory bears the cast of Medieval scholarly practices to the current day. This argument appears by looking at the context of the 400s-1400s in the territories of what later became Europe and suggests the relevance of relational units for social theory.

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INNOVATION THROUGH KNOWLEDGE SCIENCE AND KNOWLEDGE MANAGEMENT SUPPORTED BY SOFT SYSTEMS METHODOLOGIES

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Knowledge Science (KS) and Knowledge Management (KM) have become more important in the last decade. An authentic revolution has occurred in this field. Many studies and surveys were conducted among doctoral and post-doctoral researchers who were studying these subjects to define the Knowledge Science content: creativity, systematic application of knowledge, human science and methods of knowledge transfer, knowledge utilization and knowledge creation.

It has been hard to define the content of Knowledge Management as an interdisciplinary field. Several different definitions have been proposed. In spite of that, it is well known that Knowledge Management focuses on organizing general management to achieve its mission, improve its competitive advantage and develop organizational competences through that knowledge.

Several models have been proposed which cover a lot of factors, entities, functions, events and support. Factors for considering all the needed variables, entities for answering what does KM deal with, functions for defining how to implement KM, events for studying main situations and support to enable us with the available tools.

Creativity and innovation are keys to obtain results. The available models should be analyzed, from the simplest to the most sophisticated, by means of a systems analysis methodology. When a model for improving a specific innovation system is applied it is convenient to select and utilize a soft system methodology (SSM) to promote the change process.

In this paper several KM models are analyzed and one additional model, coherent, integral and applicable in most common problems is proposed. Besides that the paper focuses on discussing the relationships between Knowledge Management, creativity, innovation and technological development.

Several partial problems and solutions are considered in this KM study: 1. Organization of knowledge data and information, 2. Utilization of this knowledge in internal processes, 3. New knowledge creation and finally, 4. Integration of new knowledge in the organization.

Keywords: knowledge science, knowledge Management, creativity, innovation, Soft System Methodology

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THE INFLUENCE OF SYSTEMS ON JOHN BOWLBY'S WORK IN ATTACHMENT THEORY

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This presentation will summarize the findings of a research project, which investigated the connections between John Bowlby's development of Attachment Theory, and the systems theorists with whom he was in contact. While Bowlby was, in fact, in contact with many well-known systems theorists over many years, the influences of those relationships is only indirectly evident in his writings. Evidence of the influences will be presented and implications discussed.

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CONSCIOUS PURPOSE IN 2010: BATESON'S PRESCIENT WARNING

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In 1968 Gregory Bateson hosted a conference on "the effects of conscious purpose on human adaptation." In his conference paper he warned that human conscious purpose distorts perception in a way, which obscures the systemic ("cybernetic") nature of both self and

environment. The ensuing years have paid little attention to his analysis of both observer and environment as cybernetic systems whose systemic natures are dangerously opaque to human purposive thought. But his analysis is sounder than ever on the basis of scientific developments of the last forty years. Recent adaptive systems formulations in ecological theory have underscored how ecological systems, because of their systems nature, can be vulnerable to the unintended consequences of human actions. Modern neuroscience has also delineated many of the limitations of conscious thinking Bateson warned us against. In fact, new work on the cerebral hemispheres has pointed to epistemological biases, characteristic of the left hemisphere in particular, which fit Bateson's portrait of the biases of conscious purpose. It seems that Bateson's forty-two year old warning was prescient and relevant to our predicament today.

Keywords: ecology, consciousness, cybernetics

1343

PSYCHOLOGICAL PANARCHY: STEPS TO AN ECOLOGY OF THOUGHT

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Since its origination, researchers in the field of ecology have been faced with complex questions of considerable complexity. To consider an entity within its habitat involves recurring problems of definition; of the entity, the boundary of the inquiry and the criterion for observation. The increasing sophistication of systems theory in the construction of ecosystem models provided new ways of studying ecologies as processes, independent of the botanical organisms they contain. Extensions of hierarchy theory allowed multiple scalar levels of systemic interactions to be observed. The development of panarchy theory has now provided a cyclical perspective on complex ecologies in multiple spatio-temporal spans. Yet in all the advancements of our observations of complex ecological systems, we have advanced only slightly in our observation of the observer.

Recent research into developmental psychology suggests that psychosystems, like ecosystems, are not unimodal and continuously distributed. Patterns of thought may also form complex hierarchies appropriate to the environments of existence. Panarchy principles have proven useful in providing metaphors for the complexity of socio-political and socio-cultural dynamics. The governing dynamics of human thought are now being seen as crucial for the resilience, sustainability and liveability of our future societies. The potential exists for a more detailed construction of a theory of panarchy for human psychology to provide an explanation of the role of thought in understanding human and ecological systems.

This paper considers parallels between recent findings in developmental psychology and developments in the panarchy research into complex ecologies to assess the viability of the application of panarchy theory to the ecology of human thought. Five distinctive features of a panarchy inquiry are considered with reference to the viability of their application to the psychological dynamics operating in evolutionary human social systems. The paper concludes that a theory of psychological panarchy is viable, and necessary, if roles of the observer and the observed are to be understood to progress the study of the resiliency of complex human societies.

Keywords: ecosystems, ecology, systems theory, psychosystems, panarchy

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SYSTEMIC DESIGN FOR THE RECYCLING OF SOLID AND LIQUID ORGANIC WASTES AND THE HYDROPONIC GROWTH OF ORGANIC FOOD: A NATURAL CYCLE OF DEATH AND LIFE

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We propose a systemic design for the total recycling process of solid and liquid organic wastes, its anaerobic and aerobic treatment, and the production of organic food through the use of hydroponics under a controlled environment. In the Mexico City megalopolis, as in many other cities in the world, a growing problem is the management of wastes, solid and liquid, organic and inorganic. One half of the solid wastes in Mexico City are organic. The city government also has a huge the problem with the disposal of wastes. Another important problem is to provide water for the Mexico City, 20 millions habitants. In the Instituto Politecnico Nacional (IPN), the National Polytechnic Institute, a large and influential Mexican public university, a technical investigation project has been developing to design a systemic solution for these important needs.

In nature there is a Cycle of Life and Death, in each ecosystem there is a synergetic relationship between biotic and non biotic systems. The biotic systems have a Cycle of Life and Death. When a living being dies its organic wastes become a favorable media for life, in the organic wastes living beings obtain water and nutrients for their growth. The main composition of living beings is water. We can observe how ecosystems work, and use an ecosystemic metaphor for systems design of a recycling process.

A systemic socio-technical solution is being developed under the conceptual guideline of the ecosystemic metaphor through a participative action-research process to design an integral solution to the problems of wastes, water and food production. For almost thirty years we have been working in this type of solutions with rural and urban communities, the next step is to optimize the recycling and construction process with an action research systemic project on its technological, economic, social and environmental dimensions.

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A HOLISTIC DESIGN FOR THE SELF-CONSTRUCTION OF THE CORE OF A MODULAR SMALL HOUSE AND ITS SERVICES FOR DISASTER ZONES

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Haiti's catastrophic systemic collapse after the ...earthquake is a dramatic example of the connection between a natural phenomena and the social and economic organization in an underdeveloped country. The earthquake had a much smaller magnitude than the ...Chile's earthquake, but had a much larger effect. In Haiti there was a widespread destruction of its infrastructure, the reconstruction had to begin from scrape. Today a large part of the refugees is living in temporal living lodgings there are not enough funds to restore the fragile housing infrastructure of the country. The poor regions of different countries have a very fragile infrastructure that can be severely affected by natural disasters. When a catastrophic event happens, a widespread destruction occurs. After the event, an international effort is made to reconstruct the houses, and services that where destroyed. The relief effort does not last for a long time, and after the initial effort the population is abandoned, they have to solve their problems with their own scarce resources.

In the Instituto Politecnico Nacional (IPN), the National Polytechnic Institute, a large and influential Mexican public university, a project is being developed for the construction of a strong modular transportable mini house (bathroom and kitchen, and its services) as a first step in the

rebuilding effort in disaster zones. The first step in the reconstruction of the housing infrastructure and its water service (with the recycling of water) can be a strong central core of the medium and long term rebuilding houses and their services. The construction process of this small central core of housing is the beginning of a participative self-sufficient effort of organized communities, a gradual medium or long term rebuilding process of their complete houses and services, with their own resources and knowledge. It is an integral, or holistic open socio-technical process that links the design of water infrastructure, with a social process (linking rational, emotional, cultural and spiritual dimensions) in a particular geo-cultural context..

The modular core, is the first part of a participative self-help construction process with local materials after training and workshops. Actually, we already are in the first step of this process (workshop and training) in Haiti, with some other partners as Caritas and Misereor.

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A CYBERNETIC APPROACH TO HURRICANE HAZARD MANAGEMENT ON O'AHU, HAWAI'I

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This dissertation was set out to reveal deficiencies in hurricane hazard management on the island of O'ahu, Hawaii. The hurricane risk for a strong hit or near miss on O'ahu lies at about 1-3%. This probability seems low, but risk is mathematically constituted by the probability of an event times the magnitude of the consequences of the event. Consequently, the severity of the impacts needs to be considered. As the vulnerability analysis showed, those impacts would be catastrophic.

Compared to the damage extent of Hurricane Katrina still vivid in the memories of many, O'ahu faces a much more vulnerable situation due to its isolation, high population density and fragile infrastructure. In human terms, the biggest difference is the infeasibility of evacuation of the island's population of almost one mio. people, which would be highly vulnerable due to the failure of 80% of the island's infrastructure. Honolulu International Airport would be unavailable for an extended time and the extensive damage to harbor facilities and smaller inland airports would limit the island's resource access to a great extent. Overall, all critical infrastructure including energy, transportation, communications, food, sanitation and water distribution and emergency services would be severely impacted. Given the picture of great potential problems, there is a need for a way to maintain a society's internal stability and reduce the vulnerability in face of such an external threat. Cybernetics in general and the VSM in particular, seemed to offer potential solutions.

The objectives of this dissertation were (1) to investigate if hurricane hazard management in Hawaii can be improved by the VSM looking both at the structure and the processes; and (2) to evaluate the VSM's applicability to disaster management and the insights for Geography and hazard management research.

The VSM revealed that all system elements were in place, but the balance, quality and importance of some need urgent adjustments. A major structural drawback was the hierarchical structure of the National Incident Management System, even though it had cybernetically sound aspects such as a redundant system structure and a maximum of seven System 1 elements. System 2 was evident on paper, but overall it was an unpracticed system element. System Three Star was failing through all Levels of Recursion. System Four was evolving, but very weak at the time of investigation. System Five was strong given the subject matter.

Overall, the application of the VSM to hurricane hazard management confirmed the model's usefulness. It is specifically capable of dealing adequately with the discontinuous temporal character of a 'hibernating' system such as a disaster organization. Besides application problems such as the abstractness of its language and concepts, it was concluded that after the big effort in the beginning shortens with more experience, the model reveals its excellent diagnostic capabilities. The VSM is analogous to a treasure map: You can run around an island and find the treasure by chance. This way, one can know about the treasure, but take forever to find it. The

VSM, in contrary, leads you right to it. The insights could maybe be found out without the VSM, but it would take a longer time to reach those insights, one would need a variety of other approaches to do so and therefore need a variety of experts that speak the same meta-language. This is the great advantage of a VSM application: it can integrate different fields of knowledge and fits therefore into the field of Geography. It is capable to grasps the full complexity of the very interdisciplinary field of disaster management. This shows why the cybernetic meta-language and abstract concepts are necessary, highly useful and worth learning.

1351

THE HARD FACTS OF SOFT SOCIAL SYSTEMS: BOULDING'S TYPOLOGY ELABORATED TO EXPLAIN BEHAVIOR IN SCHOOLS AND WORKPLACES

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In this paper, a new theory for social system behaviour is outlined. Gleaned out of Boulding's nine-level typology of system complexity, it is named TPO for the three key domains in schools--things, people, and outcomes for non-specialists; and technical, personal and organizational for specialists. The need for such a theory is great, given the variety of decision-makers, and the failure of well-intentioned reform efforts. The value of this theory is that it condenses factors into three key parts of a social system--Things, people, and outcomes--by their very different properties. First, things (technical) in a social system are of three kinds--level 1: frameworks/structures (e.g., buildings, books, and equipment); level 2: clockworks (e.g., school routines, schedules and calendars); and level 3: thermostat-like systems (e.g., school goals which people--students and educators--self-regulate to attain.) Things are predictable and designable. Second, people (personal) in a social system are not designable. While things like thermostats self-regulate to externally prescribed criteria, living systems self-regulate to internally prescribed criteria (level 4: open; e.g., living cell). Living systems (levels 4-7) act to meet their own basic needs first, then, in people, higher needs--generally predictable by Maslow's hierarchy of human needs: survival, safety, belonging, achievement, self-actualization and transcendence. People's behaviour decreases in predictability due to inherent individual differences (level 5: blueprint; e.g., plant); differing immediate perceptions from among competing stimuli (level 6: image-aware; e.g., animal), and their own long term reflections, prior knowledge, choices, and abilities (level 7: symbol processing; e.g., human). The third part of a social system is labelled outcomes (organizational). Outcomes depend on people's behaviour. If people easily meet their basic needs, they will act to meet the organization's needs. This principle is not a question of ethics, but a question of physics. It is natural, biological, and scientific law that people will behave to meet their individual and personal needs (level 7: human) before their social system or organization's needs (levels 8 and 9). Level 8 systems (social) are optional. Level 7 functioning is mandatory. A person can transfer schools (level 8), but cannot transfer bodies (level 7). The TPO theory of a social system clarifies that effective designers put all their attention to things, the designable components of a social system: frameworks; clockworks; and thermostat-like systems (e.g., school and classroom goals and ratios and flows of resources). Effective designers fashion these designable components as attractors, to allow system members to meet individual/personal goals as first priority, and organization goals as second priority. TPO is an approach here termed systemic renewal, or systemic change efforts designed to increase opportunities for each social system member to meet his/her own self-perceived goals at his/her own pace. The ISSS Morning RoundTable corresponds to the goals of systemic renewal and the TPO theory.

Keywords: General systems theory, social system theory; systemic school renewal.

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**THE A H1N1 INFLUENZA PANDEMIC:
A SYSTEMIC ANALYSIS OF ITS GENESIS, EVOLUTION, AND SOCIO-ECONOMIC,
CULTURAL AND HEALTH CONSEQUENCES**

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In April 2009 a health emergency was declared in Mexico City, as a new influenza virus (AH1N1) began to spread. This new virus was similar to the Spanish Influenza virus which caused the death of more than 40 million persons in 1918-1919.

The 2009 health emergency declaration in Mexico imposed the suspension of activities in crowded areas such as schools, restaurants, sports and recreational areas, during several days, causing important economic losses and deep-seated fears in many persons.

This paper presents a systemic analysis of the genesis and evolution of this pandemic and proposes some preliminary conclusions and recommendations.

This pandemic situation was not as grave as expected, but the alert flags continue to be raised, at the world level, because the World Health Organization specialists fear the spread of a very dangerous influenza epidemic.

Keywords: A H1N1 Virus, Influenza, Epidemic, Health and Economic Consequences.

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THE 2010 EARTHQUAKES IN HAITI AND CHILE. A COMPARATIVE SYSTEMIC ANALYSIS

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Why did a relatively mild earthquake of 7.0 degrees on the Richter scale in Haiti cause more than 200,000 dead? And why did a very intense 8.8 Richter earthquake in Chile cause less than one thousand dead? In this paper, the socio-economic, demographic, legal, cultural, and natural causes of these differences are analyzed from a systemic standpoint. The objective of this paper is to contribute to the creation of a set of standards for Latin-American cities, to be better prepared in confronting the effects of disastrous events such as earthquakes.

Some of the preliminary conclusions of this paper are that the lack of high construction standards in Haiti, together with poverty and uncontrolled demographic growth in Port au Prince made the city very vulnerable. Chilean cities, on the other hand, with a better socio-economic and cultural level, and very strict construction standards, survived the earthquake and its sequels better than in Haiti.

A set of recommendations are given in order to achieve the objectives proposed in the paper.

Keywords: Earthquakes, Haiti, Chile, Systemic Analysis, Disaster Prevention.

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DESIGNING A CLASS TO TEACH MULTI-VIEWPOINTS

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The Graduate School of System Design and Management of Keio University (Keio SDM) was established on April 1, 2008 to cultivate systemic thinkers who can lead in the development and operation of large-scale complex technological and social systems. One of the indispensable capability of systemic thinker is multi-viewpoints. No system can be described from only one viewpoint. Complex technological system and social system have many stakeholders. To understand and satisfy stakeholder's requirements, the systemic thinkers have to have multi-viewpoints.

My approach to cultivate persons who have multi-viewpoints through a class at KEIO SDM is to make good use of combination of individual work and group work. Our students in the Keio SDM are of all ages and come from a wide variety of backgrounds, including employees and officials

(both young and experienced) from private public sectors. We also have recent graduates. Group works with different background can cultivate multi-viewpoints as far as the student work seriously. The student motivation is also very important for this approach.

I designed my class, introduction to systems engineering, which is mandatory for all master degree students to realize the approach. I would like to have much time for group work, however, many students didn't have any background of system thinking nor systems engineering. In 2008, first year of KEIO SDM establishment, I taught its knowledge during the class, I didn't have enough time to have group work. Most of the class time, students had to sit and listen to my explanation. To improve the situation, I utilized an e-learning capability which KEIO SDM had. I prepared the e-learning video for the class preparation. I introduced the following cycle; step1: learn the knowledge by e-learning at off-campus, step2: individual work at off-campus during e-learning and at on-campus during the class and step3: group work at on-campus during the class. The students had to watch the corresponding preparation video before the each class started. One or two 90min video was prepared for the each class preparation. As the results of this improvement, I had enough time for group work.

As I mentioned above, a student motivation is also very important to make group work effective. My approach to make student motivation is to make students feel their growth through the class. My method to realize this approach is to ask the same question both at the beginning of class and at the end of class. The students can feel their own differences between before class and after class. When they can feel their own differences, they can feel their growth. This makes them participate actively in the group work by motivated

I did the questionnaires to the student at the end of each semester and also interviewed some students. According to them, my approach and method worked well. However, a new issue was pointed out from the student interview. Because the class preparation of the students is essential for this method, however, some of the students have difficulty to have time to see video even if the video can fast forward to reduce the time to skip the known information because they work at office during daytime. I have to improve the preparation system to reduce the preparation time.

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GROUP DEVELOPMENT: A COMPLEX ADAPTIVE SYSTEMS PERSPECTIVE

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A substantial number of group development models have used sequential or phasic paradigms to create an understanding of group dynamics under normal conditions. Few GD models have used systemic perspectives to explore group dynamics in the face of adversity. This essay compared GD models with an ecological model of complex adaptive cycles to explore group resilience using the four principles of complex adaptive systems (CAS) – self-organization, hierarchy, emergence, and learning.

The comparison was based upon a historical literature review of several theories of GD, CAS, and group resilience. The rationale for this comparison was to bridge a gap in understanding between existing GD models and team resilience using lessons learned from CAS in ecology. The application of a model of complex adaptive cycles informed existing GD models through the four principles of CAS by revealing similarities, differences, and inflection points that provide potential to areas for further research.

Keywords: Group development, complex adaptive systems, adaptive cycle, self-organization, hierarchy, emergence, learning, feedback, creative destruction, resilience.

TOWARD OF GENERAL THEORY OF LAND-USE SYSTEMS**Nicholas R. Magliocca****Department of Geography and Environmental Systems, University of Maryland, Baltimore County, 211 Sondhiem Hall, 1000 Hilltop Circle, Baltimore, MD, 21250, USA, nmag1@umbc.edu**

Land-cover changes from human land-uses are seen as primary sources of global change. The multitude of forces influencing land-use change and the complexity of their present substantial challenges for connecting land-use changes to their causes at and between local, regional, and global scales. The currently accepted theoretical framework for studying causes of land-use change is that of 'proximate and underlying causes' (e.g. Geist et. al., 2006). This work demonstrates how a hierarchical complex systems modeling (HCSM) framework can advance our knowledge of land-use systems beyond that provided by the current framework. HCSM is built upon the premise that processes within hierarchical complex systems can be organized by the temporal scales of their dynamics (Werner, 1999; Werner and McNamara, 2007). The relative strengths and mismatches between processes at different scales can then provide causal explanations of systemic change. Such an understanding would advance the development of a general theory of land-use systems.

To compare the explanatory power and generality of each framework, a meta-analysis was conducted across case studies of deforestation and agricultural expansion. The meta-analysis used qualitative comparative analysis (QCA) owing to its ability to explicitly analyze relationships between causal conditions of land-use change outcomes. QCA was first performed with the 'proximate and underlying causes' framework currently used in land change science, which was unable to resolve contradictory land-use outcomes given the same causal conditions. A second QCA was performed by organizing causal conditions based on the temporal scales of their dynamics according to HCSM, which produced fully resolved, temporal scale-explicit causal explanations of land-use outcomes. Although only a preliminary investigation, this work demonstrates how HCSM can be used to organize causal drivers of land-use systems and offer a potential framework from which to articulate a general theory of land-use systems.

Keywords: Land-use change; hierarchical complex systems; qualitative comparative analysis

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TOTAL SYSTEM INTERVENTION FOR SYSTEM FAILURES AND ITS APPLICATION TO ICT SYSTEMS**Takafumi Nakamura^{1*}, Kyoich Kijima²****¹Fujitsu FSAS Inc., Support Technology Group, Masonic 38 MT Building, 4-1-4, Shibakoen, Minato-ku, Japan, nakamura.takafu@jp.fujitsu.com****²Tokyo Institute of Technology, Graduate School of Decision Science and Technology, 2-12-1 Ookayama, Meguro-ku, Japan, kijima@valdes.titech.ac.jp**

Total system intervention for system failure (TSI for FS) is proposed for preventing further occurrences of system failures. Total system intervention (TSI) is a meta-methodology in critical system thinking for managing complex and differing viewpoints. First, the authors introduce meta-methodology called "system of system failures (SOSF)" as a common language among various stakeholders to improve their understanding of system failures. Then we propose the actual application scenario, or "total system intervention for system failures (TSI for FS)". TSI for FS

identify the stakeholders in the failure using a matrix that shows for each stakeholder the entity and/or the factor that is thought to have caused the failure. This helps to clarify the stakeholders' views and to identify stakeholders with opposing views. The SOSF meta-methodology and related methodologies are used in the course of the subsequent discussion and debate to agree upon who is responsible for the failure and to identify the countermeasures and/or preventative measures to be applied. An application example in information and communication technologies engineering demonstrates that using the proposed meta-methodology as a critical system practice helps prevent future system failures by learning from previous system failures. Three actions were identified for preventing further system failures: close the gap between the stakeholders, introduce absolute goals and enlarge system boundary.

Keywords: total system intervention, critical system thinking, critical system practice, system failure model, structuring methodology, double-loop learning, risk management

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PANDEMIC INFLUENZA IN METROPOLITAN SEOUL AREA WITH A WELL DEVELOPED PUBLIC TRANSPORTATION: INDIVIDUAL-BASED SIMULATION WITH KOREAN DATA

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Global world has suffered severely from influenza A (H1N1) last year. Since spread of pandemic influenza is hard to be predicted in terms of direction and speed, high death and severe illnesses are inevitable. Using individual-based (agent-based) computational model (IBM; ABM) with real data, which shows macrobehavior generated from microinteractions of individuals over time iterations, we can clearly understand the epidemic transmission and control.

In this research, we provide individual-based model with activities (commute, work, study, reside and etc.), attributes (age, health condition, sex, residence, workplace, household and etc.), interactions and cultures of individuals based on Korean-specific data. Population and traffic information are also involved, and the disease information is obtained from historical statistics of similar ones. The model targets the metropolitan Seoul area in Korea for influenza A (H1N1).

Through a series of simulations, we are able to understand the characteristics of the pandemic, spread patterns and direction, and the outbreak conditions. We apply several intervention scenarios not only vaccination strategies including ones, which Korea Centers for Disease Control and Prevention (KCDC) has applied last year, but also social protections like school isolations.

Analysis of results gives us a unique observation that public (mass) transportation in Seoul area could possibly play a similar role to the closed groups such as schools and workplaces. It is reasonable, because metropolitan Seoul area has a well developed public transportation system, such as ten different subway lines, and many people use it for commute. The analysis also implicates that own transport could possibly delay pandemic transmission.

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SYSTEM DYNAMICS OF THE RELATIONS BETWEEN TWO KOREAS UNDER THE ROH MOO-HYUN ADMINISTRATION

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Under the Roh Moo-hyun administration, two Koreas continued improvement in relations begun by the previous Kim Dae-jung administration. The flow of the matter-energy and information between two Koreas had consistently expanded during these administrations. Comparing growth rates in information and matter-energy, we find that the growth rate in information ran faster than

that one in matter-energy from 1989 to 1994; since 1995, both have run at a similar rate. This shows that two Koreas recognized the relative advantage of information in relation to matter-energy, but focused on the flow of matter-energy.

The two Korean governments recognized the significance of the state of affairs in the region surrounding the Korean peninsula. At the same time, external pressure had a significant influence on the two Koreas' relationship. Historically, the two Koreas' relationship has been dependent on external pressure from the big powers. This pressure, which produced heterogeneous societies on the Korean peninsula, has made it difficult to improve relations between the Koreas in emerging areas and the traditional sphere of subsystems.

Keywords: Subsystems, matter-energy, information, relation, South-North Korea.

1362 (1507)

ENACTING WHOLENESS-INFINITY THEORY TO FOSTER WHOLENESS PRAXIS OF SOCIAL ENTERPRISE FOR GLOBAL SUSTAINABILITY

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Each century could be described as “The best of times, and the worst of times.” Such contrast is unexceedingly great in the twenty first century. Because it might be a far better times, and an even darker times. The tension between the unsustainability driving forces and the awakening sustainability consciousness has caught much attention all over the world. Since the great shift on earth was admonished by scholars, such as Capra and Laszlo, and the “2012 Global Collapse” prophesized by the Mayans was cast on the public’s eyes, resolving the imminent human crisis and unexpected global disasters become the urgent tasks to all human beings.

Indeed, the unsustainability crisis encountered by us nowadays has much to do with the malfunction of the global governing systems. The global governing network composed of governmental, business and non-profit organizations has become so complicated that any single sector could hardly cope with the increasing problems of the unsustainability crisis. Such malfunction, at worst, might cause a great number of losers in the dawn of new millennium, be they overwhelmed by the sudden loss of homes, jobs, family members or a safe environment. Therefore, it is obligatory that we expend more efforts to reframe the problem structures come from the three sectors and clarify the rooted causes of such unsustainability in order to create a new opportunity structure within the social enterprise (the sets of the three sectors) for global sustainability.

Since the 15th century, western science has become a dominant discipline, and many humanity sciences, such as aesthetics, ethics and religions disciplines, were gradually marginalized and regarded as dissipated and archaic. This phenomenon aggravated in the following centuries, and went extreme in the 1950s. Therefore, calls for emancipation from scientific knowledge were echoed from various disciplines. The most distinguishable are Habermas’ reflection on modernity, Derrida’s deconstruction of modernity, and Giroux’ postmodern discourse on unleashing the technological hegemony revealed in the western education, all of which represent emerging forces challenging the authority of scientific knowledge. Some scholars (Giddens, Griffin) even advocate the third path to search for order from the postmodern chaos. Moreover, attempts to resolve the disputes between modernism and postmodernism yield to more converging efforts on integrating knowledge and wisdom from the West and East. Meanwhile, the core idea and ultimate goal of integrating the western science and eastern humanity is also heatedly discussed with the economic uprising of China.

The literature reviewed in this paper covers four themes. The first is the major problems and challenges of technological civilization which human beings have been encountering and have to confront in the 21st century. The second is the paradigm shift of systems sciences, and the

evolution of wholeness movement. The third is exploration of human collective wisdom and evolution of wholeness consciousness. The last one is devoted to the Tao of sustainability for enacting global wholeness praxis and global governance within the social enterprise (the sets of the three sectors).

In this paper, the authors apply the Wholeness-Infinity Theory (WIT) they developed in 2010 to resolve the cultural disparities of the west and east, and to integrate the unique characteristics of the western and eastern cultures. The literature reviewed in this paper serves as theoretical background for the wholeness- infinity theory. It is expected that delicate integration and convergence of the western systemic knowledge and eastern wholeness wisdom will enact a new wholeness praxis organization, hence presence the various forms of social enterprise to maximize the possibilities of global sustainability.

In this paper, the wholeness-infinity theory the authors apply includes four metaphoric patterns, each bringing forth different types of social enterprise. Furthermore, the authors use the four types of social enterprise to illustrate how to promote the global dialogues and cultivate collective wisdom among governments, profit organizations and non-profit organizations to resolve the predicaments of global unsustainability and to create wholeness praxis organizations for global sustainability.

The four research questions to be inquired in depth are listed as follows.

1. How might Wholeness-Infinity Theory (WIT) develop a co-living art?
2. How might WIT enact the possibilities of wholeness praxis organizations?
3. How could the essence of wholeness praxis organization presence various forms of social enterprise?
4. How could the various forms of social enterprise enhance the transformation of global unsustainability into sustainability?

We are encountering a critical turning point in the 21 century. Laszlo confirms that human beings will leap finally in this point and create a human new era in his book "2010." De Chardin pioneered the next evolutions from the humanity to deity in the middle period of 20 century. We believe that wise integration of contemporary knowledge and wisdom tradition will open up new possibilities for well-balanced global governance systems. Human's collective wisdom for creating new forms of global social enterprise with transcendental knowledge and wholeness praxis would undoubtedly contribute to global sustainability.

In brief, the primary findings of this study include:

1. Application and exploration of wholeness infinity Theory (WIT).
2. Cultivation and development of wholeness praxis organization through WIT.
3. Critical roles of wholeness praxis organizations in building new forms of social enterprise for resolving the predicaments of global unsustainability.

Keywords: Wholeness-Infinity Theory, Wholeness Praxis organization, Global Sustainability, Social Enterprise.

1363 (1449)

ENACTING WHOLENESS-PRAxis COMMUNITIES FOR TRANSFORMING GLOBAL UNSUSTAINABILITY WITH COLLECTIVE WHOLENESS CONSCIOUSNESS

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In the past decade, more and more organizations across the governmental and nongovernmental sectors come to realize that they must come together to face the imminent challenges-crises in order to maintain a livable and sustainable earth. This global consciousness, once being well

recognized, could guide organizations to find new approaches to organizational transformation. In the past few years, Senge and his colleagues (Scharmer, Sue & Jaworski, 2004) have been working to cultivate a collective consciousness of global sustainability, aiming at fostering a new social technology of 'presencing.' Indeed, organizations across the 3 sectors have to collaborate with one another in order to create possibilities in the complicated 'problem maze' for resolving unending problems and emerging crisis. Organizational leaders' wholeness awareness and awakened global consciousness undoubtedly would help nurture the public's collective consciousness of human's shared wholeness. Moreover, it is encouraging to observe that not only do more organizations across the 3 sectors endeavor in building sustainable culture with wholeness perspectives, innumerable divergent learning communities are also undertaking the grass-root movement of wholeness praxis. Therefore, in this paper, the authors will highlight the emerging wholeness spirit embodied in the practice of many small but rigorous learning communities, and explicate how the wholeness praxis communities might interact and evolve with other communities.

It is revealing that the learning communities taking the holistic approach tend to embrace wholeness paradigm of organizational learning and transformation. Such a new paradigm of wholeness praxis is grounded in the community leaders' perspectives of wholeness wellness. It is essential to explore how the community leaders' lives are transformed with their wholeness praxis. The research aims at exploring the community leaders' professional practice and life transformation, and how such transformation guides them to create new possibilities and opportunities. It is expected that with more and more learning communities transcending from their bounded world view and being transformed into wholeness praxis communities, it is more likely that we might create a positive and negentropic global force to prevent our environment and ecology from being further exploited. There are three main research questions to be inquired in depth, which are listed below:

How might learning communities transform into wholeness praxis communities and how the community leaders' lives are transformed?

How do the wholeness praxis communities interact with other communities to realize their vision and mission, and become self-generative and self-organized communities?

How do such self-generative, self-organized communities cultivate the public's wholeness consciousness for global sustainability?

In this study, the authors integrate three approaches for research design and data collection. They are whole systems design and wholeness dialogue design of the world café, models integration and application, and textual analysis, which serve for wholeness praxis theory construction and revision. They also designed two tools for guiding the collective dialogue in the world café and in-depth interviews. One is the life transformation model and the other is holistic dialogue model. The participants of this research are community leaders and their learners from 12 divergent learning communities with various practice of wholeness.

The results of this study reveal that leaders of the emerging "wholeness praxis communities" not only experience deep life transformation, but also wholeheartedly commit themselves to creating supporting and regenerative network for their wholeness practice and their learners' wholeness experiential learning. With the cultivation of wholeness spirit, they could relate to as many organizations as possible in order to co-create collective transformation for realizing a sustainability world.

Moreover, such wholeness praxis communities are generative and regenerative in nature, which emerge from the spirit of co-relating, co-suffering, co-sensing, co-presencing and co-creating. In brief, the primary findings of this study include:

1. The wholeness images, wholeness mindfulness, wholeness enlightenment and wholeness praxis (e.g. learning design) of the community leaders.
2. The essence of the emerging wholeness praxis communities and their critical roles in building a global sustainable culture.
3. The levels of wholeness consciousness cultivated in the wholeness praxis communities in this study.

4. The wholeness dynamics, to be enacted among the wholeness praxis communities and other communities: such as communities of practice, communities of meaning construction, and communities of spiritual awakening for building a global sustainable culture.

It is expected that this contemplative and philosophical reconceptualization of organizational transformation and community praxis would bring forth more inspiring and intellectual discussions about the emerging wholeness-praxis organizations and communities in the contemporary age. If more and more communities or organizations could transform from knowledge learning and skill development to wholeness learning and praxis, the many ecological, global, technological, and ethical challenges we are facing would serve to illuminate our reflective dialogue and enlighten our collective thinking. Moreover, collaboration within the wholeness praxis communities and with other generative communities would be likely to shape a new culture for global sustainability.

Keywords: Wholeness Praxis, Deep Dialogue, Global Sustainability, Wholeness Wellness, Community, Collective Wisdom, World Café

1365

BUILDING COMMUNITY RESILIENCE IN THE FACE OF PEAK OIL AND CLIMATE CHANGE: MEDITATIONS ON THE TRANSITION TOWN MOVEMENT AND PARADIGMATIC CHANGE

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The Transition Town Movement (TTM) started in 2005 in Totnes, England. The TTM began as a grassroots response to the interrelated issues of peak oil and climate change. These pressing issues highlight that contemporary society is ultimately unsustainable, signalling the requirement for a fundamental shift in how modern systems of production, procurement and distribution operate. The TTM has been forwarded as a potential response to absorbing anticipated shocks to economic and social systems in such a way as to retain the same function, structure, identity and feedbacks. It offers a means of facilitating creative change at the local level. Its goal is to produce more sustainable, localized economies and systems of living to improve the resilient capacity of towns, cities and regions. This paper unpacks several assumptions made by the TTM. Our aim is not for superfluous critique of the TTM, for indeed, we believe their work is important to promote 'greener' lifestyles that are more sustainable and less reliant on fossil fuels. Our discussion demonstrates how TTM definitions of resilience and transition are situated within conventional notions of 'progress.' Alternative paradigms offer the opportunity to incorporate constructs of social justice and equity into the TTM. As an alternative paradigm, a life-centred approach fundamentally re-values all forms of life and promotes transformational change. In doing so, it operates in opposition to a 'progress-oriented' approach aimed at the maintenance of human systems that have thus far been responsible for producing social and environmental injustices. By explicating the TTM assumptions, we explore the possibility for paradigmatic change within the movement and in society more broadly. Discussing the barriers and implications for promoting transformational change, we show how a life-centred approach offers an alternative perspective. In doing so, systems change becomes possible, and human life and action can be re-valued to produce such a change.

1367

**IMPROVING RESILIENCE OF CRITICAL HUMAN SYSTEMS IN CBRN-EMERGENCIES:
CHALLENGES FOR FIRST RESPONDERS**

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Today's catastrophes (many of them man-made or at least triggered by human activities) usually endanger a growing number of humans and larger areas in more diversified ways, creating a need for dependability and resilience of our environment. Experience tells us that no matter what precautions and quality approaches we take we will always encounter systems, which initially were dependable and 'suddenly' turn untrustworthy due to some unexpected, unknown cause. A system, which in itself is unable to reestablish its dependability, i.e. it is not resilient (any more) needs an outside intervention: For humans a physician acts as an intervention system for re-establishing dependability. A complex system can be made resilient by the inclusion of an Intervention System, which intervenes in the case of loss of dependability.

In this paper we investigate the role of First Responders (i.e. fire brigade, ambulance services, police forces) as an Intervention System in the case of CBRN-incidents, aimed at providing resilience. Taking a process view of such interventions we analyze key processes especially with respect to supporting them by Information and Communication Technology. We identify properties of CBRN incidents and their implications for the activities of First Responders both in training and real assignments.

Keywords: First Responders, CBRN-emergencies, process modelling, resilience, dependability, intervention system, simulation, Mixed Reality

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A COMPLEX ADAPTIVE SYSTEMS APPROACH FOR THE GREEN GROWTH

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As we know, one of the most interesting themes at 21st century is the environmental problems. Also, so many people interested sustainable development and the economic growth. Both of them adhere closely. They are related with environmental sustainability. With a line of connection, "Green Growth" is more interesting theme for Asia-Pacific region people. The Asia-Pacific region has 61 per cent of the world's population and it covers 40 per cent of the Earth's land area. Facing Second Millenniums Era, dramatic economic growth has facilitated poverty alleviation and social progress in many parts of the region. But, increasing demands for food, water, shelter, sanitation, energy, health services and economic and human security, all these added pressures make big issues. How are they satisfied with their increasing demands? How meet they the difficult global challenges before them, while simultaneously improving people's lives and conserving their natural resources? As a result, the Governments in the Asia-Pacific region have unanimously agreed to respond to these challenges through the promising path of environmentally sustainable economic growth, as "Green Growth"

I'd like to research the Asia-Pacific countries' efforts for environmentally sustainable economic growth, as "Green Growth" by Complex Adaptive Systems (CAS).

CAS is dynamic systems able to adapt in and evolve with a changing environment. It is important to realize that there is no separation between a system and its environment in the idea that a system always adapts to a changing environment. Rather, the concept to be examined is that of a system closely linked with all other related systems making up an ecosystem. Within such a context, change needs to be seen in terms of co-evolution with all other related systems, rather than as adaptation to a separate and distinct environment. Also, I intend to add software for achieving the Green Growth as Asia-Pacific region people wanted.

Keywords: Green Growth, sustainable development, economic growth, CAS

1370

EDUCATIONAL CURRICULUM FOR MULTI-DISCIPLINARY SYSTEM DESIGN AND MANAGEMENT

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“System Design and Management” program, a study that integrates humanities and sciences by crossing many disciplines, is essential to foster talented persons who can lead in the development and operation of large-scale complex systems that are symbiotic, safe and secure. The subject of the new graduate school education is large-scale complex technological and social systems, with an education curriculum that provides practically oriented lectures through which students can acquire the capacity to consider systems, the faculty to design systems in line with system life cycles, and the ability for system management. By collaborating with industries and related stakeholders such as domestic and international educational research institutions, we designed an educational curriculum. As for the establishment of the graduate school in April 2008, the educational curriculum was formed to provide students with opportunities to acquire must-learn capability and knowledge that were classified into six groups. The validity of the education method was confirmed based on verification of the students’ self-evaluation and evaluation by the external evaluation committee after the first two years of graduate education.

Keywords: system design and management, multi-disciplinary, large-scale complex system

1373

IMPLEMENTING AN ETHICAL MERCHANDISING CODE IN A COMMUNITY MARKET

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The nature of the consultation was to use methods of action research to investigate the feasibility of developing a process to implement a code of ethical merchandising for use by a member owned cooperative market.

Initial research was to determine the nature, and extent of current ethical positions of the Co-op was undertaken using documentary sources only. Following the initial research of the published positions of the organization a series of meetings were scheduled with various stakeholders. The meetings were action research sessions. The researcher used a series of questions to facilitate discussion among the participants at the meetings. The participants identified a variety of problems involved in the implementation of an ethical code of merchandising, and created methods and processes of resolving those problems.

An ethical merchandising code that is oriented to a telos of sustainability is a worthwhile project for a community member-owned market. The adoption of such a code, and of processes to implement the same, requires the participation of stakeholders in the Cooperative. The ethos of the various stakeholders must be balanced against the need of the enterprise to remain financially stable. This balancing process requires adopting an ethical code that involves the cooperative membership the in process of establishing ethical criteria for the selection of products, and in vetting the potential products for sale. The use of knowledge and the means of

production of knowledge are seen as an ethical process in and of themselves, as well as carrying out the mandate of the mission statement of the enterprise.

1377

RAINFALL USE TO IMPROVE THE SUSTAINABILITY OF THE HYDRAULIC SYSTEM IN THE VALLEY OF MEXICO

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This paper is a complementary part of previous papers dealing with water issues in México City and its suburbs. Specifically addresses the system of rain water collecting, as there is still plenty of rainwater volumes which has features to satisfies the needs of the city. After a brief description of the hydrological system characteristics of the valley in order to give an idea of the potential of the sustainability of the rain water resources, it is proposed a set of short and long range actions to retain larger volumes of rain water: a) Construction of underground and surfaces tanks and / or semi-underground storages, b) Construction of an underground and distribution ring storage tank, c) Construction of dams, d) Construction of wells for adsorption, e) Massive cobbled of secondary streets, f) Storage of rainwater in houses, g) Massive reforestation of originally forested areas and construction of new forests, h) Protection of soil with litter i) Construction of a special rain water sewage.

Keywords: rain water, México Valley, hydrology, systemic sustainability

1382

THE SOFT SYSTEMS METHODOLOGY ON THE IMPLEMENTING OF A GPS SYSTEM, IN THE TRUCKING COMPANIES

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The identifying of the complex systems of the real world not only require of the participating and the interpretation of the different actors in the society with several Weltanschauung, but also of participative and holistic methodological process of planning-action with a feedback that confront and articulate to the set of subjective visions of each social actor that is involved in the whole process. The trucking face recurrent problems as the empty trips, delays in times for delivering-receiving of merchandises, trips out of route, insecurity of the charging, lack of logistical planning, and high costs of operation, among them. That's why, as a result of the applying of the soft systems methodology SSM, the system Global Positionment System GPS of localization, monitoring and control of vehicle units is a logistical technique that can convert by itself in a model to support the enhancing the levels of productivity in the trucking transportation industry.

Keywords: SSM, Weltanschauung, GPS, logistical, trucking

1385

TOWARDS A HOLISTIC APPROACH FOR MODELING FINANCIAL VOLATILITY

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Due to the more global economic system, financial markets impact to society and family throughout the world and causing new global crisis because of the higher and faster volatility of financial prices. This paper proposes a system view to set the basis for modeling the dynamics of global financial market with a holistic system view, in order to achieve a global sustainable development.

Keywords: Economic system, financial markets, derivatives, volatility, holistic, systems.

1387

STRUCTURAL EQUATION MODEL FOR THE MULTIDIMENSIONAL MEASUREMENT OF THE POVERTY IN MEXICO

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This paper postulate that the poverty in Mexico can be determined analyzing different hypothetical constructs, just like the official measurements, that carry out several organisms of the Federal Government's, to effect of obtain an unique measurement. It postulate that the measurements of the levels of alimentary poverty, of capacities, of patrimony, the index of social backwardness, that obtains the Social Developmental Secretariat, they can integrate with other socioeconomic measurements such as the Marginalization index, that obtains the National Council of Population.

Given the subjectivity of the different hypothetical constructs, as poverty, social backwardness and marginalization, the only form of measuring them is indirectly, by using methods that use variables that they can be measured directly. For the integration of the diverse official measurements proposes a method of multivariate analysis known as a Structural Equation Model. It develops a complete model of structural regression, compound by two sub models: the Measurement and the Structure models; which used *i* variables observed to define *j* variables latent hypothetical, both dependent and independent, to determinate an integrated measure of the poverty.

Keywords: poverty, Structural Equations Model, general index of poverty

1389

STUDY OF INTELLIGENT CONTROL OF AN ARM ROBOT EQUIPPED WITH A C-MOS CAMERA USING A NEW TYPE OF IMAGE PROCESSING

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This paper proposes an approach that allows an arm robot equipped with a C-MOS camera to utilize new image recognition in order to intelligently and autonomously grasp objects, and introduces a method that uses the conventional way of teaching position to the arm robot, after which the intelligent robot employs a program that allows the arm robot itself to autonomously determine the action required to move the arm into that position. In experiments, an intelligent robot was successfully engineered to use image recognition to identify colored blocks and autonomously move toward a target and grasp it using a new centroid search approach.

Keywords: image processing, arm robot, intelligent control

1398

ANALYZING THE BULLWHIP EFFECT IN AFTER-SALES SPARE PARTS SUPPLY CHAINS IN TELECOM FIRMS, A COMPLEX SYSTEM APPROACH.

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Complex system science is a new field into the interdisciplinary disciplines. Different phenomena have been studied under this approach. In this paper, we analyzed the bullwhip effect in an after-sales spare part closed loop supply chain in telecom firms. The system is analyzed using tools of fractal analysis.

Keywords: complex systems, bullwhip effect, supply chains, telecom industry

1403

VIABLE SYSTEMS MODEL AND QUALITY OF HOSPITALITY SERVICES

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This paper discusses the design of a model for service quality in hospitality concepts and proposals using the Viable System Model (VSM) of S, Beer. The object of study is a human activity system whose complexity must be addressed through systemic methods. The study identifies the elements to be considered for a system design approach (with emphasis on quality of service) through the establishment of internal and external environments that integrate it. Through the analysis it is determined that the hotels can function as viable systems, ie may be able to absorb the complexity through the generation of internal tools to manage it.

Keywords: Viable Systems Model, hospitality, quality service

1407

RESILIENCE, A NECESSARY PROPERTY FOR THE HOUSING PROBLEM OF USHUAIA: THE INHERENT FACTOR FOR THE GOVERNANCE

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The city of Ushuaia, located in Tierra del Fuego (Argentina), and other urban conglomerates in Latin America, are undergoing into a crisis in urban areas, where the housing problem is shown as the witness and most obvious symptom of the crisis. The explosive population growth that has experienced Ushuaia from the '70s to these days has triggered various crises of urban and social type. Among the housing problems that have been generated we can stress the strong friction between different sectors of the people, neighbours with unsolvable housing problem that intrude state land. On the other hand there are neighbours who are opposed to these intrusions, but there are government sectors that sympathize with the intruders, so there are no government actions to prevent such activities and a significant number of laws are violate. All these factors generate the frame of a strained social situation in the city.

The native forest deforestation, pollution of freshwater rivers, the precarious living conditions of some people, the lack of systemic and coordinated politics driving by government agencies, the intransigence of some neighbours and the culture of citizens in general, result in a social crisis from which no one knows the outcome.

The resilience of this society involved as a voluntary emergent property of it, can be one of the references approaches to begin a path in order to search of sustainable solutions that contribute to governance for a young State with a whole future ahead.

There are several management tools to address complex problems such as the one we have just described. These management tools and its applications will be discussed on this paper, hoping that can contribute to create the foundations for a possible settlement of the conflict. We believe that this analysis can drive to a sustainable self-organizing social system of the city of Ushuaia, in an almost immediate future.

Keywords: Housing problem, resilience, governance, integrity, self-organization

1407

SYSTEMIC INSIGHTS INTO THE MANAGEMENT OF ECOSYSTEM SERVICES IN THE MARINE ENVIRONMENT

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This paper centres on the application of the Ecosystem Approach in the management of the marine environment, involving the identification of multi-stakeholder needs and uses of ecosystem services. The Ecosystem Approach provides 'a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way' (CBD, 2000), while ecosystem services are 'the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfil human life' (Daily, 1997). Ever increasing and diverse use of the marine environment is leading to human-induced changes in marine-life, making necessary the development of a marine policy formation process that recognises and takes into consideration the full range of stakeholders and results in policy that addresses current, multiple, interacting uses (e.g. the EU's Maritime Policy and Marine Framework Strategy Directive). Taking a systemic approach, incorporating an understanding of marine ecosystem structure and functioning, we identify the diversity of stakeholders and their uses of the marine environment within the framework of ecosystem services (production, regulation, cultural and over-arching support services). Informed by the DPSIR (Drivers-Pressures-State-Impact-Response) approach - a framework for assessing the causes, consequences and responses to change - we assess the outcomes of competing human uses and emerging pressures on the marine environment, the complexity of decision making in this area, and provide a process for informing choices in conflict resolution involving a diversity of stakeholders. Case studies include the management of (i) coastal biodiversity at Flamborough Head, UK, and (ii) marine aggregates extraction in the North Sea.

1410

SYSTEMS THINKING FOR STRATEGIC DEVELOPMENT

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In this paper important ontological questions are raised about the strategic development process and related concepts, which should significantly affect how strategy is approached both in theory and in practice.

The dominant discourse on strategic development and management views the organization as possessing a brain and hence being capable of knowing its range of possible futures, making decisions and taking actions in the present to bring about the most desired state. By making this view of the organization problematic and not giving the ontological status ascribed to it by the traditional paradigm, we are required to look anew at the development and management of

strategy. An alternative route, following Henderson and Heidegger, is to view the organization and authentic strategy as acts of individual will and social becoming based on the structures of attunement, standing, discourse and destiny. Since traditional forms of strategic management are not able to bring about the structures necessary to support the creation of authentic strategy or shared destiny, these are rejected in favour of a systems based approach. Espejo's concept of self-constructed organization recognizes that organizations are constituted by complex networks of ongoing interactions and it is proposed that in such organizations the strategic development process can be designed to enable reflective organizational stakeholder engagement and self-construction. An on-going project with an independent school in the United Kingdom illustrates the use of the ideas in practice.

1413

FACTORS DEFINING ECONOMIC ORGANIZATIONS IN RELATIONSHIP TO THE GROUPS THAT MAKE THEM UP

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Factors common to economic organizations and the groups that comprise them are identified and examined for similarities and differences. A model is created that combines the factors into a predictive tool that can be used to identify whether a collection of individuals is showing group or organization tendencies. Miller's (1978) Living System Theory is referenced to help put boundaries around the concepts of group and organization. To focus the study, two limiting assumptions are made. First, the study is confined to economic, utilitarian, and private corporations and the work groups that are embedded within those corporations. Second, a specific definition of groups and organizations is used. Groups are defined as heavily influenced by the individuals in the groups. Organizations are defined as not easily influenced by the individuals and groups that make them up. The factors used to create the model are identified using Flood's (1999) four categories of systems approach.

1416

SYSTEMS METHODOLOGIES, COMPLEXITY, AND RESOURCE AND ENVIRONMENTAL MANAGEMENT

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Systems ideas have a long history of influence and application in resource and environmental management (REM). And the multi- and trans-disciplinary nature of resource and environmental management make them an excellent area for exploration of systems ideas and approaches. For example, concepts and approaches from ecological, biospherical, and ecosystem science, adaptive management, resilience, and complexity in different ways derive from and imply systems understandings. There are arguably several main periods of influence of systems ideas in REM, loosely corresponding with periods of strong interest in and development of systems ideas, and these are traced and discussed. It is also possible to identify a set of categories of ways in which systems ideas have influence, including the structure and processes of REM, the structure and dynamics of REM objects and systems, and identifying limits and potentials for REM systems. Application in and ideas from REM have also arguably influenced systems approaches, and this paper will highlight some of these influences such as notions of stability and system intervention.

COMPUTER-BASED INFORMATION SYSTEMS AS A MEANS OF AUTOMATING THE USE OF KNOWLEDGE ABOUT INFORMATION PROCESSING IN COMPLEX SYSTEMS**Roberto R. Kampfner****Department of Computer and Information Science, College of Engineering and Computer Science, The University of Michigan-Dearborn, Dearborn, Michigan 48128**

Information processing can be seen as an aspect, indeed as an integral part, of the dynamics of systems (Kampfner, 1998). Any system uses information in order to perform, control, and coordinate the processes that perform its functions. It is in this broad sense that the dynamics of a system, which comprises the processes that perform its functions, can be seen as the specific way in which a particular system processes information. Information processing in a system or, equivalently, the information processing aspect of its dynamics, can be seen as a manifestation of the 'knowledge' about information processing that the system possesses. The notion of information processing that we are using here is very broad. It applies not only to information processing as performed directly by humans or by devices or systems of human design, such as computers and computer-based information systems. It applies to any dynamic system since any such system needs to process information in order to perform, control, and coordinate the processes that perform its functions and achieve its goals. This view confers to information processing a fundamental role in the dynamics of a system, hence in its ability to perform its functions and to achieve its goals.

Computer-based information systems play an increasingly important role in the way in which complex adaptive systems such as modern organizations process information. The effectiveness with which computer-based information systems support the functions of a system is therefore a basic, underlying design goal. In this paper we explore the role that some basic principles for the design of computer-based information systems stated earlier play as a guide for the development of computer-based information systems that provide effective function support and contribute to adaptability. We discuss some design factors on the light of these principles.

The dynamics of complex systems such as modern organizations is composed of a variety of processes including physical, human, social, and economic ones. As an aspect of their dynamics, information processing is correspondingly complex in these systems: it takes a variety of forms that act concurrently with the other aspects of the dynamics. Especially important to us is the fact that it combines human, computer-based, and other forms of information processing. Human information processing is capable of representing, organizing, transforming, manipulating, and communicating information in a variety of ways, both explicitly and through the actions that we take and the processes that we control. Human information processing is capable of exercising judgment, creativity, and general problem solving capabilities. In addition to that, we humans process information in a conscious way and we can acquire, develop, and use knowledge about information processing.

The way a system changes its behavior can be seen as a manifestation of the knowledge it has about how to evolve and to adapt to changes in its environment. This knowledge can be seen as inherent to the system. Part of this knowledge is implicit in its structure and dynamics in the sense that it is not stated in any explicit form. We mentioned earlier that the information processing aspect of the dynamics of a system can be seen as a manifestation of the information processing knowledge that it possesses. The information processing knowledge that a system possesses is, however, only an aspect of the knowledge that it has about all of its dynamics and, consequently, it can be considered an integral part of this broader knowledge. In the systems of interest to us, this knowledge is constantly changing, which means that these systems are constantly developing new ways of processing information. Part of the knowledge that a system has about information processing is meta-knowledge, that is, knowledge about information processing knowledge. This meta-knowledge includes the ability of a system to change its information processing knowledge and, consequently, the way in which it processes information. In the systems of interest here, however, parts of the information processing knowledge and the corresponding meta-knowledge (that is, knowledge about how it processes information) usually exist in an explicit form, including, but not only, the explicit knowledge that people have about computer-based information systems, and the knowledge that is expressed in the documentation

of their functions, of the information systems development processes, and of their operation and maintenance.

A basic design principle that we refer to here aims at the achievement of the effective support of function in a manner compatible with the adaptability of the system being supported (Kampfner, 1997, 2002). We also refer to a related design principle that aims at designing the architecture of the computer-based information system in a manner that reduces subsystem interdependence in the system being supported (Kampfner, 2008). In this paper we show that allowing the computer-based information system to use some of the information processing knowledge that it needs only when it needs it, instead of storing and maintaining this knowledge on a permanent basis, may help to improve its contribution to adaptability in a manner consistent with the effective support of function. We discuss the conditions in which this contribution is more significant.

Keywords: computer-based information systems, information processing knowledge, information processing, dynamics, human information processing, meta-knowledge

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1419

KNOW THYSELF: APPLICATIONS FOR ANTICIPATORY SYSTEMS THEORY IN MEDICINE AND PSYCHOLOGY

Judith Rosen

As a result of working closely with thinkers like Robert Maynard Hutchins and Jonas Salk, my father, Robert Rosen, came to certain realizations about living systems in his own work as a Theoretical Biologist. He wrote a book, detailing some of his findings, which he titled "Anticipatory Systems; Philosophical, Mathematical, and Methodological Foundations", published by Pergamon Press in 1985 with a new, expanded second edition to be published in 2010 by Springer Verlag. A new area of science has sprung up as a result of this work, generally referred to as "Anticipation" or "Anticipatory Systems" and it is growing rapidly. Among the discoveries that have driven this expansion in science are multiple proofs that the reactive paradigm, while universally applicable, is incomplete-- particularly when applied to biological systems. Living organisms can, of course, merely react to causal events. However, at the same time, they also manifest behaviors-- at all levels of systemic organization-- that cannot be explained from within a purely reactive model of reality.

At the somatic as well as the psychological levels of human experience, our own physiology and mind are constantly anticipating events which have not yet occurred. This is a feature of all living organisms and differentiates them from any other (known) type of naturally occurring, self-organizing system. In this paper, I will discuss examples of Anticipation taken from common human experience, with an eye towards current and future medical research and development. In the process, I hope to illustrate the importance of expanding not only the paradigm by which science is envisioned and practiced but also the curriculum for teaching science to the thinkers and practitioners of it, in the future.

1420

THE YIN AND YANG OF CHANGE – SYSTEMIC EFFICACY IN CHANGE MANAGEMENT

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Concern/approach: Sustainability in change management is an issue. Western Change management approaches are well elaborated in the mechanics of change. A broader perspective on efficiency, effectiveness or even efficacy is rare. The proposed brings together systemic approaches and Chinese philosophy to draft a broader perspective on efficacy, sustainability and viability in change processes.

Argument: The research on systemic efficacy in change management starts with the five Tai phases leading to Tai Chi and the model of Yin and Yang. The systemic counterbalance focuses on distinction theory in reference to George Spencer-Browns laws of form and Niklas Luhmanns sociological systems theory. As a first result we can distinguish between:

Yin-Change: cold change, continuous improvement, integration

Yang-Change: hot change, innovation, transformation

Change management, as a conclusion to this first finding, needs to distinguish and to balance the two sides of change to realise efficacy, sustainability and viability.

Following the argument the Tai Chi philosophy a second distinction produces the four directions: north, south, east, and west. This second distinction reads deficient versus sufficient producing four different states of balance and imbalance. Organisational change, as another important conclusion, needs to balance Yin-Change and Yang-Change towards a state of. Deficient Yin-Change and deficient Yang-Change as another implication marks a lethal state of insufficient change in the system. This reads like an imperative of change.

Since the Tai Chi philosophy refers to a third distinction producing another four states we are challenged even further since it is always the same distinction. This approach we find again in the laws of form and the counterbalance is given in Luhmanns “unity of the distinction”. We are looking at a dynamic notion of more|less, of plenty|empty.

Concerning the implications for change management it will not be enough to produce a simple 2x2x2-table. This will certainly provide a useful map. Yet, the map is not the territory and the proof is in the eating. So we are looking at the unity of the distinctions and the art of balancing. Overall this provides a fruitful perspective supporting the practice of change management with regard to efficacy, sustainability and viability of change processes.

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TOWARDS A GLOBAL-SYSTEMS STEERING VISION THAT IS SIMPLE ENOUGH, BUT NOT TOO SIMPLE: SYMVIABILITY

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The question addressed is:- How can we have pleasant long-term humane, human survival on Earth, given our very potent globally impacting technologies, huge populations and our terrible propensity for solidarity to propagate our own ‘pure’ quasi-tribal genetic and cultural identities through ruthlessly devastating competition with and suppression of, others’ genes and cultures?

What has been tried and why it is not good enough: We have tried religious visions of peace, love (caritas) and even asceticism. These have indeed appealed to vast numbers of people, but have left them almost defenceless against those whose religious beliefs demand the conversion or extermination of unbelievers. We have also tried bread and circuses - economic growth with fair shares for all, but some humanimals are much more equal than others. The have-nots rebel (Thailand, Jamaica). Moreover large-scale economic growth without system-sciences based ecological wisdom quickly becomes ecocidal and eventually may be anthropocidal. Mankind’s guiding visions have been workable for small populations with primitive technics, but they are proving to be much too simple to enable us to collaboratively steer the complex webs of coupled

systems, which constitute Life on Earth today. Recently, many people have pushed for notions of “sustainability” a rather ambiguous term, attractive to those with much to lose, but not so attractive to the have-nots of the World. What we propose: We propose an alternative, systems-sciences based vision that is simple enough to evoke World-wide acceptance and concertation of efforts by educated people, yet complex enough to ensure requisite variety of ventures, strategies, tactics and tools. The vision we call SYMVIABILITY is a vision of both ecological-cultural symbioses and intercultural symbioses World-wide, where each cultural actor appreciates the need to allow and support other cultural actors to live and flourish, providing that they control themselves to do likewise. It is important to eschew the use of “sustainability” which ambiguously allows people to believe that they can somehow manage to sustain whatever they feel identified with, (e.g. SUVs, imported foods and global air-travel etc.), provided that they make small sacrifices and others suffer large ones! . We propose this SYMVIABILITY as a transformative educative ultimate value vision based on methodological pragmatic philosophy and the systems sciences and implemented fairly through discursive legitimation forums representing all stakeholders – the whole to be carried out through global social networking and modelling and simulation games technology.

Keywords: sustainability, ecology, cultural-symbioses, symviability,

1425

DIFFERENT TYPES OF MISPERCEPTION REGARDING BENEVOLENCE

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This paper introduces misperception to bilateral decision situations with benevolent players (Bergstrom, 1999) based on hypergame framework (Bennett, 1979). In Bergstrom (1999), a benevolent player not only considers the opponent's private subutility but also his benevolence towards her. Accordingly, we analyze two cases in which the player misperceives only the opponent's private subutility and only the opponent's benevolence respectively. An interesting result we obtained is that misperception of the opponent's benevolence only has the unit change effect, such that in many applications the effect of opponent's benevolence may be ignored.

Keywords: Hypergames, benevolence, misperception.

1427

PRINCIPLES FOR MAKING SOFT SCIENCES HARD: THE NEWTON MODEL

James R. Simms

This paper describes the development of the fundamental principles of a science of life and society that are equivalent to those of the natural sciences, such as physics and chemistry. The natural sciences are typified by identification of universal phenomena, relations among these phenomena, and fundamental measures and units of measure for these phenomena. It is shown that knowledge, information, energy, matter, and behavior are universal phenomena of life, and that there are relations among these phenomena. Units of measure for these phenomena are developed. The principles of life and social sciences were developed using the natural sciences development model.

Keywords: Living systems science; social science; knowledge; information; soft sciences

1433

DYNAMIC CO-CREATION

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Creation according to the sacred texts of Christianity, Islam and Jewish religions, reinforced by the Newtonian paradigm during the enlightenment, was seen as a one-off event undertaken by an external God creating a separate universe into which "man" is placed as a separate creation with the right to dominate his world.

The examination of the properties of complex system offers an alternative view of creation that may be more meaningful for the people of the 21st century. Our whole universe may be viewed as a complex system with many nested levels of complex systems within it.

Dissipative systems maintain themselves by a flow of energy and need to be seen as a process rather than an event. Rather than seeing creation as involving separate elements, we can see them as structurally coupled, dynamically co-creating themselves from moment to moment,

If God becomes an imminent and all pervasive consciousness, there is no separation between God and creation. Humanity moves from a place of domination, to one of interconnectedness. Humanity can then claim the dignity, but must also accept the responsibility, of being an integral part of nature and the universe.

1443

VALUE CO -CREATION MODEL OF SERVICE INNOVATION: SYMBIOTIC HYPERGAME ANALYSIS

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From service science perspective, value co-creation based on mutual understanding between customer and provider is one of fundamental importance. Service-dominant (S-D) logic is tied to the value-in-use meaning of value. The roles of providers and consumers are not distinct, meaning that value is co-created, jointly and reciprocally, also mutually beneficial relationship. However, at crucial points of interaction between customer and provider, where the co-creation experience occurs and where value is co-created, misunderstandings and service breakdowns can destroy the relationship. In this paper, we analyze formally how customer and provider are sharing internal model in the first phase of value co-creation model of service innovation, i.e., co-experience and co-definition. In co-experience, customer and provider perceived the value of each value proposition differently. Customers have their own internal model and so provider is, therefore co-experience is the most crucial feature of service system. Symbiotic hypergame analysis, in general explicitly assumes that the players involved possess subjective internal model of the environment including the counterparts. These assumptions convince us that it is the most adequate and convenient for describing value co-creation process by customer and provider. First, we categorizing customer and provider into the several types based on customer expectation and provider ability. Then, analyze formally using symbiotic hypergame analysis, how mutual understanding can be achieved between customer and provider. From the analysis, mutual understanding can be achieved as long as customer and provider have same interpretation, customer who has high expectation believes that provider is innovative and vice versa. It has been proven by analyzing Hyper Nash equilibrium in each scenario for pair of each type based on symbiotic hypergame analysis.

Keywords: Co-experience, Co- definition, Value Co-creation, Symbiotic Hypergame

ASSOCIATIONS FOR THE RECIPROCAL AND MUTUAL SHARING OF ADVANTAGES AND DISADVANTAGES: THE WAY, TO BE RESILIENT AND SELF-SUSTAINABLE, THE LIVING SYSTEMS RUN THROUGH

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To survive, the living systems must “to eat” and “not to be eaten“. But, soon or later, every one “is eaten” <http://tinyurl.com/surviepbafscet>. The law of the strongest is not-at-all the best! The only way to escape from the struggle is to enter into an Association for the Reciprocal and Mutual Sharing of Advantages and DisAdvantages (ARMSADA). A lichen, which is both an organism and an ecosystem, a cell which is also an ecosystem and an endosyncenosis (ceno: to meet and fuse, syn: into a system, endo: with a new organisation), both are ARMSADAs. Every ARMSADA merges when the partners loss simultaneously the capacity to kill the other one(s). In the new Whole, all that is an advantage for a partner is a disadvantage for the other one(s).

The “parceners” are fused together, “for the best and for the worst” <http://tinyurl.com/pbsustdev>. The benefits are only for the Wholeness, which expresses new abilities <http://tinyurl.com/andesymbiosis>. The synthesis of the myelin into the neurone merges from the “unity through diversity“ between a population of Schwann's cells and a giant cellular body. The nitrogen fixation of legumes' nodes merges from the fusion of a population of Monera with -and within- an organism. The eucaryotes Cell has merged - thanks to the help of a RNA virus- from a microbial mat of Monera <http://tinyurl.com/pbcellorigin>. In their new endophysiotope (endo: internal, tope: space, physio: of functioning), the “parceners“ are absolutely dependant from each other. But, through the iteration of the process of new ARMSADAs' merging, the new -more and more complex- “system-of-systems” is, more and more, independent of its ecoexotope (exo: external, tope: space, eco: of inhabitation) of survival <http://tinyurl.com/phylogtagmotaphology>. The endophysiotope of a i level of organisation is the ecoexotope of previous i-n levels. So the Whole is also less and more than the sum of its parts: because of the semi-autonomy of the parceners, simultaneously abilities of the previous levels are lost and new are gained <http://tinyurl.com/anlea05pau>. There is never advantage without disadvantage. To survive is to turn disadvantages into advantages and to avoid advantages turning into disadvantages. The systemic disfunctioning of its ARMSADA explains the apoptosis of the cell. That is the result of the death of one endangered internal partner (the monere parts: the population of mitochondria or the nucleus), which results into the death of the endosyncenosis. Cancer also is a breaking of the cell's ARMSADA <http://tinyurl.com/pbcancerlisboa>. Cells that should have to die, because of external dangers, “thanks” to the escape of internal dormant viruses do not. Through this metamorphosis -<http://tinyurl.com/pbmeta1>- their new endophysiotope survives but their previous ecoexotope, the organism, is altered and endangered. Into an ARMSADA each partner can survive only if the other ones survive first. Man is not an exception <http://tinyurl.com/WHYman>.

1446

**"KNOWLEDGE INHERITANCE IN TRADITIONAL CHINESE MEDICINE (TCM)
(ON MASTER-DISCIPLE EDUCATION METHOD IN TCM EDUCATION)"**

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Traditional Chinese Medicine has his old history and accumulated a lot of rich experiences and thoughts, but how can we inherit them is a difficult problems, since some of them are tacit knowledge.

From 2006 we had participated into a large project sponsored by Ministry of Science and Technology. The purpose of this large project was designed for collecting and maintaining the idea, experiences, knowledge and wisdom from selected 100 veteran TCM masters. We wish use the advanced IT technology and systems science to mine the main ideas and experiences from each of them and also to find their collective experiences and thoughts. We also wish to improve the old traditional master-disciple education method in TCM to learn the phronesis from the veteran TCM doctors.

1450

**A SYSTEM THAT WORKS: BUILDING A DECENTRALIZED GLOBAL POLITICAL ECONOMY
USING THE VIABLE SYSTEM MODEL**

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A political economy that enhances personal freedom requires effective but limited regulation. The Viable System Model by Stafford Beer offers a way to analyze an organization's communication problems, maximize resource use, minimize waste, and adapt to a changing environment by clarifying what to regulate. Jon Walker's "VSM Quick Guide" and Allenna Leonard's "Personal VSM" ground the reader. VSM is applied to a community of 65,000 people in Davis, California, USA, in a way that could be used in other places around the world, to help identify strategies to better meet human needs, enhance the local economy, reduce environmental damage, and encourage natural healing processes. Given the recursive nature of the VSM, this method could be used at every level from person to family/neighborhood/village/community/district/region/state/nation/continent/planet, emphasizing the system in focus. "National Government: disseminated regulation in real time, or 'How to run a country'" by Stafford Beer describes how to construct "quantified flow charts" to identify which statistics to measure daily as regulation at a particular level of recursion.

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**FALLACY AND OSTENTATION OF CORPORATE SOCIAL RESPONSIBILITY (IN SOME
COMPANIES)**

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Companies that achieve a more or less consolidated market position and a sustainable growth in it, start working on improving their corporate image.

Among the strategies to achieve this social recognition the preferred one is develop their actions under the principles of Corporate Social Responsibility (CSR), a concept that involves procedures and attitudes that should be ethical, rational and sustainable of these firms in their environment.

We consider that there is a fallacious behaviour of many of these companies that are covered under CSR but they commit very serious damage to the environment, sometimes unwittingly and sometimes with full awareness of it. And worst, they make an ostentatious display of it.

A narrow view of the meaning of CSR leads to these firms misleads them and deceives the community. So we think it is important to stop and analyze a series of examples that can demonstrate that the lack of broader vision of the whole in time and space, leave out of consideration effects or emergent properties of a system designed as model to follow (CSR) but adversely affects a large proportion of the population.

Keywords: Corporate Social Responsibility, fallacy, holistic vision, emergent properties

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FOSTERING THE COLLECTIVE WISDOM OF COMMUNITIES WITH THE QUINTESSENCE OF HERO'S JOURNEY

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In today's rapidly changing social environment, it is inevitable that a community will face unpredictable and unsteady challenges. How does a community survive under such difficult conditions and how does it adapt in this rapidly changing world?

This paper focuses primarily on the sustainable development of communities in Taiwan, exploring in particular the essence of such communities through the various "Archetypes" of the Hero's Journey characterized by Joseph Campbell and Viktor Frankl's Logotherapy. The first section will give a brief introduction to the intertwining connections that can be found between Joseph Campbell's hero's journey, the main content of the different archetypes in Hero's journey, and Frankl's logotherapy. I will then analyze the archetypes and roles found in the typical Taiwanese community, and how traits of self-exploring are found in both the leader and members of this group. Moreover, I will go into depth on the inner dynamics of the Taiwanese community, ultimately deriving distinctive local characteristics of sustainable growth found in Taiwanese communities.

Both Campbell and Frankl agree that a crisis can be a turning point for people to overcome, in order to effectively and finally transcend their difficulties. This paper presents a case study I conducted in uncovering the life cycle and transformation process of a local community - BaoShan Study Group (BSSG). This community has run for more than 10 years in Taiwan. By focusing on the various archetypes in this community and their hero's journey under the author's guidance, community members gradually realized the different functions and characteristics of their roles. This study also reveals how community members sustain their community, evolve through hard times, and respond to and adapt to the hardship they encountered with the quintessence of the Hero's Journey.

In short, the major findings of this study include: 1. The more a community grows overtime, the more obvious that each heroes' (each members') role becomes in relation to the leader. 2. Once community members realize their required role in a Hero's Journey and identify it, the community becomes more united and coherent.

Keywords: realization of the roles in Hero's journey; archetype; sustainable growth

NOT 2, BUT 3: ALWAYS!**Ron Cottam, Willy Ranson, Roger Vounckx**

There is apparently no unequivocal definition of life. Its presence is commonly characterized by some combination of metabolism, growth, organization, reproduction, homeostasis and adaptation, whether reactive or anticipative. More generally, it is self-referentially recognized according to correspondence with a number of predetermined criteria which are said to indicate life. In this paper we describe a propositional 'definition' which, although also demonstrably self-referential in its scientifically related confirmation, is directly derived from the scalar properties of all material and systems.

We have earlier addressed Robert Rosen's M,R representation of an organism [1], and indicated that a primary objection to its universality is the apparent supposition that mechanism and life form a general complementary pair. On further reflection, the ultimate validity of any mono-dimensional dualistic proposition is brought into question. Any categorization or division of a unified entity results in at least 3 'entities', and not 2; namely not only the 2 parts themselves, but also the relationship between them. [More carefully, the presence of a single delineated entity itself implies at least 2 'domains' – the entity and its environment – and division of this kind results in at least the 2 'expected' parts and the environment, plus possibly any number of 'inter-part' relationships, including direct ones and indirect ones via the environment, plus those still remaining or newly created with the environment itself.]

We suggest that both Descartes duality of 'mind and matter' and its more recent rejection are erroneous, in that arguably Descartes' 'mind' should be portrayed as a dynamic relationship between matter and its complement: not 2, but 3 'entities'. We consider that all really multi-scalar systems are potentially alive. And not uniquely physically multi-scalar systems. Humans, for example, are exemplified by their social relations, amongst others, where somewhat abstract formulations are implicit (e.g. language). If one extreme of a mono-dimensional representation is purely physical, its complementary extreme must of necessity be wholly abstract. Conventional electronics operates between the individually useless extremes of metals and insulators. More generally, the only really interesting area of any mono-dimensional representation is in-between the extremes. Apart from anything else, this raises serious questions of any philosophy which is fundamentally based on dimensional extremes, for example where 'existence' is defined by reference to 'non-existence': any reality of existence lies partway between the extremes of 'absolute incontestable presence' and 'undeniable absence'. Physics refers to a duality of 'wave and particle' for elementary quantal entities; experiments in the 1990s indicated that measures of intermediate 'states' are not only possible, but likely.

We present a 'definition' of life, which leads to wider implications, and to broader application. Human 'illness' – cancer, for example – appears to be a parasitic life-form which inhabits the human-body ecosystem. We view any multi-scalar system as being potentially alive. However, the degree to which it will be really alive depends on its cross-scalar cohesion – on the 'strength' of its inter-scalar couplings, in a manner reminiscent of the description of life as a phenomenon between the extremes of order and disorder, or 'at the edge of chaos'. Weakly-coupled scales lead to a system's vulnerability to mono-scalar attack: many diseases can be easily 'killed' by attack at a single biochemical level (e.g. by antibiotics). Cancers appear to be more strongly coupled, however, and purely biochemical attack (chemotherapy) often results in the cancer's catastrophic evolution towards therapy-resistant strains and death of its 'host'.

Keywords: life; multi-scalar; triadic relationships; Descartes; cancer

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1465

ONTOLOGICAL SUPPORT FOR MULTIPARADIGM MULTIMETHODOLOGIES: ISOMORPHIC PROCESS–STRUCTURES AND THE CRITICAL MOMENT

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Because it still lacks adequate theory needed to ground its multiparadigm multimethodologies, critical systems practice has been derisively called “theoretically-contradictory eclecticism”. This paper is an introduction to and overview of the author’s forthcoming Ph.D. dissertation which offers a new framework for research in critical systems thinking and proposes a new approach for the practice of critical systemic intervention. To underpin this framework an ontology of process–structure isomorphies is designed as a metaphysical interface through an abstraction called the critical moment to each of the conventional paradigms of critical systems thinking (functionalist, interpretivist, emancipatory and postmodern). The ontology is realised by a new epistemology (its *raison d'être*) that respects paradigm incommensurability and yet exploits all the advantages to be had from a multiparadigmatic perspectivity. The new methodology, (wherein each of the paradigmatic approaches is critically ‘deployed’) then operationalises and completes the new framework. This new approach calls for and directs the systemist’s critically reflexive, axiologically transparent, multiparadigmatic appreciation of, and multimethodological engagement with, the problem situation and flux. The philosophy necessarily lays out the framework’s foundational motives, rationale, intents and purposes and acts as a guide for its use. The principal advantage of this new approach is derived from its critically-grounded multiparadigmatic perspectivity and the consequent leveraging of the full gamut of existing systemic methodologies and best practices.

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COLLABORATIVE DISCOVERY OF THE STRUCTURE OF CONCERNS: UNDERSTANDING AND NAVIGATING COMPLEX PROBLEM SYSTEMS

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A research-based, progressive discovery approach was developed for requirements generation for large-scale systems. Complex systems are framed as problem systems, large-scale wicked problems necessarily addressed by transdisciplinary organizations to satisfy the demands of requisite variety. The engineering error of conducting problem solving in early requirements definition creates a reification process, as articulated by process philosophy. This erroneous cultural mindset, the false start of treating complex concerns as “solvable,” is addressed by social design and dialogue.

The combinatorial complexity of wicked problems defeats the divide and conquer, decomposition approaches favored by engineers in analyzing functional requirements. Yet practitioners steeped in a substantialist, positivist epistemology may be unable to shift from a problem focus to a systemic view. Rather than dichotomizing “analysis vs. synthesis,” we attempt to balance the functional with a lifeworld perspective that recognizes the authenticity and autonomy of constituents affected by, authorized by or interested in a shared concern. Yet any construction is both constructive and destructive; a model of the world is constructed and that model destroys all alternatives. A discovery methodology ensures problems-as-given are not reified in dialogue. We present a discovery method that progressively develops understanding through collective sensemaking over a progression of social design practices.

We present a progressive, collaborative methodology integrating dialogic design and organizational development to facilitate transdisciplinary understanding of shared concerns before identifying problem states or requirements. The process enables understanding of shared priorities to cooperatively describe a complex problem system. The progressive methodology

addresses the fuzzy front-end of a complex concern with a relational process of collective sensemaking. Here a system design team describes “requirements” via occurrences and relations rather than substances or entities.

We convene a small group of participants recognizing a common concern and organize their knowledge of the concern in tangible, metaphorical and/or figurative representations using generative and embodied methods. Individual icons and figures evoked by this serious play yield narratives that reveal elements and dynamics of that concern, which guide definition of a more structured problem system. Narratives of the problem system are drawn from participant descriptions of “as is” and “desired” arrangements of occurrences in their presentations. From these narratives, facilitators develop selected themes and variables with an adapted system dynamics elicitation of reference modes. The group sensemaking process concludes with a shared set of critical questions to be posed in the next session. The group also recommends the next group of participants that might best address those questions.

This discovery workshop enables Structured Dialogic Design (SDD) collaboratories, whereby these trigger questions are abduced and structured by a larger body of dedicated participants. The SDD process generates influence maps of the deep drivers of the problem system. SDD creates and maintains dialogic conditions for requisite variety, parsimony, salience and meaning to avoid erroneous priorities. Participants generate consensus on essential actions toward design and complex problem resolution. A large-scale organizational process, Future Search Conference, is also convened as a means for expanding the process to a wider cross-organizational body. The large-group process enabled deep listening by a more focused set of multiple disciplinary groups that span the dimensions of the problem system. The progressive cycle of discovery, understanding, planning, and listening is coordinated by convergent planning workshops, employing SDD for the final phase in progression. The resulting shared action planning enables the organization to continue with traditional analytic systems engineering to develop key aspects of the problem that are now properly situated from the qualitative convergence, focused on essential aspects of the problem system, while broadening the participation, commitment and relevance of those constituents.

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INTELLECTUAL COMMUNISM ENCOURAGES THE INDIVIDUALS’ CREATIVITY AND CAPITALISM’S INNOVATION: SYSTEMS THINKING FROM HEGEL, LESSIG AND LUHMANN

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Locke, Kant and Hegel made their proposals based on their property theories. Firstly, we analyze them, then, we extend them to the concept of intellectual property. Hegel argued on intellectual property in details. His proposal was that: we respect the author of some intellectual work and his right, but his work should be common. The author owes many ancestors to make his work. He adds only small portion of his originality to them. And his readers should be next authors after influenced by him.

L. Lessig, Stanford Law Professor, argues much the same. He proposes the intellectual common in order to encourage the individuals’ creativity and activate capitalism. Everybody has intellectual property rights, but to protect the rights of both the authors and the readers, the patent systems should be free. It seems a kind of intellectual communism. Here we need the social systems theory of N. Luhmann. According to his, both social systems and individuals’ inner systems are autopoietically closed, but both are in the relation of interpenetration, reciprocity: both are influenced by the other through the fulfillment of their own systems. Hegel argued much the same. He also proposed the relation of community and individuals.

We can get some suggestion from theirs. We are now in the era of information society, where the division between the rich and the poor is so deep. The distribution of income follows the power law. We should re-examine both the distribution and redistribution of income in the era of information society. Now only a small part of us engage in the primary and secondary industry, which produce much amount of goods enough to provide for all of us. Many of us engage in the

third industry, the information industry, where the division of income is so deep. Now we need some kind of basic income in order to encourage the individuals' creativity and activate capitalism. This proposal looks like Marx's saying; "each (works) according to his capability, (we distribute goods and services all around to) each according to his needs".

Keywords: property; copyright; Hegel; Lessig; Luhmann

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SOCIO-ECONOMIC EVOLUTION AS A QUESTION OF SYSTEMS OF BELIEF MORE THAN REALITY

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This paper examines the interaction between two versions of human reality, the perceived one and the evidentially unobserved one. Choice is made on the basis of how we perceive reality and this is not necessarily co-incident with what we might accept as reality if our rationality were truly unbounded by our ignorance. Many things we purchase, consume, cover come to own etc have a subjective value far in excess of their objective value. That is nowhere more evident in stock markets.

Here the value of a share is what people believe it to be worth rather than any objectively measurable means of valuing it. The physical assets and current realisable assets of a corporation can be far below the market value puts on its shares in the stock market. This depends as much on the worth of the IPR the company is seen to own, the brands it owns, the perceived competence or not of its senior leadership, even fashion as much as it is on its measurable assets.

This is most evident with respect to money, which only has value if we believe it does. In recent history it is no longer backed by a real commodity gold but by government debt and its deposit levels but as all good banking students know the bank keeps only a small amount of cash to allow those normally wishing to realise their deposits supplied. If confidence in the bank is lost and all its depositors come at the same time to realise their deposits, a run on the bank, it is impossible for any bank to satisfy its creditors and it must collapse. Banking and money more than anything else depend on people's belief in value not actual realisable value. As long as belief can be maintained value can be maintained. When confidence collapses value collapses so given the value we get out of our social belief in the value of money we all work hard to maintain general confidence in such value for without it all is lost.

All the above holds true in social, political and cultural systems belief is most everything most of the time and if we cannot sustain it that it supports crumbles to dust.

Belief is so powerfully useful consider the converse of the above. The sustainment and endorsement of each other's beliefs and of all beliefs the value and significance of different parts of knowledge that drive our modern social technological system is pivotal. It seems if we as human being can envisage something it comes to be. In my life space travel, colour movies, flat-screen televisions computers, mobile phones global TV stations were all impossible now they are our everyday lives.

Fundamental to our knowledge in the 20th Century is a dilemma as yet unresolved. Light is corpuscular and light is a waveform. Two inconveniently inconsistent beliefs which we have resolved short term, in the absence of a General Theory of Relativity though candidates do now exist, by managing to believe inconsistently in both of them at the same time as it suited our convenience.

Where lies truth knowledge and evolution in an age where value is more and more determined by belief. The material, production and logistic cost of a Nike shoe selling for \$150 is around \$10 \$70 goes to the retailer for the ambiance of his store and the remaining \$70 goes to the person that conceived the design and marketing campaign that created its value.

In an age of triple bottom line accounting what are the implications of this as in a sense knowledge creation and distribution is virtually costless and consumes hardly any real physical resources at all only the food to sustain the creators and thinkers so employed.

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SERVICE SYSTEMS EDUCATION IN A REFLEXIVE APPROACH: DESIGNING A COLLABORATIVE COPRODUCING CURRICULUM ONLINE

David Ing and Gary S. Metcalf

The science of service systems, based on systems science, is relatively nascent. In designing curriculum for master's and doctoral level students, what might be the impact of considering education as a service system design for a service systems age?

The industrial mindset applied to education assumes uniform inputs and uniform outputs. A service systems age mindset applied to education positions students and instructors as co-producers of a variety of outputs and outcomes.

Innovations could include: (a) use of social media and online tools for communications; (b) planning through work product based methods; (c) personal commitments negotiated between students and instructors, and between students in groups on expectations of outcomes and effort; (d) student studies of service systems with at least 3 parties with inductive (current state description) and abductive (future state options) deliverables; and (e) ten sets of system features as consideration for improved designs.

The session will include reflections by the authors on designing a service system course as collaborative learning, and the rethinking experienced to steer away from predisposed industrial age ways.

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THE QUEST FOR A GENERAL INFORMATION GATHERING PROCESS FOR DIAGNOSIS AT THE MACROSCOPIC LEVEL AND THE MICROSCOPIC LEVEL - THE TRADITIONAL CHINESE MEDICINE EIGHT PRINCIPLE DIFFERENTIAL DIAGNOSTIC-CURE PROCESS

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Reductionism analyse things through breaking them down into small parts and look at them microscopically. System theory analyse things through interconnections and relationships of different parts and look at them macroscopically. However, reductionism has not gone to the most microscopic level yet (complete disorder and impermanence) and system theory has not gone to the most holistic macroscopic level yet (complete order as unity). Therefore, any part is still a system, and any system is still just a part of the whole. That is, macroscopic level systems are just microscopic level systems with added complexity or organization. Even though microscopic level systems cannot represent macroscopic level systems and vice versa, it is believed that there exists a common theory that can be applied in the whole macroscopic-microscopic spectrum formed by the two Yin Yang forces in the universe: Taichi[disorder force, organizational force].

System theory sees the world composed of the observer, the decision maker, the system, the environment, the boundary and the relationships between them. And it is believed that there are two opposite forces in the world that constantly interacting with each other, creating the flow of energy, matter and information between systems and their environments. On one hand we have the disorder force governed by the second law of thermodynamics that drive everything into a equilibrium state with a maximum entropy. On the other hand we have the organizational force governed by the constrains of a system that drive the system into a particular steady state with a low entropy.

Traditional Chinese Medicine has been using the eight-principle differential diagnostic-cure process for analysing human body system for over 2000 years. The simplicity of the process

allows the practitioner to analysis the human body system in the same manner regardless of the cause of the disturbance, whether it is external or internal, physical or mental, viral or immuno etc. In this paper we investigate the nature of the eight principles and translated them in terms of system theory.

It is believed that the eight principal are the fundamental three log2 information gathering process that can be applied to the whole macroscopic-microscopic spectrum of systems. It is because the process asked the most basic question required in order to gather the most important information of any system.

The Yin and Yang are the fundamental components of any system, forming spectrums. The Superficial and Internal spectrum gathers the information between the boundary and the system. The Cold and Hot spectrum gathers information between the form and function, or matter and energy within the system. The Deficient and Excess spectrum gathers information between the environment and the system. With these information, we can determine the current state of the system and compare it with the desired steady state of the system. Strategy can then be formulated to regulate and maintain the system. Note that these three spectrums are fundamental and complete.

Note that even a closed system should include the observer and decision maker in the analysis of the system. In this eight principal analysis process, the observer(s) determine the acceptable balance range of these three spectrums. Therefore the observer(s) are already considered in the process.

Keywords: Buddha, Taichi Yin-Yang system theory, information gathering, Traditional Chinese Medicine, differential diagnostic-cure process, health and system thinking, macroscopic, microscopic, thermodynamics, entropy, Superficial and Internal spectrum, Cold and Hot spectrum, Deficient and Excess spectrum, observer.

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ENTROPY DEBT, ENTROPY CYCLING AND KARMA - THE TEACHING OF BUDDHA IN TERMS OF SYSTEM THEORY

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The development of modern science established the laws of thermodynamics. There is the disorder force governed by the second law of thermodynamics that drive everything into a equilibrium state with a maximum entropy. The development of system theory on the other hand have discovered the organizational force governed by the constraints of a system that drive the system into a particular steady state with a low entropy. In the teaching of Buddha, there are three characteristics of phenomena in this universe namely anatta meaning egolessness, anicca meaning impermanence, and dukkha meaning suffering or dis-satisfaction.

The first law of thermodynamics mentioned that the total energy never change, they are just transforming from one kind to another all the time. They act like a playground for matters and life to evolve. In the teaching of Buddha, Kalapas make up of everything in this universe and they have eight characteristics at the same time, transforming from one to another but they cannot be destroyed. And in order to experience that within ourselves, we need to achieve egolessness meaning that there is no me nor mine. It is different from the idea of unity because unity is still something while egolessness will neither end up as something nor nothing, and egolessness will even get us pass the kalapas and to the final state of the total truth namely nibbana (nirvana).

The second law of thermodynamics mentioned that there exists a disorder force that drive all ordered things into a disordered equilibrium and maintain them there. This is similar to the phenomena called impermanence in the teaching of Buddha. Experiencing the disordered force of impermanence within ourselves can purify our mind through the disordering our impurities like hatred and aversion, ill will, animosity and agitation. The method that Buddha taught us to practice for this is called Vipassana, which include awareness and equanimity.

The force that makes up lives and our ordered world is called organizational force in system theory. It is similar to the phenomena called differentiation in the teaching of Buddha. And is

similar to the concept of Taichi in the ancient Chinese science of I Ching. Differentiation creates relativity like good and evil, high and low, or big and small. Differentiation is also the fundamental starting point of set theory in mathematics, resulting in A and not A components, and union and intersection relationships. Organization force creates potential difference and creates ordered systems. Taichi cause the differentiation of Yin and Yang forming spectrums.

Living systems maintain themselves by in-taking negative entropy through organizational force and abide to the second law of thermodynamics through paying off entropy debt through out flows according to the constraints of the systems. Living systems may also obtain more organizational force and keep expanding their boundary to a maximum size before paying off the debt.

The entropy debt of matter is the causality with simple information while the entropy debt of living systems is the causality with complex information. Noted that matters pay off their entropy debts in any form. However, if human pay off their entropy debt in the wrong format, we would create more debts that need to be payback later. For example, when human intake the ordered energy of anger from others, we normally pay back the entropy debt with the ordered energy of anger, or even with increased magnitude using energy obtained from ordered food.

This is similar to the phenomena of suffering in the teaching of Buddha and is created by the ignorance of using differentiation. Hence Buddha re-discovered the technique of Vipassana to help us to get enlightened, to realise the truth and to get out of this suffering phenomena. In this paper we investigate on the art of paying back entropy debt in human systems.

Keywords: Vipassana, Buddha, nibbana nirvana, I Ching, Taichi, entropy debt, entropy cycling, karma kamma, system theory, spirituality and systems, thermodynamics, egolessness, impermanence, dis-satisfaction

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CREATING A GENERATIVE DIALOGUE PLATFORM BY INTEGRATING THE ESSENCE OF THE MODEL UNITED NATIONS AND THE WORLD CAFÉ

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I. Background of Global Dialogue in sought of co-intelligence and peace

As communication technologies develop through the times, countries around the world have joined together to form the global village. Never before have humans been so close to each other. The closeness, however, has become the source of conflict, and many complicated issues that revolve around a much larger emerge in different regions on the earth. In light of collective peace and prosperity, forms of diplomatic discussions and collective dialogues have been created. The United Nations was the product formed in this light of hope, and has developed over the past century to become the largest international organization in the world. Its influence has gone over international diplomacy and politics down into students in higher education or secondary education, and promoted the founding of the 'Model United Nations' as an authenticated simulation of the real U.N. for students of the younger generations to engage in the 'global village' and its matters.

In the early 1920s The Model United Nations was founded by students of Harvard University as a simulation of 'League of Nations', which was preceded by the 'United Nations' in 1945 as the very initial appearance of simulations of the United Nations bodies on record. The Model United Nations flourished over the second half of the Twentieth Century, which promoted and attracted young people's passion and commitment for international affairs and issues and also became the birthplace of outstanding politicians. The largest conference now based in The Hague attracts over 4500 individual participations worldwide. By 2009, there are over 400 Model United Nations

registered conferences worldwide, involving over one million high school or university students to become brilliant speakers and closely connected to current world affairs. This activity trains students with active listening and speaking skills, technical writing, negotiations and group communication as well as policy-making.

While the Model United Nations has brought about numerous leaders of world and politicians for the past decades, many new forms of dialogues and discussions are also developed. One of the many that has grown rapidly over the past decade and is well recognized worldwide was the 'World Café', founded in 1995 unintentionally. Although rather young and new, its innovation emerged as a revolutionary method for hosting conversation and dialogues. The 'World Café' has crossed the boundaries of religion, culture and political oppositions to become a complete revolution that involves co-intelligence in discussion of questions that matter, upheld by businesses as well as organizations as a new way of holding conferences.

II. Creating a revolutionary platform of dialogue through integrating The Model United Nations and The World Café

The World Café, unlike the Model United Nations, has not yet popularized as organizations for systematically diffusing collective dialogue and global affairs discussions. While the Model United Nations and the United Nations have been influencing diverse populations of the world, including both the young generation and major society, the World Café holds the potential of becoming a popularized form of conversation and dialogue in the same hope with the United Nations for world peace and prosperity. As a student of the young generation, the Model United Nations has been a significant part of my non-academic experience. Meanwhile, I also had some valuable experiences in various World Café conferences as a photographer and filmmaker. Indeed, integration of both of them would have great significance in creating global dialogues and nurturing collective wisdom. With both methods, a great revolution in the global platform of dialogue is expected to emerge. Below are the research questions of this study:

1. What are the characteristics of The Model United Nations and The World Café? What are their critical differences and commonalities?
2. What might be the drawback and limitation of the two dialogue forms? How could we create synergy of the two?
3. Why and How could Li and Lin's (2009, 2010) Wholeness Praxis Framework and Lin & Li's (2009, 2010) Wholeness-Infinity Theory be integrated for creating a synergetic approach to collective dialogue?
4. Could this type of dialogue and conversation be situated into discussion amongst youths, who play a reasonably important role of this world and in its future for it to be 'sustainable'?

III. Research Results and Findings

This paper discusses the possibility of the creation of a synergetic platform for global or collective dialogue, integrating the fundamental cruxes, advantages and uniqueness of the Model United Nations and the World Café. While the Model United Nations is far the most prestigious and favored activity that assembles the youths around the world into global-consciousness, it lacks the creativity and innovation and the World Café upholds. The World Café is beheld as the revolution of co-intelligence creation, it lacks the

This variation may cover broader issues and age-span as well as occupation range, transcending each of one form by effectuating synergy of the two. In the paper, the authors will present the following:

Investigation of key characteristics which make the Model United Nations and the World Café two unique and most celebrated forms of dialogues to be extracted to form a dialogue platform integrating the two. Critical analysis of the drawback and limitation of these two forms of global dialogue, and how one could commensurate the other so as to create possible synergy. Integration of Li & Lin's (2009, 2010) Wholeness Praxis Framework and Lin & Li's (2009, 2010) Wholeness-Infinity Theory for constructing the form and process of Wholeness Dialogue.

GENERAL SYSTEMS ESSENTIALS: AN INTRODUCTORY COURSE FOR A MODERN GENERALIST CURRICULUM**Vincent Vesterby****Poulsbo, Washington, USA**

General Systems Essentials is a course designed to serve as the introductory course for a Modern Generalist Curriculum leading to a doctoral degree in Modern Generalist Understanding. Because the course presents deep understanding of many factors of systems origins, structures, and processes, it is appropriate for anyone interested in studying systems science.

Ever since the advent of science and the consequent ever increasing body of new knowledge, it has been impossible to be a generalist in the traditional sense of quantity of knowledge. Becoming a specialist, whatever the degree of focus, was the only option.

It is now possible to become a generalist—not in the traditional manner of quantity and extent of knowledge, but in a new manner, based on quality and extent of understanding. The modern generalist mode is possible because it is a discipline-independent mode based on developments from general systems theory.

The course provides a practical introduction to the breadth and depth of the modern generalist mode by leading the student to an understanding of three universal aspects of the intrinsic nature of all that exists. (1) General factors are a more general form of general systems principles and isomorphies. (2) Structural logic is the way in which the intrinsic qualities of something that exists determine the kinds relations it can have with other things that exist. (3) Development is the sequential order of relations between things that exist, throughout space and structure, throughout time and process.

These three exist in reality as patterns of organization of space, time, and matter, and the modern generalist uses these patterns as conceptual tools of exploration, analysis, understanding, and description. Thus, the thinking within the mind matches the reality referents of that which is thought about, resulting in a high degree of objective understanding.

The modern generalist mode of exploration, analysis, understanding, and description has many benefits for understanding systems in any discipline. It enhances the ability to identify general patterns among multiple levels and disciplines through understanding the deep-structure of such patterns. It displays the interconnectedness between and within all the levels through the use of the general factors that play roles of connectivity between and within the subjects studied by the various disciplines. This generalist mode makes it possible to understand change in diverse systems and in their environments through the use of the general factors that form the bases of all forms of change. It enables critical reasoning at multiple levels through the use of the structural logic inherent in general factors and their interrelations. It enables integration of multidiscipline knowledge through the use of the general factor development, the universal general factor of connectivity. Using this method enables general holistic understanding through the use of those general factors that provide unity, depth, and breadth of understanding. Discipline-independent understanding can be achieved through the use of general factors whose core patterns of organization are independent of level of organization.

The modern generalist mode does not simplify complexity, but rather accepts it as is, gains access to the complexity by way of known general factors, observes what other factors are there playing roles of structure and process, and in that way achieves understanding of the intrinsic nature of the complexity.

Keywords: systems curriculum; modern generalist; general systems; deep structure; connectivity

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SOCIAL NETWORKS ARE EFFECTIVE ADAPTIVE MECHANISMS TO HIGH UNCERTAINTY IN DESERT LIVELIHOOD AND ECOSYSTEMS IN CENTRAL AUSTRALIA

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Nomadic livestock mobility is a strategic adaptive management response to high temporal and spatial variability inherent in desert regions. It is facilitated by open access (inclusive) land rights and established corridors of social networks. Agistment, moving livestock from one pastoral property with less feed to another property with relatively abundant feed, is an equivalent strategy in countries with private (or exclusive) pastoral land rights. However, little is known about the role social networks play in agistment decisions and in the overall adaptive capacity of pastoralists in desert regions with exclusive pastoral land rights. To find out, we collected individual, biophysical and relational data from pastoralists in central Australia. We conducted network analysis as well as a historical analysis based on adaptive cycle theory. Our findings indicate that even in exclusive land tenure regimes, durable social (family and friendship) networks and trust norms played a significant role in a general historical resilience of pastoralism in central Australia. Durable networks continue to play an important role in agistment as a strategic adaptive management

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GOVERNANCE BEST PRACTICES BEGINS AT HOME

Tamar Zohar Harel

Governance issues need to be addressed on the providers level from the providers and all stakeholders perspectives, in changing contexts, under the observation of evidence based tools. This description can be equally applied to the requirements from parents in the 21st century, as socialization agents that need to socialize their children to live competently in a world that requires well developed governance repertoires as described above. Such repertoire requires redefinition of the individual as an executive that needs to manage the self in multiple contexts, be flexible to consider alternative scenarios and reflective in monitoring behavior in changing circumstances and or contexts as well as living in multiple contexts simultaneously, namely, at home just before dinner and in facebook or at school with the iphone. Accordingly, parents as providers need to revisit and redefine their role, boundaries, authority and limits of continuous updates in relation to their children as stakeholders, and in relation to the multiple contexts virtual and non-virtual in which the family exists and operates. The purpose of this paper is to demonstrate how in the 21st century the thoroughly investigated family environment and the family-school interface assumes additional meanings that are vital for the socialization of tomorrow's governance oriented citizens for a resilient planet. The main focus of this paper is on the concept of executive functions in education: meanings, methodologies of inculcation and enhancement of self-monitoring. A case example that demonstrates process and developmental outcomes from multiple stakeholders perspectives is presented.

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EDUCATING SENIOR EXECUTIVES IN A NOVEL STRATEGIC PARADIGM: THE ROLE OF 'SYSTEMS THINKING' IN FRAMING THE CONTENT AND PEDAGOGY OF THE SUSTAINABLE ENTERPRISE ACADEMY

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This paper describes the introduction of 'sustainability' as a core conceptual and strategic paradigm in a senior executive learning program (Wheeler, Zohar, and Hart, 2003). The Sustainable Enterprise Academy, an executive education initiative founded in 2000 by the Schulich School of Business at York University, was dedicated to business transformation through the application of a strategic sustainability paradigm which assumes the desirability of business simultaneously creating economic, social and environmental value. In designing this program, a 'systems thinking' approach, based on the work of Peter Senge and his colleagues (Senge et al. 1994; 1997) served as both a conceptual framework for integrating seminar content, and a tool for developing practical action strategies. Throughout the seminars, these systems thinking models served as a way of successfully building the necessary bridges between seminar content and the realities of participants' respective work settings. Program Faculty adopted this strategy for two main reasons: it was argued that the discipline of systems thinking offered an effective way of seeing the relatedness of the dynamic, and often paradoxical, dimensions of sustainable development (Bradbury, 2003). At the same time, the practice of systems thinking offered specific, practical methods and techniques for translating new understandings to high leverage actions (Senge et al., 1997). Implications for the adaptation of a 'systems approach' as both a discipline of thinking, and as a method for generating successful action plans are critically examined.

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PROJECT MANAGEMENT PERFORMANCE ASSESSMENT ON THE ATTAINMENT OF CONSTRUCTION SUSTAINABILITY: KNOWLEDGE-BASED SYSTEM APPROACH

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This paper describes the development of a system aimed at facilitating the evaluation of project management performance regarding the achievement of sustainability indicators of construction projects. The literature reports that though the knowledge on sustainable development is vast and continuously expanding, the practice of sustainable construction is still limited. This research project is based on the premise that knowledge related to the factors and indicators that determine the sustainability of construction projects exists explicitly in the bibliography and tacitly in the experience of construction practitioners. In this sense, the proposed system targets the application of modelling techniques, such as fuzzy logic and expert systems, to incorporate this knowledge into decision making concerning the implementation of project management practices that support the attainment of sustainability goals in construction projects. The modelling of this system considers inherent aspects of sustainable construction, such as the life-cycle of construction projects (e.g. pre-design, design and construction), as well as the social, economic, and environmental attributes of the projects. The paper also explains a prototype of the system as applied to the design and construction of social housing projects in Mexico.

TEXTURIZING EMERGENT REALITY: THE THEORY AND PRACTICE OF EVOLUTIONARY ALCHEMY

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The causal texture of turbulent environments lends itself to socio-technical systems design. Given the theme of the 54th Meeting and Conference of the ISSS as Governance for a Resilient Planet, this paper addresses the need to chart paths of being and becoming that draw upon the full potential of conscious evolution. It is easy to make change happen in the world. What takes more presence of mind, heart and spirit is flowing change so that what you do is both a natural, seemingly inevitable outcome of evolutionary dynamics and, at the same time, an expression of your deepest dream and highest vision for what should happen next. As part of the Evolutionary Development SIG, it is the intent of this paper to explore the relevant axiological and dispositional orientations involving insights, practices, principles and lived experiences that can inform the challenge of embodying, incorporating and enacting flowing change in evolutionary learning communities of all kinds. To begin with, this research explores the question of how we start down the systemic learning path of evolutionary leadership. The questions for socio-technical systems design include: How do we align ourselves on that path, and where do we begin? In what way can we take the first steps so that we avoid trudging doggedly down well worn ruts of habit and reflex and instead are danced along flights of creative inspiration? All of us have had the experience of being in moments of flow, of true alignment and dynamic harmony with an evolving pattern of being and becoming, and in these moments it seems almost as if we are borne along by unseen currents of creative emergence. That is the experience of syntony as an organizing force in evolutionary dynamics. This paper explores how to harness the power of that force through conscious intention and heightened attention.

For the evolutionary guidance systems of learning communities to embody the conscious creation of conditions that give rise to syntonious patterns of being and becoming, it is important to design them so as to cultivate an evolutionary sense-ability. The ability to sense patterns that foster creative emergence places greater importance on process over product. Get the being and becoming of life right and the living of it is a natural by-product. Therefore, the task of taking on the mantle of Evolutionary Leader calls upon us to listen, learn, sense, feel and ultimately know the “rightness” or “trueness” of a developmental path that has heart. It is a whole-being engagement, not one involving the intellect alone. In fact, it requires us to think with more than just ourselves! What this means, both in theory and in practice, is the subject of this paper.

Conscious evolution through evolutionary leadership draws on our interconnection with the world around us, feeding and being fed by the flowing patterns of creative emergence. Fostering the ability first to perceive these patterns, and then to cultivate them, is the primary challenge of the evolutionary leader. Becoming skilled at flowing the patterns into a vibrant and pulsing existence all around us is the primary challenge of syntony. The evolutionary design objective of governance for self-directed sustainability both locally and globally is to explore the essential parameters of this challenge, to model the ideal systemic relationships that can foster it, and to plan how to move through the stages of conceptualization, crystallization, concretization, creation and cultivation that will take such a model into operational viability. Such is the research focus of this paper.

FROM SYSTEMS THINKING TO SYSTEMS BEING: THE EMBODIMENT OF EVOLUTIONARY LEADERSHIP

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This paper is a reflection of my learning and practice as an evolutionary systems thinker/practitioner in the roles I play in this regard: as an educator, consultant, coach, social

entrepreneur and mother. Systems thinking has been a means for enabling critical and creative perspectives from which ideas for improving a difficult situation or innovating a new possibility emerge. However, no matter how powerful this way of thinking is, there is more to the task of catalyzing evolutionary transformation toward life-affirming, future creating, and opportunity increasing realities. Designing systems of governance for a resilient planet is a call for participation in the most important task of our time: to innovate a future of peace and abundance in partnership with all the living systems of our planet Earth. This is not a task for a few privileged, “enlightened” ones, but a responsibility for every human being.

If the insights from systems thinking and practice will be of help in the transition to a viable future for all, they should not be restricted to books and the halls of a few universities, but they need to become part of the social fabric that informs our cultures: the narrative that gives purpose and meaning to who we are, why we are here, and where we are going as a global civilization. This paper explores these issues and offers suggestions for how to engage with them in day-to-day practice.

Keywords: systems thinking, systems feeling, systems being, evolutionary leadership, evolutionary learning community, ecologies of innovation, sustainability, higher purpose, abundance mental model

1494

VOLUNTEERING AND LINKING ROLES IN (ENABLING AND SUSTAINING THE GRASSROOTS BASE OF) RESILIENT GLOBAL GOVERNANCE: A SYSTEMIC MODEL?

Dennis Finlayson

Defining resilience? Regarding individual commitment in social enterprises and innovation.

- Linking in different sectors arising from volunteering experiences and other social contacts across international boundaries.
 - Agencies and initiatives that promote linkages and their governance.
 - The role of academics and other social thinkers in designing and sustaining international linkages and initiatives: hands-off leadership?
 - Horizontal and vertical Governance of initiatives, reporting and separate responsibilities.
- Barriers to sustaining resilient governance in grass-roots based organisations: professionalism; vested interests in governments and international agencies; self-maintaining NGO's and institutionalisation.

Sources on the web and elsewhere: Boy Scouts and related groups; VSO; ASE; UKOWLA; DEA; WEA; Fair Trade Foundation; Trade Unions and Business-based Groups i.e. Rotary.

1496

ENABLING RESILIENT GOVERNANCE: CANADA'S ROLE IN HAITI?

Dennis Finlayson

Canada has already been playing a role in the re-emergence of Haiti from the recent earthquake by convening the Montreal Conference to obtain aid pledges for the reconstruction and, perhaps, symbolically, by agreeing to assist the rebuilding of the Haitian Government Headquarters. So, we ask: “ how might the enabling of resilient governance continue?”

First, it might be appropriate to offer some context on the past history on Haiti, on why Canadian intervention might be appropriate, and on the relevance of countries neighbouring situations. Cuba and Jamaica each face their own challenges so a retraining programme for their leading civil servants could perhaps be offered. There are also smaller islands that could also be included some of which are French speaking. ‘Hands-off leadership’ as part of a wider approach of ‘enabling effective engagement’ formed the core of my approach to tutoring ‘systemic approaches to conflicts and crises (including natural disaster)’ for my last few years at Lincoln University. Essentially, the approach suggests three levels of intervention: beginning with a set of interviews with the target population utilising John Friend's ‘Mutual Consulting (though I prefer Conferring)

Approach' combined with 'cascading' as set out in my own contribution to the ISSS Conference Proceeding in 2000; then the use of a set of Checkland's 'Rich Pictures' to generate past, present and future scenarios and narratives for the study area, i.e. Haiti; and, finally, a Friend's 'commitment matrix' for interventions at various points in time which also identifies who the agents of the intervention might be.

In this case, I have labeled the latter as Canadian Communities: Ca; Fr; and Is. These communities would engage in 'linkages' with elements of Haitian Society that would complement efforts by Government Agencies at Canada's Federal and Province levels to revisit Haiti's governance structures and procedures. Such linkages might involve economic activity groups such as fishing and farming communities, as well as civic activities by professionals alongside volunteers in fields like education, health, sport, culture and local governance. The advantage of having a high level and broad ranging level of engagement from one country in the western hemisphere is that there would be greater continuity and coordination than currently being delivered by a wide range of NGO and government efforts from many different international groups. Canada is not the USA, not the ex-colonial power and yet is a rich, developed country with French as an official language and many migrants from the Caribbean area as well as many island communities.

1501

THE ORIGIN OF NATURAL SYSTEMS BY MEANS OF CONTEXTUAL RELATION

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A concerted effort is underway to produce a synthesis of relational complexity theory, following the theoretical and mathematical foundations of Robert Rosen and his successors. Criteria for this synthesis are stringent, requiring that it meet six key epistemological requirements for a general worldview. Accordingly, its application has to date been explored in many fields. In the emerging view, nature can be described as fundamentally complex in the sense that it is entailed by contextual relations, representing formal cause in Aristotle's four-cause view of nature. Such entailment allows the theory to relate systems to each other and their origins via contextual systems. A holistic analysis of natural systems is possible in this theory based on information (modeling) relations linking the four 'causes' proposed by Aristotle within a causal 'holon' model. Whereas mechanistic assumptions require an external (unnatural) origin of nature, by restoring formal cause to science (in contrast to the tradition of reducing it to efficient causes), it is possible to apply the theory and its analytical methods to a full range of complex system phenomena, including life. Final cause, in this view, is no longer extrinsic to science; it closes the source of formal cause back onto nature, thus ensuring that all causes in the analysis are fully natural. Restitution of all four of Aristotle's causalities to science opens it to holistic study of true complexity, and makes it capable of representing the full range of natural phenomena known today

There are three kinds of natural system implied by relational theory; complex (impredicative), simple (mechanical), and organic (living). All systems originate in the complex, which involve multiple formal cause relations between system and context, including final cause entailments. Mechanistic systems (comprised of material and efficient cause) are properly seen as a special case of complex systems functioning under a single formal cause context. Such conditions arise naturally from mutual interaction without formal cause boundaries, thus making formal cause predicative and efficient cause predictive. Complexity is the condition when formal cause is either not singular or not reducible. Reduction of the complex to 'simple' (mechanistic) systems can occur at any scale where complex elements (particles, organisms, social components, or mental events) are highly interactive in their shared measures (interactive variables). This analysis of the foundations of relational complexity thus suggests a general principle of contextual relation, which states that all interactions entail, and are entailed with, a context (the 'outside' of the system), and all non-reducible contextual entailments represent formal cause, which is information in nature.

Living systems (life forms) realize another kind of special system organization that entails a unique set of 'existence' functions (metabolism, repair, and replication) with internal context, and isolating the whole system functionally from its environment. This organization enhances complex relations by a special arrangement of impredicative formal-cause entailments (modeling relations). When naturally complex relations close a system causally to metabolic, repair, and replication functions, the intrinsic model-generating and model-driven behavior of the system is internalized, establishing final cause and anticipation. Depending on how these entailments are established, the system can evolve in many ways as a result of its interactions with the environment and consequent adaptive and selective processes. Isolation of the whole system from its environment, except for adaptive behavior and selection functions, prevents external entailments from disrupting the closure of internal functions. The absence of unwanted predicative relations with environment is thus as important as the internalization of impredicative relations in maintaining a living system. Various forms of material closure, for example a membrane, provide the necessary isolation of the system's efficient processes from its environment. Once identity is achieved in all four Aristotelian causes, the system can evolve as an organism species.

By combining the logic of modeling relations with the mathematics of categorical mappings, a consistent theory can be applied to analyze the living entailment organization. From that synthesis, there are three apparent ways to get the basic organic closure and necessary causal boundaries. These organizations seem to correspond with the three types of cells known in nature, Bacteria, Archaea, and Eukaryota. The combination of categorical mappings and modeling relations can be used to diagram these three organizational types. Furthermore, the general functional characteristics of these three kinds of cell/organism may be inferrable from the way they are organized. This unified explanation of nature provides a 'holistic' analysis and defines a relational 'holon'. The relational holon proposed in previous work, becomes further clarified as a closed Aristotelian four-causal system and fundamental representation of natural holism that is capable of describing self-generating, logically irreducible objects. The four Aristotelian causes relate to and establish each other in a mutually hierarchical fashion in the natural world, involving us scientifically through formal cause relations. The clarified holon architecture also allows us to see where nature can bifurcate into psychological hierarchies.

1505

'HOLISTIC APPROACH' AND 'REDUCTIONIST APPROACH': A SYSTEM OF APPROACHES TOWARDS SUSTAINABILITY OF A HEALTH SYSTEM

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The objective of this paper is to examine how the principles and methodological approaches of holism and reductionism can be leveraged and/or articulated to create a system of approaches to contribute to addressing challenges facing health system and health care system towards sustainability.

This paper reviews the concepts of holism and reductionism through their respective principles and methodological dimensions. Applications of holistic and reductionist principles and methodologies in health system and health care system are examined.

This paper argues that failing to simultaneously acknowledging and taking into consideration both holistic and reductionist principles, is exactly the opposite of what is expected from a Systems thinking mindset (i.e. focusing on and highlighting the interrelationship or interconnectedness). It also argues that failing to examine, value and articulate the integration of holistic and reductionist methodologies has slowed and/or negatively impacted the journey towards Sustainability's destination for health system and health care system. A System of Approaches is therefore proposed, leveraging on both holistic and reductionist methodologies, towards Sustainability of health system.

Keywords: health system, health care system, Holistic/Reductionist Methodology, holism, reductionism, systems thinking (mindset), integration, System of Approaches, sustainability

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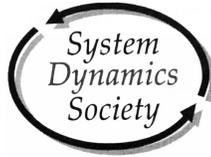
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Location: On the banks of the Potomac River, Crystal City has dramatic views of the USA's capital. Historic Washington, DC is a political, economic, and cultural center, and it is just a quick subway ride away. This unique city is filled with exciting and memorable places—not only famous national landmarks, monuments, museums, galleries, and universities, but also historic neighborhoods where cultural heritage is rich, vibrantly reflecting the city's diversity. DC is home to the world's largest museum complex, the Smithsonian Institution. Visit the National Mall, the famous Washington, Lincoln and Jefferson presidential memorials, as well as the International Spy Museum. The city boasts of magnificent architecture, including the White House and Capitol Building. Spend time at the lush Botanic Garden and the unforgettable National Zoo. While DC is famous for its specialty restaurants and cultural events, Crystal City itself has numerous restaurants and shops, including an extensive network of underground shopping areas.



The Conference Venue: The newly renovated Hyatt Regency Crystal City hotel is within walking distance to the Metro, providing access to the entire DC area. The facilities are excellent. The hotel offers spacious, state-of-the-art conference facilities, an ideal setting for all conference activities, including program sessions, networking and socializing. For detailed information about the Hyatt Regency Crystal City hotel please see: www.crystalcity.hyatt.com.

Watch for further announcements and details as they develop.
Visit our website: <http://www.systemdynamics.org>

International Federation for Systems Research



What is the IFSR?

Founded in 1980 the IFSR is a Federation of societies involved in Systems Research. Currently it has 36 members from 24 countries, comprising all continents. It does not have individual members.

What is its purpose?

- To stimulate all activities in the scientific study of systems
- To coordinate systems activities at the international level.
- To organize, support, and sponsor research and development in systems research
- To develop international publications
- To define and promote standards of competence

What are current activities of the IFSR?

- Publish the Journal of Systems Research and Behavioral Science Organize the Fuschl/Pernegg Conversations (biannually)
- Create the Internat. Academy of Systems and Cybernetics Sciences
- SPublish the IFSR Book Series
- Publish the IFSR Newsletter
- Maintain the IFSR Web Site (www.ifsr.org)
- Support conferences of member societies (e.g. Ashby lecture at EMCSR)

Who manages the IFSR?

The IFSR is run by an Executive Committee consisting of a President, up to 3 Vice Presidents, and a Secretary General. They are biannually elected by the Membership Board consisting of 2 representatives from each member society.

President



Gary Melzer, USA

Secretary General



Gerhard Chroust, Austria

Vice Presidents



Kyozhi Jim Kijima, Japan



Amanda Gregory, UK

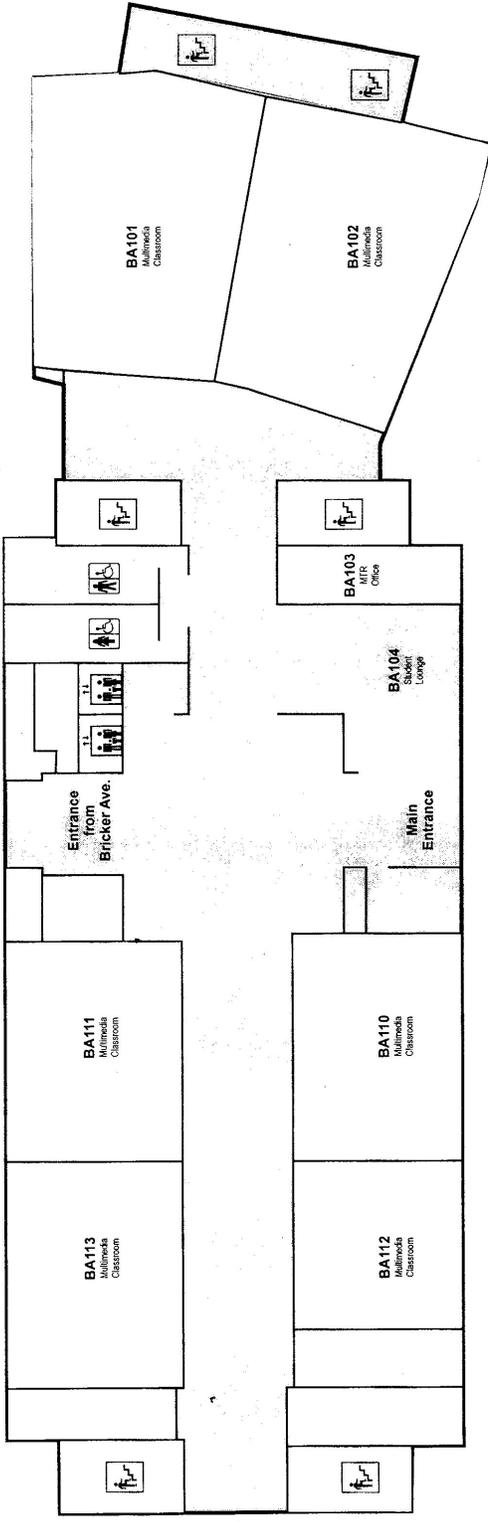


Leona Solomon, Australia

If you work in the systems area ... talk to us, join us!

www.ifsr.org or
Gerhard.Chroust@jku.at

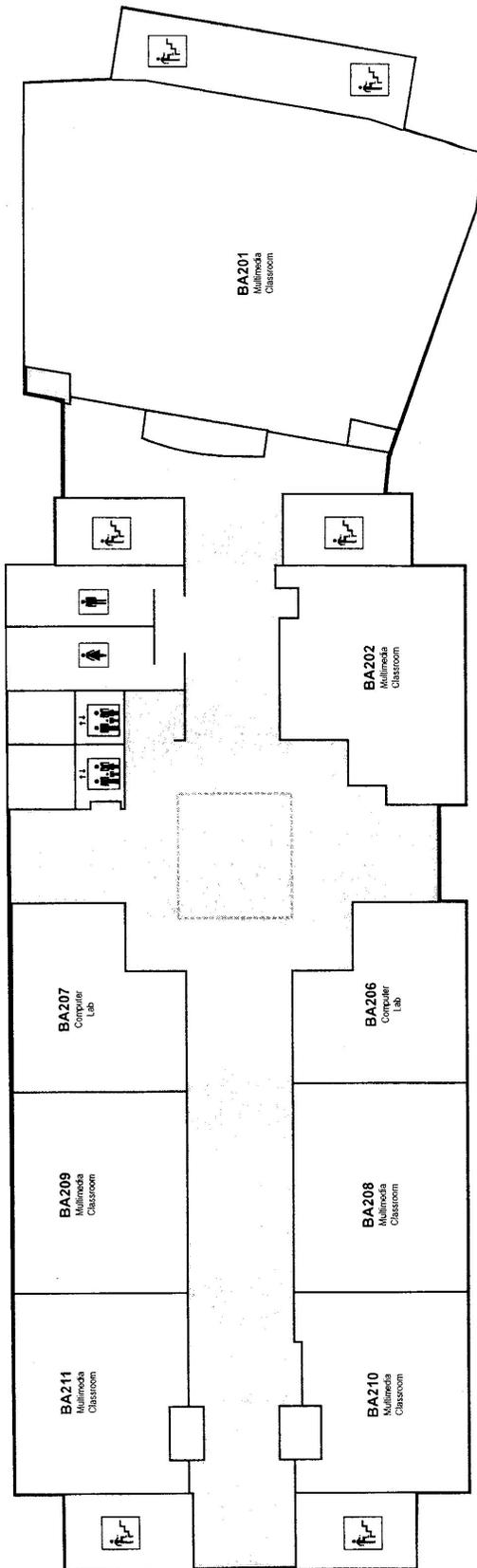
Campus Maps



Revised 11-2003

BRICKER ACADEMIC BUILDING - 1st Floor

BRICKER AVENUE



Revised 02-2004

BRICKER ACADEMIC BUILDING - 2nd Floor

