Table of Contents

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Welcome to ISSS 2013

Welcome to Hai Phong City here on the north coast of Viet Nam, and the 57th Annual Meeting and Conference of the International Society for the Systems Sciences.

This event is billed as a World Conference of the Systems Sciences, and it stands to make a significant contribution to the shape of the Systems Movement. Or more to the point, it provides you – the members of the ISSS and participants in this conference – with a platform to make such a contribution. And the timing couldn't be better. The number of cases of systemic sustainability is burgeoning, and the government of Viet Nam is proudly hosting the presentation of living cases from around the world and right here in Hai Phong as well as on the fabulous Islands of Cat Ba — a Man And Biosphere (MAB) UNESCO Global Heritage site that we will visit as part of the conference program. With this year's focus on Curating the Conditions for a Thrivable Planet: Systemic Leverage Points for Emerging a Global Eco-Civilization, we will surface a world of actionable frameworks and initiatives that, together, will contribute to the launching of the first standing Global Evolutionary Learning Laboratory (GELL) in the world.

But that's only one of several "firsts" that this meeting stands to offer. Here in Hai Phong City, you will get to learn about and experience how the this urban and peri-urban system has come to be managed according integral systems principles – another world "first". This living learning laboratory here at the conference provides a total immersion environment in which to learn about the challenges of thrivability dynamics and the advances in the curating, designing, planning and engineering of systemic sustainability in the environments in which we work, play, and learn. The program has been designed so as to offer you multiple perspectives that bridge local and global frameworks. For instance, in addition to the standard venue of Plenary Speakers, we have innovated a new category called Planetary Speakers – individuals who will be patched in from around the world through real-time audio/video streams to interact with the Plenary Speakers and with you from a context of the issues as they see them in their part of the world. And we have extended this socio-technical system throughout the conference infrastructure by way of an Internet accessible portal open to all of you here so that you can see, interact with, comment upon and enrich the proceedings moment by moment throughout our time together here. We have called this platform the Collective Intelligence Enhancement Lab or CIEL – and it represents another world "first" in conference design and relational intelligence.

Here, at the 57th Annual Meeting and World Conference of the ISSS, you will move through urban, littoral, virtual and representational immersion environments as we explore the role of the systems sciences in surfacing leverage points for global civilizational shift. The environments (both in Hai Phong and on Cat Ba) have been purposefully designed to augment the meaning making process that will make of this conference much more than an academic exchange of ideas. For six days here in Viet

Nam, and for those continuing on to ISEE 2013 — the International conference on Social Environmental Education for an emerging Eco-Civilization, in Taiwan on the 21st and 22nd of July — this will be our action lab where we will surface actionable leverage points for systemic sustainability at various fractal levels of planetary thrivability, and ground the outcomes emerged through this process at local and global (glocal) levels.

I dedicate this conference to the search for systemic leverage points that stand to shift humanity toward a global eco-civilization. Out of this process (or rather, into it) will come what I mentioned earlier as the GELL – a project that Prof. Ockie Bosch has been steadily bringing into existence over several years of dedicated work. The GELL holds the promise of ongoing thrivability curation – of surfacing the collection of local and regional solutions to real-world systemic sustainability challenges, and bringing them into systemic relationship with each other to form a fractal ontology of thrivability practices that span the globe. Thank you for being an interactive part of the process of emerging this new narrative of the Systems Movement.

Alexander Laszlo
President, ISSS, 2012-2013

Committee Memberships

ISSS Conference Management Committee

Jennifer Wilby, VP Administration

Nam Nguyen, VP Conferences and Membership

Alexander Laszlo, President

Pamela Buckle, Secretary and VP Protocol

Stefan Blachfellner, Director of Marketing

Viet Nam National Organizing Committee (NOC)

Professor Dan Duc Hiep, Chairman, First Vice Chairman of the People's Committee, Hai Phong City

Mr. Le Thanh Son, Vice Chairman, Director of the Department of Planning and Investment, Hai Phong City

NOC Committee Members

Head of local departments: Agriculture and Rural Development, Science and Technologies, Natural Resources and Environment, Department of Foreign Affairs, Finance, Cultural, Tourism and Sports, Office of the People's Committee of Hai Phong City, Office of the People's Committee of Cat Hai District.

Standing (contacting) Department: Department of Planning and Investment

Invited: Chief of Office of the Communist Party of Hai Phong City to join the NOC as a member.

The Assistant Secretariat for the National Organising Committee

Secretary-General: Mr. Duong Ngoc Tuan, Vice Director, Department of P&I

Secretary Members:

Mr. Do Quang Khoa, Deputy Chief of the Office of the Communist Party of Hai Phong City

Mr. Le Van Quy, Director of the Department of External Affairs

Mr. Nguyen Hai Binh, PA of the Secretary of the Communist Party of Hai Phong City

Mr. Do Quang Hung, Director of General Department, Office of the People's Committee Hai Phong City; Vice – Director of the Office for Sustainable Development, Hai Phong City

Mr. Tran Van Phuong, Environmental management specialist, Economic Department, Division 2, Office of the People's Committee Hai Phong City

Ms. Hoang Thi Lien, Vice Manager of External Economic Division, Department of Planning and Investment

Ms. Bui Thi Phuong, Specialist, Department of Agriculture and Rural Development

The Conference Organizing and Logistics sub-committee

This sub-committee was concerned with the actual conference itself — on the ground in Hai Phong City and on Cat Ba island.

Ockie Bosch VP Communication and Systems Education
Lien Hoang
Alexander Laszlo, President
Nam Nguyen (Chair), VP Membership and Conferences
Jennifer Wilby, VP Administration

Core Co-ordinating Circle Subcommittee

Stefan Blachfellner
Kathryn Bottrell
Violeta Bulc
Alexander Laszlo (Chair), President
Nam Nguyen, VP Membership and Conference
George Pór
Jennifer Wilby, VP Administration

ISSS Program Design Subcommittee

Stefan Blachfellner
Ockie Bosch
Pamela Buckle
Violeta Bulc (Chair)
Todd Johnston
Alexander Laszlo, President ISSS
Nam Nguyen, VP Membership and Conferences
Will Varey
Palma Vizzoni
Jacqui Wilmshurst
Irma Wilson
Karri Winn

The Collective Intelligence Enhancement Laboratory (CIEL) sub-committee

This sub-committee worked with George on the Co-Intelligence Initiative of the conference, the primary vehicle of which is the CIEL. The sub-subcommittee of this team was focused more specifically on the socio-technical and technological challenges of creating an operational CIEL in coordination with the needs of the GELL developed by Ockie and Nam.

George Pór (Co-Chair); Kathryn Ananda (Co-Chair); Fabio Barone; Ockie Bosch; Violeta Bulc; Tom Bullock; Glistening Deepwater; Valeria Delgado; Debora Hammond; Haydn Hsin; Todd Johnson; Klara Klaric; Alexander Laszlo; Connor Turland; John Vodonick; Jacquie Wilmshurst; Irma Wilson; Dino Karabeg; Paola Di Maio; Judith Rosen; Gail Taylor; Stuart Umpleby and Harlan Wood.

Conference Program and Schedule
ISSS 2013

Sunday: July 14, 2013 – Pre-Conference Workshops

REGISTRATION DESK OPEN 12:00 – 17:00 (Lobby, Haiphong Conference Centre)

10:00 – 15:30 Pre-conference Workshops		
1.	**Workshop** **2003** System Theory And Our Minds: A Systemic Way Of Understanding Ourselves, Each Other, The Nature, The Past and Future Possibilities *Wong, Thomas Sui Leung; Huang, EC Yan* *Workshop will break for lunch and people are welcome to join at any time.*	Haiphong Conference Centre Room Main Hall
15:30 – 17:30 Introduction to ISSS 2013		
1.	Informal plenary session: (WHAT THE CONFERENCE IS ALL ABOUT) Introduction of the concepts: eco civilization, thrivable plane, leverage points: what does it mean (20 min of introduction and 40 min of discussion): Alexander Laszlo Report on how this conference came about, what have we learnt, what do we want to achieve at the conference (30 min): Ockie Bosch Explanation about the program structure and how it came about (10 min): Violeta Bulc Introduction of the day topics and the core intentions per day by the day's moderators (5min/day) Introduction of the parallel happenings at the conference: collective intelligence, APPRECIATIVE INQUIRY and 4 ways of knowing (15min), participation models (10min) Relational intelligence and its relation to systemic consciousness; ways in which the Systems Movement can evolve beyond mapping, modeling and simulating systems.	Haiphong Conference Centre Room Main Hall

18:00 – 20:00 Reception
Evening Reception at Haiphong Convention Centre – Hosted by Local Organizing Committee – Hai Phong Guest House

Monday: July 15, 2013
Theme: Imagine a Thrivable Planet and an Eco Civilization

REGISTRATION DESK OPEN 08:00 – 17:00 (Haiphong Conference Centre, Lobby)

07:45 to 08:45 ISSS Roundtable Discussion (Haiphong Conference Centre, Room TBC)

09:00 Plenary Session (Haiphong Conference Centre, Main Hall)	
09:00	**Welcoming speech – Mr. Duong Anh Dien, Chairman of the Peoples' Committee (Lord Mayor) of Haiphong City**
09:15	**Connecting the DOTS—The Design of Thrivable Systems through the Power of Collective Intelligence** *Professor Alexander Laszlo, President of ISSS* **Where is this so-called "Fifth Discipline" if project failures, blown-out budgets, decision disasters and poor investments continue to plague our society?** *Professor Ockie J.H. Bosch, Nam C. Nguyen and Pamela Buckle Henning* **Using an Evolutionary Learning Laboratory Approach to Establish a World First Model for Integrated Governance of Haiphong, Vietnam** *Dr Thanh V. Nguyen, Ockie J. H. Bosch and Nam C. Nguyen*
11:00 – 11:20 Tea/Coffee (Haiphong Conference Centre Lobby) – Poster Viewing	
11:20	**The keynote speaker theory, visions – CIEL** (George Pór, Kathyrn Ananda) **Scaling the Fractal: From Local to Global Systemic Sustainability** *Alexander Laszlo, Ockie Bosch, Ervin Laszlo (video contribution)* **Planetary speakers by video conference** • *Professor Enrique Herrscher, Argentina* • *Jean Russell, Los Angeles, CA, USA* **Youth visions about the eco civilization and a thrivable planet (coordinated by Anne Stephens)** **Introduction of the afternoon sessions (Nam Nguyen)**
13:00 Lunch (Haiphong Conference Centre)	

14:00 Parallel Sessions					
1	**2**	**3**	**4**	**5**	**6**
Haiphong Conf. Centre **Room 104** **Socio-ecological Systems** **Chair: Helen Ross** **2058** Management of MAB Vietnam's Network of Biosphere Reserves through the approach of System Thinking, Land/seascape Planning, Inter-sectoral Coordination and Quality Economy (SLIQ): A case study of the Cat Ba Archipelago Biosphere Reserve *Tran, Hoa; Nguyen, Tri; Le, Tuyen* **2059** Biosphere Reserves as a Management Tool to Adapt to Climate Change-Case study in Cat Ba Biosphere Reserve, Viet Nam *Nguyen, Cong; Tran, Hoa; Vu, Thao; Nguyen, Hue* **2071** Integrated Ecological Risk Assessment (ERA) in the Cat Ba Biosphere Reserve: A pilot case study in Phu Long Commune, Haiphong City, Vietnam *Than, Hien Thi; Gunnarsson, Jonas; Nguyen, Thu Thi; Nguyen, Lan Thi Tuyet; Hoang, Thap Van*	**Haiphong Conf. Centre** **Room 201** **Chair: Allenna Leonard** **Cybernetics** **1966** A Life in Systems *Phillips, Fred Young* **Viable System Model** **2125** Integrated Information of Negative-Negative Entropy *Allenna Leonard* **Hierarchy Theory** **1999** Convergence as a Medium Scale Acephalous Group *MacGill, Victor R. D.*	**Haiphong Conf. Centre** **Room 202** **Evolutionary Development** **Chair: Alexander Laszlo** **2045** Nurturance Spaces: Twelve Places to Intercede in Apithology Systems *Varey, Will* **1989** Identifying System Archetypes and Leverage Points for the Protection of Aquifers in the Water/Energy Nexus *Jarvie, Deb* **1970** Meta Security in the Human Hive - Integrally Aligning Sustainability Responses to Trajectory of Evolutionary Threats *Hamilton, Marilyn*	**Haiphong Conf. Centre** **Room 303** **Translational Systems Science** **Chair: Jim Kijima** **2098** Manifest for Translational Systems Science *Kijima, Kyoichi* **2010** Constructing a Client Recruitment System for Rural Myanmar Unbanked People to Access PACT Microfinance Institution *Aye, Hnin Pwint; Nakamori, Yoshiteru* **2013** Study on A Model for Teacher Professional Development in Vietnam Based on Knowledge Management *Ho, Thang Vinh; Nakamori, Yoshiteru; Ho, Bao Tu; Ho, Dam*	**Haiphong Conf. Centre** **Room 305** **Human Systems Inquiry** **Chair: Shankar Sankaran** **2029** Using A Systems Based Evolutionary Learning Laboratory to Address the NEET - Not In Employment, Education or Training Issue in Japan *Kiura, Toshiro; Bosch, Ockie; Nguyen, Nam; Yasui, Toshiyuki; Maeno, Takashi* **2079** A Visual Framework for Integrating Systemic Methods for Dealing with Complex Issues *Hieronymi, Andreas* **Health and Systems Thinking** **2052** Enacting Systemic Change of Health Promotion with Simplicity and Transformability of ϕ [fi] *Hu, Yu-Wen*	**Haiphong Conf. Centre** **Room 103** **Ecopolicy Games Session**
15:30 Tea/Coffee (Haiphong Conference Centre Lobby) – Poster Viewing in Room 102					

16:00 Parallel Sessions					
1	**2**	**3**	**4**	**5**	**6**
Haiphong Conf. Centre **Room 104** **Socio-Ecological Systems** **Chair: Helen Ross** **2024** Beyond the "black box": rethinking the use of models in the management of social ecological systems *Kumar, Saideepa; Curtis, Allan; Mendham, Emily; Merritt, Wendy* **2042** Understanding and managing Moreton Bay and its catchments as a social-ecological system *Ross, Helen* **2048** A Study on Water Resources in Vietnam: Current Status, Problems and Solutions for Sustainable Consumption *Vu, Minh Thi; Nguyen, Hoa Thi H.* **2116** Using a Systems Thinking Approach to Investigate the Impact of Climate Change on Livestock Production in Australia *Nguyen, Quan Van; Nguyen, Nam*	**Haiphong Conf. Centre** **Room 201** **Action Research** **Chair: Shankar Sankaran** **2028** Action Research in Organizations *Sankaran, Shankar* **1979** Teaching Communitarian Ethics from Systemic Perspectives *Yu, Jae Eon* **2044** Action Research in Conflict Situations *Finlayson, Dennis*	**Haiphong Conf. Centre** **Room 202** **Organisational Transformation and Social Change** **Chair: Tamar Harel** **2054** Global Supply Chains, Disasters and Externalities *Udbye, Andreas* **2015** Enabling Creative Evolution through Systemic Innovation *Karabeg, Dino* **2091** From Implicit to Explicit Knowledge About Self in the System Across the Life Span *Zohar Harel, Tamar*	**Haiphong Conf. Centre** **Room 303** **Translational Systems Science** **Chair: Jim Kijima** **2122** Simulated Tabletop Exercise For Anti Bio-Terorism Risk Management *Deguchi, Hiroshi* **One Hour Workshop**	**Haiphong Conf. Centre** **Room 305** **Critical Systems Theory and Practice** **Chair: Jennifer Wilby** **2005** Intention on Intervention: A Conceptual Model *Velez-Castiblanco, Jorge Ivan* **2032** Philosophical Conditions for Sustainable Outcomes to Complex Systemic Interventions *Rousseau, David* **2000** Identifying the Archetypes of an Enhanced System Dynamic Causal Loop Diagram; Finding Strategies to Improve Smallholder Beef Farming in Java, Indonesia *Setianto, Novie Andri; Cameron, Donald; Gaughan, John B.*	**Haiphong Conf. Centre** **Room 103** **Ecopolicy Games Session**
17:30 to 18:30 Daily Reflection Session In Main Plenary Hall					

Tuesday: July 16, 2013
Theme: System Theory and Systemic Thinking in Use

REGISTRATION DESK OPEN 08:00 – 17:00 (Lobby, Haiphong Conference Centre)

07:45 to 08:45 ISSS Roundtable Discussion (Haiphong Conference Centre)

09:00 Plenary Session (Haiphong Conference Centre, Main Hall)	
09:00	**SYSTEM THEORY AND SYSTEMIC THINKING FOR NEW SYSTEMIC THEORY BASED STRUCTURES** **Plenary Speaker** Designing for Hope: *Chrisna DuPlessis, South Africa* **Planetary Speakers:** • *Dmitrios Varsos, Iraklion, Crete, Greece* • *Javier Valladares, Buenos Aires, Argentina* Round table discussions (3 guests – 3 circles) – Co-ordinated by Irma Wilson
11:15 – 11:45 Tea/Coffee (Haiphong Conference Centre Lobby) – Poster Viewing in Lobby	
11:45	**SYSTEM THEORY AND SYSTEMIC THINKING USED FOR NEW WAYS OF LEARNING** **Plenary Speaker** Systems Thinking: A Modern Manifesto on Trying to Perceive Elephants *Dr Pamela Buckle, Robert B. Willumstad School of Business, Adelphi University, Garden City, NJ, USA* **Planetary Speakers** • *T. Ariyaratne, Colombo, Sri Lanka* • *Matjaž Mulej, Ljubljana, Slovenia* Round table discussions (3 guests – 3 circles) – Co-ordinated by Stefan Blachfellner

13:00 Lunch (Haiphong Conference Centre, Room TBC)

14:00 Parallel Sessions

1	2	3	4	5
Haiphong Conf. Centre **Room 104** **Systemic Approaches to Conflict and Crises** **Chair: Dennis Finlayson** **1991** Reliable Communication - A Key to Disaster Response *Chroust, Gerhard; Aumayr, Georg* **2039** First Responders et al. in Regime Sponsored Conflict Situations *Finlayson, Dennis* **2067** The Relations between Two Koreas under Roh Moo-hyun Administration: Matter-Energy and Information Flow *Shim, Yeon-Soo*	**Haiphong Conf. Centre** **Room 201** **Systems Engineering** **Chair: Timothy Ferris** **2121** Effectiveness of Hands-On Practice in Bridging the Gap between Systems Science and Systems Engineering *Ohkami, Yoshiaki; Shimazu, Keiko* **2104** The Concept of Resilience in Community and Engineered Systems - A Cross Sectoral Feeding of Ideas *Ferris, Timothy L. J.* **1994** Systematic Planning for the Mexican Satellite System *León Vega, Cirilo Gabino; Lozada, Erick Velázquez; Hernandez, Ciro David León*	**Haiphong Conf. Centre** **Room 202** **Translational Systems Science** **Chair: Jim Kijima** **2043** Method for promoting ICT engineering safety learning from crisis management *Nakamura, Takafumi; Kijima, Kyoichi* **2093** Translational Complex Social Systems Modeling via Agent Based Approach *Deguchi, Hiroshi* **2106** Social Systems and Design Book *Metcalf, Gary S.*	**Haiphong Conf. Centre** **Room 303** **Systems Pathology Socio-Ecological Systems** **Chair: Helen Ross** **2017** Un-safety: Systems Pathology of the Fukushima Nuclear Catastrophe *Atsuji, Shigeo; Ueda, Kazunori* **2126** Maritime awareness development as a key educational issue: a learning spiral to foster biosocial sustainability *Sarka,Eva Zweifel, Silvia, et al.* **2085** Beyond Leverage Points for Emerging an Eco-civilization *Hartley, Elaine*	**Haiphong Conference Centre** **Room 101 and 103** **Mini-International Ecopolicyade** **Participants:** 2 High school teams from Adelaide, Australia; 5 High school teams and 3 University teams from Haiphong, Vietnam **Procedure:** 1. Greetings (Leaders from Haiphong City, Sponsors, ISSS) 2. Background/mission (Malik Management video – Professor Fredmund Malik) 3. Rules of the competition – (Professsor Ockie Bosch and Dr Nam Nguyen) 4. Round 1 – Cybernetia, industrialised country (20') 5. Round 2 – Cybinia, threshold country (20')

15:30 Tea/Coffee (Haiphong Conference Centre Lobby) – Poster Viewing in Room 102

16:00 Parallel Sessions				
1	**2**	**3**	**4**	**5**
Haiphong Conf. Centre **Room 104** **Workshop Systems Approaches to Conflict and Crises** **Chair: Gerhard Chroust** **1982** Information and Communication in Disaster Response *Chroust, Gerhard; Sankaran, Shankar*	**Haiphong Conf. Centre** **Room 202** **Workshop Systems and Health** **Chair: Thomas Wong** **2004** Health and System Thinking - A Systemic Way Of Maintaining Ourselves, Each Other, And The Nature *Wong, Thomas Sui Leung; Huang, EC Yan*	**Haiphong Conf. Centre** **Room 201** **Systems Engineering** **Chair: Timothy Ferris** **2115** Breeding Cars? Automatic Generation of Hybrid Electric Vehicle Topology Using Genetic Algorithm *Ing, Adam* **1995** The Importance of the Rural Telephone Line Satellite In Mexico *León Vega, Cirilo Gabino; Vázquez, Oscar Dolores; Solís, Ramón Marín* **2033** Systemic Intervention Requirements for Dynamic composition of System Components at Run-Time *Kumar, Anand*	**Haiphong Conf. Centre** **Room 303** **Action Research** **Chair: Shankar Sankaran** **2103** Systems Theory and Practice: The Role of Action Research in Organizational Change and Development *Hammond, Debora* **2105** An Action Research Study of Organizational Trust in China *Pierre, Jean-Claude; Metcalf, Gary*	**Haiphong Conference Centre** **Room 101 and 103** **Mini-International Ecopolicyade Session continued** 6. Round 3 – Cybonia, developing country (20') 7. Feedback 8. Award Ceremony (photos)

17:30 to 18:30 Daily Reflection Session In Main Plenary Hall	
Dinner available at nearby local restaurants	
19:30 Evening	
19:30 – 21:00	**ISSS Council Meeting – Location Harbour View Hotel, Haiphong**

Wednesday: July 17, 2013

Theme: Systems Theory in Practice – On Site at Cat Ba Island

REGISTRATION DESK AT CONFERENCE CENTRE – Conference being held at Cat Ba Island Conference Centre

07:15 to 08:15 ISSS Roundtable Discussion (MEET DURING BOAT TRIP TO CAT BA)

08:00 Plenary Session (Cat Ba Island Conference Centre, Main Plenary Hall)	
06:45 a.m.	**All conference participants going to Cat Ba have to be at the Conference Centre by 06:45 am.** **We will then walk a short distance to the Boat Dock to catch a speedboat (very big) to Cat Ba Island at 7 a.m., for the crossing to the island that will take about 1 and ½ hour. Snack breakfast and water will be provided on board, if you are not able to get breakfast that early at the hotels. We will be at the new Conference Hall in the National Park by 9 to 9:15 am.** **The day will start at 9:00am with the following program:** **09:00 WELCOME TO CAT BA CONFERENCE CENTRE AND ISLAND** **09:15 TALK 1:** **CAT BA BIOSPHERE RESERVE (HAIPHONG, VIETNAM)** **Mr Hien T. Pham**, Dr Tung T. Bui & Mr Tuyen T. Le (In collaboration with the Systems Design & Complexity Management Alliance, University of Adelaide Business School, Australia) **09:45 TALK 2:** **Establishing an Evolutionary Learning Laboratory for the Sustainable Development of Cat Ba Biosphere Reserve** **Dr Tung T. Bui**, Dr Thanh V. Nguyen**,** Prof Ockie J.H. Bosch and Dr Nam C. Nguyen **10:05 TALK 3:** **Evolutionary Learning Laboratory providing Opportunities for Development of Sustainable Tourism in Cat Ba** **Professor Hiep D. Dan** & Dr Thanh v. Mai (In collaboration with the Systems Design & Complexity Management Alliance, University of Adelaide Business School, Australia) **10:30 General Discussion and Questions**

	10:45 TEA BREAK **11:00 TALK 5 Slovenia Case study** **InCo movement – practical experiences of system approach with a local and global impact** R: InCo movement team, Violeta Bulc **11:30 TALK 4 Africa Case study** **A Systems Thinking Approach to Address the Complexity of Agribusiness for Sustainable Development in Africa** Kwamina Ewur Banson, Nam C. Nguyen, Ockie J H Bosch, Thich V. Nguyen **12:00 Explanation of Afternoon Tour** Dr Tung Bui and Mr Hien Pham **12:15 AFTERNOON TOUR INCLUDING LUNCH** **Afternoon visit to three points of interests (Subject to possible change depending on time available)** • **Overall Cat Ba viewing point focusing on Nature Conservation;** • **Cat Ba Bay focusing on waste and tourist pollution problem;** • **Sustainable Ecotourism (Resort) and demonstration of a once poor family's abilities to turn their life style that mis-used the forests (illegal hunting) to a sustainable small business and conservation of the forests.** **+/- 19:00 RETURN TO HAIPHONG PER SPEED BOAT** **+/- 20:00 ARRIVE HAIPHONG**

Thursday: July 18, 2013
Theme: System Theory and Systemic Thinking in Solving Day-to-Day Issues

REGISTRATION DESK OPEN 08:00 – 17:00 (Lobby, Haiphong Conference Centre)

07:45 to 08:45 ISSS Roundtable Discussion (Haiphong Conference Centre, Room TBC)

09:00 Plenary Session (Haiphong Conference Centre, Main Hall)	
09:00	**THE MORNING GROUP WORK ("SYSTEM THEORY AND SYSTEMIC THINKING IN SOLVING DAY-TO-DAY ISSUES" and "NEW WAYS OF BEING")** **STEP 1:** - Grouping of the participants at the tables (not more than 7 people per group) - Introduction of the topics to the audience and of the rules that need to be applied as part of the group work **STEP 2:** - Tables discuss the proposed topics and formulate the tables' points of view/suggestions about how system thinking could address the proposed topics (1,5h) **STEP 3:** - Two tables with the same topic are joined together; they exchange their thoughts and results and come up with a joined presentation (45min) - The newly joined groups report on the merged group results (10 min each)
11:00 Tea/Coffee (Haiphong Conference Centre Lobby) – Poster Viewing in Lobby	
11:30 – 12:30	**SESSION CONTINUES**
12:30	**Presentations by Systems Organizations and Discussion, Chair – Alexander Laszlo**
13:00 Lunch (Haiphong Conference Centre)	

14:00 Parallel Sessions				
1	**2**	**3**	**4**	**5**
Haiphong Conf. Centre **Room 104** **OTSC** **Chair: Tamar Harel** **2075** An Analysis of Social Enterprises and Innovation practices based on Barratt's Value System: A Hong Kong Perspective *Hsin, Haydn* **2009** Complex Thought and Systems Thinking Connecting Group Process and Team Management: New Lenses for Social Transformation at Work Environment *Kaspary, Magda C.*	**Haiphong Conf. Centre** **Room 201** **Balancing Individualism and Collectivism** **Chair: Dennis Finlayson** **2034 and 2036** Being, Having, Doing and Interacting: Towards Ethical Democracy, Governance and Stewardship and User Guide: Engagement to Address Climate Change through Participatory Democracy and Governance *McIntyre-Mills, Janet Judy; Binchai, Natasun* **2023** Engaging to Harness Community Creativity for Sustainable Urban Planning *Dickens, Barbara* **2025** Life Chances of Children and Young People in Institutional Care in Sri Lanka: A Critical Review of Policy and Governance with References to Case Studies *Ariyadasa, Eshantha*	**Haiphong Conf. Centre** **Room 202** **Systems Applications in Business and Industry** **Chair: Louis Klein** **2026** Taming the Beast: How American Corporations Unwittingly Conspire to Make Bullying a Rational Choice *Daniel, Teresa A.; Metcalf, Gary* **2030** Pragmatism, Morphogenesis & Sustainable Manufacturing *Tennant, Mike* **2001** Mechanisms for Understanding Mental Model Change in Group Model Building *Scott, Rodney James* **2014** Systems Approaches towards Understanding the Barriers to Innovation Adoption in the Australian Beef Industry *Sun, Daowei; Bosch, Ockie*	**Haiphong Conf. Centre** **Room 303** **Systems Modeling and Simulation** **Chair: Yoshishigo Sato** **2074** Dynamics and Viability of the Critically Endangered Cat Ba Langur: A New Perspective for Conservation Actions *Phan, Thuc Duy; Bosch, Ockie J.H.; Nguyen, Nam Cao; Le, Tuyen Thanh* **2046** Study of Intelligent Impedance Control Using a Fuzzy Neural Network *Sato, Yoshishigo* **Relational Science** **2064** The Concept Design of Cause Related Marketing Utilizing Wants Chain Analysis Proposing the Method and Validation through Value Co-Creation Workshops *Sugiyama, Nozomi; Fujita, Tomoyuki; Maeno, Takashi; Shirasaka, Seiko ; Yasui, Toshiyuki; Kanke, Motoshi*	**Haiphong Conf. Centre** **Room 103** **SYSTEMS THINKING MARKETPLACE**
15:30 Tea/Coffee (Haiphong Conference Centre Lobby) – Poster Viewing in Room 102				

16:00 Parallel Sessions					
1		**2**	**3**	**4**	**5**
Haiphong Conf. Centre **Room 104** **Research Toward a General Theory of Systems** **Chair: Jennifer Wilby** **2007** General Systems Theory and Spirituality and Religion *Rajendran, Somasundaram* **2069** The General Model for Systems Science *Lin, Kingkong* **2136** Innovation and General System Theory: The China Case *Hilton, Brian J.*	**Haiphong Conf. Centre** **Room 201** **Evolutionary Development** **Chair: Alexander Laszlo** **2072** Urban Pioneering Movement as an Example of Emergence and Change *Pulkkinen, Katri-Liisa* **2076** The Art of Changes for Collaboration and Co-evolution of Heterogeneous Eco-communities: From the Wilderness to the Source *Li, Mingfen* **2096** Is it Possible? *Barrera, Ricardo*	**Haiphong Conf. Centre** **Room 202** **Designing Educational Systems** **Chair: Ockie Bosch** **Launching the Evolutionary Learning Laboratory for Systems Education – Prof Ockie Bosch** (Special invitation to representatives from Universities that teaches Systems Thinking to become involved in the International Project on Systems Education and linking with the Global Evolutionary Learning Laboratory (GELL)). **2097** An Applied Educational Learning Concept for “Living System” Fieldwork *Nousala, Susu; Garduno, Claudio* **1988** Education for Emerging Societies *Bulc, Violetta; Wilmshurst, Jacqui*	**Haiphong Conf. Centre** **Room 303** **Systemic Approaches to Conflict and Crises** **Chair: Dennis Finlayson** **1974** Systems Thinking Approach to Address the Complexity of Agribusiness for Sustainable Development in Africa: A Case Study in Ghana *Banson, Kwamina Ewur; Nguyen, Nam C; Bosch, Ockie* **1987** The ROMAC program: Managing and Recovering from Family: Crises in Developing Countries in the Asia-Pacific *Sankaran, Shankar*	**Haiphong Conf. Centre** **Room 305** **INCOSE / ISSS SYSTEMS ENGINEERING PANEL** **Chair: Timothy Ferris** ISSS and INCOSE to discuss, explore and possibly debate, ways in which the knowledge and insight associated with a broad range of systemic methodologies could be used to contribute to exploration of the need and the translation of that into a description of the appropriate solution which could then be engineered.	**Haiphong Conf. Centre** **Room 103** **SYSTEMS THINKING MARKETPLACE**
17:30 to 18:30 Daily Reflection Session In Main Plenary Hall					
19:30 Conference Dinner					
ISSS CONFERENCE DINNER – Hai Phong City Guest House					

Friday: July 19, 2013
Theme: Conclusions and New Directions

REGISTRATION DESK OPEN 08:00 – 13:00 (Lobby, Haiphong Conference Centre)

07:45 to 08:45 ISSS Roundtable Discussion (Haiphong Conference Centre)

09:00 Plenary Session (Haiphong Conference Centre, Main Hall)	
09:00	**Chair of Plenary: ALEXANDER LASZLO** **PLENARY SESSION:** **THE CORE TOPIC: conclusions; what have we learn (the main conference room)** **Collective Intelligence fruits harvested from the conference with:** **-** GELL (Ockie) - CIEL (George Por) - The design group learning and propositions for the future (Jacqui Wilmshurst) - SIG Reports - Student's conclusions - Host appreciation - President's Wrap-up (Alexander Laszlo)
11:00 Tea/Coffee (Haiphong Conference Centre Lobby) – Poster Viewing in Room 102	
11:30	**Systemic Intervention for Community Involvement in Sustainable Water Management** Incoming President's Address and Invitation for ISSS 2014, Professor Gerald Midgley, University of Hull, UK **ISSS 2013 Annual General Membership 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

ALEXANDER LASZLO

Alexander Laszlo, Ph.D., is Founder and President of Syntony Quest, former Director of the Doctoral Program in Management at the Graduate School of Business Administration & Leadership (ITESM), Mexico, and President of the International Society for the Systems Sciences (ISSS). As Professor of Systems Science and Evolutionary Development, he currently teaches at a variety of MBA and Doctoral programs internationally and is Core Faculty in the Organization Systems Renewal program at Bainbridge Graduate Institute. He has worked for UNESCO, the Italian Electric Power Agency, and the U.S. Department of Education, has held visiting appointments with the London School of Economics and the European University Institute, and has been named a Level I Member of the National Research Academy of Mexico (SNI). He is on the Editorial Boards of four internationally arbitered research journals, recipient of the Gertrude Albert Heller Award, the Sir Geoffrey Vickers Memorial Award, and the Förderpreis Akademischer Klub award, author of over sixty journal, book, and encyclopedia publications, and a 5th Degree Black Belt of traditional Korean Karate. For more information see http://en.wikipedia.org/wiki/Alexander_Laszlo_(scientist)

DR NGUYEN VAN THANH

Dr Nguyen Van Thanh is a Member of the Central Committee of the Vietnamese Communist Party, Secretary of the Communist Party and Chairman of the Peoples' Council of Haiphong City (HPC).

Dr Thanh has solid backgrounds in various fields including Economics and Engineering (B.Sc), Law (Bachelor), Industrial Economics Management (Master), and Economics (PhD). He has held various leadership positions with many different portfolios.

From December 2010 to present, he is a Member of the Central Committee of the Vietnamese Communist Party, Secretary of the Communist Party and Chairman the People's Council of HPC – providing strategic guidelines and directing the development of the whole City. This position is equivalent to that of the Premier of a State in Australia.

From 2009 to 2010, he was the Chairman of the People's Committee of HPC and the Chairman of HPC's Sustainable Development Council – overseeing the public management of all sectors of HPC. From 2004 to 2006, he was a Vice Chairman of the

People's Committee of HPC and from 2006 to 2009, he was the First Vice Chairman of the People's Committee of HPC – managing and leading various portfolios including natural resources, environment, fishery, agriculture and rural development. From 2001 to 2004, he was the Director of the City Communist Party Office. His main duties included providing consultations and supports to the leaders of the city party on using plans, strategies, programs, and policies for the overall socio-economic development of the city; assisting the city party leaders in directing, orientating operations of the city party and government system. From 1996 to 2001, he was the Chief Secretary-Chairman of Hong Bang District People's Council, HPC - responsible for directing, orientating and developing the district's socio-economic development plans, programs, and strategies. From 1993 to 1994, he was Deputy Vice Chairman and from 1994 to 1996, Chairman of Hong Bang District People's Council, HPC.

Dr Thanh has been invited to present at various international conferences (e.g. Haiphong, 2013; Manila, 2011; Paris, 2010; Madrid, 2008; New York, 2007; Washington DC, 2007; Hanoi, 2007; Jeju 2005; Hawaii, 2004; Bangkok; 1996; Finland, 1994). He is a member of various organisations and agencies (e.g. National Association of Vietnam-USA, Chairman of Haiphong Association of Vietnam-USA; Coastal Economics and Environment Association; Scientific Council of Coastal Resources and Environment Institute; Grading Council of Technology University). Dr Thanh has also contributed to various research projects and chaired many international and national scientific research councils (e.g. systems thinking; integrated coastal management; biosphere reserves; and urban mobility planning).

OCKIE J H BOSCH

Professor Bosch's research career has rapidly changed from mainly discipline focused to a *systems scientist* and *integrator*. This change was triggered by the realisation that his research outputs were developed 'for' instead of 'with' end-users and that social, cultural, economic and other factors are equally important as hard discipline science in finding solutions for managing complex systems.

As Head of the School of Integrative Systems at The University of Queensland from 2002 to 2011 Prof Bosch's research opportunities should have become more limited, but he remained highly active in networking and research and developed a world renowned reputation as a systems scientist with special skills in the development, refinement and use of generic systems thinking tools that are directly applicable in various practical contexts. More recently (March 2012), Prof Bosch has brought a strong focus on systems design and complexity management to the University of Adelaide Business School. He continues to develop a large national and international network and is currently heading the Systems Design and Complexity Management Alliance (SDCM), hosted by the Adelaide Business School. In this role, he has created a highly productive and stimulating environment, collaborating actively with 31 institutions and individuals around the world.

Prof Bosch is an effective leader in international organisations and societies with a comprehensive understanding of the wider social, economic and political context in

which complex issues are embedded. He is currently Vice President of the International Society for the Systems Sciences and the only Australian elected as an Academician of the prestigious International Academy for Cybernetics and Systems Sciences. He has published more than 60 articles in scientific journals around the world.

NAM C NGUYEN

Dr Nam Nguyen is one of the founding members of the newly established Systems Design and Complexity Management (SDCM) Alliance in The University of Adelaide Business School. He has been awarded a number of national and international competitive academic fellowships and research grants worth more than $1 million. Dr Nguyen is also a Recipient of the prestigious 2011 Australian Leadership Award, a Member of the Board of Directors and a Vice President of the International Society for the Systems Sciences (ISSS).

As a systems scientist Dr Nguyen's research is interdisciplinary in nature which cuts across a wide range of disciplines and themes including management, leadership, governance, social science, sustainable development, education, economics, sustainable tourism development, conservation, poverty reduction and rural development. He actively work within the SDCM team (led by Prof Ockie Bosch) to establish various Evolutionary Learning Laboratories (ELLabs) to address complex issues around the world. In addition, Dr Nguyen brought his research and practical experience into the teaching of several systems thinking courses at his previous university (The University of Queensland – with a total number of more than 800 students until the end of 2011). He is currently teaching the systems thinking courses with Prof Bosch in the Adelaide MBA program, in Singapore (B.Com) and in Japan (Systems Design and Management).

Dr Nguyen has developed a strong national and international reputation. Nationally, he was invited on the Advisory Group contributing to an Australian Learning and Teaching Council project on Decision Support Systems in Australian Universities. Dr Nguyen had also contributed advice to the 'Australia Reports 2011 & 2012: Risks and Opportunities', developed by the ADC Forum in collaboration with KPMG. In addition, he had successfully coordinated two Australian Leadership Award Fellowship (ALAF) programs funded by AusAID. Internationally, his research is attracting much attention from systems scientists. This is evidenced by the recent publication of four research articles in the official Journal of the International Federation for Systems Research (IFSR). Dr Nguyen was invited to attend the IFSR Conversations in Linz, Austria from 14-19 April 2012 – only 30 systems scientists from around the world were invited as participants in the IFSR Conversations. Dr Nguyen is also invited as Keynote Speaker at the International Conference on Social Environmental Education in Taiwan from 21-25 July 2013.

CHRISNA DU PLESSIS

Chrisna du Plessis is Associate Professor at the Department of Construction Economics, University of Pretoria where she is currently leading a research programme on resilient and regenerative cities and lecturing on sustainable construction. She is also currently Theme Coordinator for the International Council on Research and Innovation (CIB) Priority Theme Sustainable Construction. Her research interests focus at both a theoretical and technological level on the principles and guiding frameworks for the practices of sustainable construction and human settlement development as informed by urban sustainability science. She holds graduate and post-graduate degrees in architecture and sustainable development from the University of Pretoria, a PhD in Urban Sustainability from the University of Salford and an honorary doctorate from Chalmers University of Technology in Sweden. Her personal interests lie in furthering the development of and shift towards a holistic/ ecological/integral worldview and understanding what this means for personal and societal values and ethics. She is also an occasional potter and dabbles in creative writing.

PAMELA BUCKLE HENNING

Pamela Buckle Henning has worked in the not-for-profit, private, and public sectors in Canada. Her doctorate degree is in human resources and organizational dynamics. She is an Associate Professor of Management at the Robert B. Willumstad School of Business at Adelphi University in New York. As a management educator in the United States, she teaches graduate and undergraduate courses in organizational behavior, leadership, teamwork and group dynamics, and supervises student thesis and independent study work.

Pamela researches how people detect often-subtle, un-designed, non-conscious behaviours in which individuals and groups become unwittingly entrained. She collaborates with other international researchers investigating the cognitive and emotional processes involved in systems thinking, and the worldviews and values systems of systems thinkers. Her interests include the processes involved in scientists' systems thinking, as well as "lay epistemics" (perceptual processes used by non-scientists).

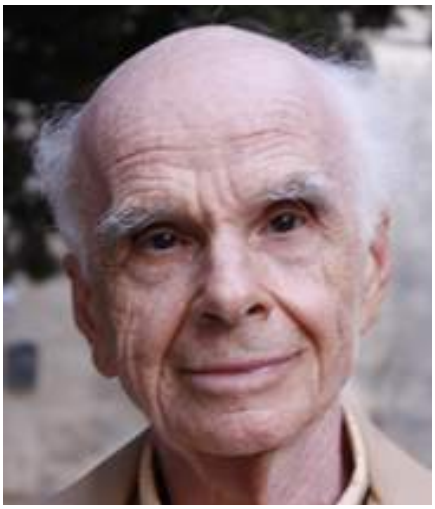
Pamela publishes in systems, project management, education, and psychology journals. She is a Visiting Fellow at the University of Bristol's Systems Centre in the UK, and a member of the editorial board of the Bertalanffy Center for the Systems Science journal: *Systems. Connecting Matter, Life, Culture and Technology*. She serves on the ISSS Board of Directors as Secretary and VP Protocol.

GERALD MIDGLEY

Gerald Midgley is Professor of Systems Thinking at the University of Hull, UK. He also holds Adjunct Professorships at the University of Queensland, Australia; the University of Canterbury, New Zealand; Mälardalen University, Sweden; and Victoria University of Wellington, New Zealand. From 2003-2010, he was a Senior Science Leader in the Social Systems Group at the Institute of Environmental Science and Research (New Zealand). He has had over 300 papers on systems thinking and stakeholder engagement published in international journals, edited books and practitioner magazines, and has been involved in a wide variety of public sector, community development, technology foresight and resource management research projects. He is the 2013/14 President of the International Society for the Systems Sciences, and has written or edited 11 books including, *Systemic Intervention: Philosophy, Methodology, and Practice* (Kluwer, 2000); *Operational Research and Environmental Management: A New Agenda* (Operational Research Society, 2001); *Systems Thinking, Volumes I-IV* (Sage, 2003); *Community Operational Research: OR and Systems Thinking for Community Development* (Kluwer, 2004); and *Forensic DNA Evidence on Trial: Science and Uncertainty in the Courtroom* (Emergent, 2011).

Planetary Speakers

Ervin Laszlo



Ervin Laszlo is Founder and President of The Club of Budapest, Chancellor of the Giordano Bruno GlobalShift University, Founder and Director of the General Evolution Research Group, Member of the Hungarian Academy of Science, Fellow of the World Academy of Arts and Sciences, Member of the International Academy of Philosophy of Science, Member of the International Academy of Systems Research and Cybernetics, Senator of the International Medici Academy, and Editor of the international periodical *World Futures: The Journal of Global Education*. He is author, co-author or editor of 89 books that have appeared in a total of 23 languages, and has also written several hundred papers and articles in scientific journals and popular magazines. His many awards and distinctions include the Peace Prize of Japan, the Goi Award (Tokyo 2002), the International Mandir of Peace Prize (Assisi 2005), and nomination for the Nobel Peace Prize (2004 and 2005). Formerly Professor of Philosophy, Systems Science, and Futures Studies in various universities in the US, Europe, and the Far East, he lectures worldwide. He lives in a four hundred year-old former chapel in the hills of Tuscany.

Enrique Herrscher

President of the ISSS in 2005 — will focus on issues of conviviality and participatory processes in social systems inquiry through consideration of the potential impacts of systemics on society, as being developed in Latin America.

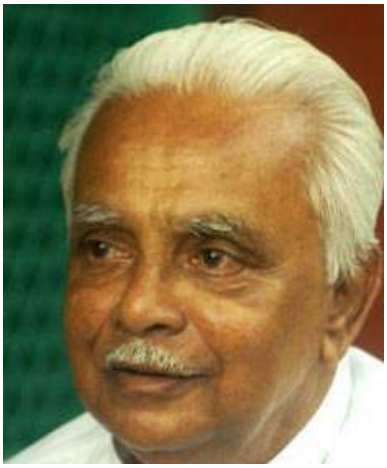
Jean Russell

Founder of Thrivability.net, author/innovator on thrivability and leading authority on this subject. Jean will provide critical and practical perspectives on the key concepts of this year's conference theme — especially those of "curating" and "thrivability".

Dimitrios Varsos

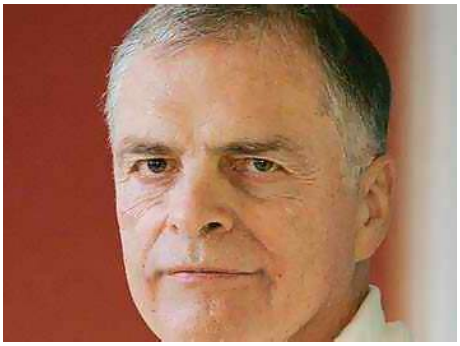
Dimitrios Varsos, *(Greece)*: Member of the Board of Directors of the Hellenic Society for Systems Studies (HSSS) — will look at what is being done in Greece to develop effective methodologies and multi-methodologies for the management of organizational complexity for process cohesion. His experience on how the issues of sustainable development affect the relationship between land and water in the Greek Islands will inform his perspective.

A. T. Ariyaratne



Dr A.T. Ariyaratne, *(Sri Lanka)*: — founder of the Sarvodaya Shramadana Movement — will showcasing the initiatives of the Sarvodaya Shramadana Movement in terms of how it is contributing to the emergence of a new narrative of "glocal" self-reliance and interdependence. He will help paint a picture of the type of global eco-civilization that we, as a species, are ushering in.

Matjaz Mulej



Matjaz Mulej, *(Slovenia)*: — Vice-President of the International Academy for Systems and Cybernetic Sciences (IACSYS) — will consider how initiatives that draw upon a deeper systemic consciousness can help emerge a much needed self-directed sustainability ethic in nature-embedded communities around the world.

Javier Valladares

Javier Valladares will present the efforts being undertaken in Latin America to frame systemic sustainability around the theme of “Patagonia Azul”, a pragmatic research project aimed at integrating broad-based citizen understanding of the interdependence between oceanic and terrestrial biomes with geo-political interests in sustainable development.

The CIEL Design Team

VIOLETA BULC

Violeta Bulc, founder of Vibacom (www.vibacom.com), expert on balanced sustainable development strategies, organic growth and innovation ecosystems. She believes in the power of networks, holistic individual, and positive energy. She has received national awards for business innovation (2004 – 2011), as well as, together with her clients, 4 national FENIKS Awards for consulting projects (2004, 2006, 2008, 2010). As entrepreneur she gets invited to different EU strategy and action groups. She is a member of management and supervisory boards of several professional associations (UN Chapter of Global Compact in Slovenia, Manager Association, Umanotera, and the global "Change the game" initiative). She is also a member of Slovenian National Council for innovative society and an honorary member of Association of Slovenian Innovators. She is a vice president for innovation at Challenge Future, global solution network for youth empowerment. Among her special achievements is the initialization and coordination of "InCo movement", a civilian initiative for raising the awareness on innovation (www.incomovement.eu). With partners she initiated 8 national rewards for innovation communication and journalism, and 4 yearly conferences on innovation: InLoCom (innovative local community), Innovation in education, InCo (innovation communication) conference, and international InJo workshop for journalists and PR professionals. She is also a co-organizer of the global ISSS conference in Vietnam.

GEORGE POR

George is a Senior Consultant, having worked with Canadian Imperial Bank of Commerce, European Commission, European Foundation for Management Development, European Investment Bank, Gulf Canada, Hewlett-Packard, INSEAD, Intel, Procter & Gamble, Shell International, Siemens, Sun Microsystems, Swiss Re, and Unilever. George's academic posts included U. of Ottawa, the London School of Economics, INSEAD, UC Berkeley, U.of Lund, Université de Paris. Interests are action-research and consulting projects and include: • Building communities around world-changing projects of my clients • Accelerating radical innovation processes • Value-creation with communities of practice • Principles and practices of knowledge ecology, the human-centric alternative to KM • Social dynamics of collaborative knowledge creation in virtual communities • Ontologies and pattern language for mapping successful practices that sustain coherent and scalable group discourse in cyberspace • Scenarios for collaborative taxonomy development in constellations of knowledge communities and networks.

KATHRYN ANANDA

Kathryn Ananda has been labelled a brand & culture developer, UX strategist, service designer, graphic & web designer, systems thinker & strategist… She's even been called a sustainability consultant... But she's much more interested in what's beyond sustainability (esp of the status quo), as an ambassador and architect/designer for the thrivability movement. Kathryn is Chief Emergence/Thrivability Officer (& founder) of Positive Handprints Agency, Core Partner at Thrivable.net, and serves on the managing committee of the newly founded B-Team Asia-Pacific.

JACQUI WILMHURST

During the course of my career I have worked in the military, the not-for-profit sector, engineering industry and higher education. I have a great deal of experience in adult education and training, and a passion for working with people towards sustainable solutions to contemporary problems. Over the past few years I have developed subject matter specialisms in risk psychology and in systems thinking. I hold Visiting Scholar positions at Adelphi University Business School, New York, the Faculty of Engineering at the University of Bristol and the Schumacher Institute for Sustainable Systems.

My early research focused on risk psychology in the context of natural disasters and environmental risk, including climate change, in a cross cultural setting (mainly UK, USA and Belize). Subsequent post-doctoral research concentrated on creating more inclusive and participatory risk management strategies for active volcanoes in Colombia. My research in Disaster Risk Reduction (DRR) has been featured in a number of publications in the UK and overseas, including on The Weather Channel, in Scientific American and in a book chapter published by Cambridge University Press.

I also work on applied systems research alongside Bristol University Engineering Faculty, exploring the nature of 'systems thinking', leadership and 'problem' solving in an applied engineering industry context. I collaborate with industry-based doctoral research engineers, academics and industry leaders to identify challenges, and to design and deliver more effective university-based professional development for future industry leaders.

IRMA WILSON

Irma is a Collective Intelligence Strategist and Futurist with her finger on the Social Innovation pulse. She is a whole systems design thinker and commentator with special attention on collective intelligence creation, disruptive innovation, meme design and the spread thereof. She investigates the ways in which imagination and individual agency can be activated to create engaged global citizens.

Irma is the founder of FutureSharp, a collaborative researcher, interactive conversation facilitator, keynote speaker and imagineer. She is a director of two private companies and sits of the board of the South African Innovation Network. She lives in Johannesburg, South Africa and is active in selective social media spaces, most notably The Next Edge, SOCAP, Living Bridges & Innovation Africa. She is on the design them for ISSS57 and is engaged in understanding the future of the manifestation of our built environment, collaboration, work and education.

After she obtained a BCom M(CL) from University of Pretoria, she entered the advertising industry as a media strategist and became the youngest Media Director in South Africa's history at age 26 (atHunt Lascaris TBWA). She left that industry to champion the development of Information and Communication Technology on the African continent and drive open regulatory environments, became deeply interested in alternative economic theory and today is a supporter of the Peer-to-Peer Foundation. She is a deep generalist with meta-cognition abilities and sees herself as a midwife to a Thriving world that works for ALL. You can follow her on twitter @irma_evolve

STEFAN BLACHFELLNER

Since 1999 Stefan Blachfellner works internationally as an entrepreneur in business and communication design from Europe to China. His experiences include consulting with Fortune TOP 500 industries, the service sector, public administration, cultural and educational organizations, and communities. Additional he is one of the co-founders of the international Change the Game Initiative, a network of gamechangers united by their interest in innovation, ethics and leadership. Today he also serves the Bertalanffy Center for the Study of Systems Science as Managing Director in Vienna, Austria. He is an active member in several scientific communities dedicated to social and technological innovations. In 2012 he was elected as Vice-President by the IFSR - International Federation for Systems Research. He serves several research journals as supervisory, managing and guest editor, among them “systems. connecting matter, life, culture and technology”, the journal which originated from the EMCSR - European Meetings on Cybernetics and Systems Research, which he manages since 2012.

Graduate at the University of Salzburg he studied Communication, Psychology and History. He is currently part time university lecturer at the Upper Austria University of Applied Sciences Campus Steyr and Hagenberg, CAMPUS 02 University of Applied Sciences Graz, and the Danube University Krems in Austria, teaching over 8 subjects in 7 different curricula.

VALERIA DELGADO

Valeria Veronica Delgado studies at the National University of Luján in Argentina in the disciplinary areas of management, marketing, research methods, statistics, and mathematical finance. Her professional activities focus on organization and management consulting as well as career and life coaching. She enjoys challenging tasks with high degrees of responsibility where she can give full reign to her creativity and executive decision-making skills. She has worked for the Sociedad de Fomento *Rafael Obligado*; the Centro de Rehabilitación de General Sarmiento; the Unión Industrial General Sarmiento; and at the San Miguel campus of the Universidad Católica de Salta, and the San Miguel annex of the Universidad de Flores — both of which are run by the Fundación Arcángel San Miguel. Currently, she is working on the development of GESI activities (the Group for the Study of Integral Systems based in Argentina), coordinating projects with national and international systems societies and organizations. She is also an accomplished artist with a degree in Visual Arts from the National College of Art (IUNA) in Buenos Aires, Argentina, and a deep passion for the study and perfection of a variety of painting techniques.

CIEL – The Collective Intelligence Enhancement Lab

The ISSS conference design team experience
Violeta Bulc, the group coordinator

I was surprised when Alexander asked me to lead the group responsible for the design of the ISSS global conference in Vietnam. I was new in the ISSS community, had no prior experiences about the ISSS or how was the conference supposed to look like. So I took over the listening, coordinating, recording and the modeling role.

The work was divided into 4 phases:

Phase 0 (Linz April 2012)

Core activities:

- the cores structure of the conference
- core principles
- understanding the target participants
- understanding the core needs of the target participants

Results:

- definition of the Core coordination team (CCC team)
- definition of the initial proposal of the program for the conference

Phase 1 (April 2012 – September 2013)

Core activities:

- set up the program design group
- get to know each other
- select the core messages from the Linz's proposal
- collect additional suggestions for the conference topics from the team
- decide on the tools to support the team collaboration
- define different roles within the group
- definition of the interconnectivity points with other subgroups (collective intelligence, operations, marketing)

Results: the team, the rules, and the framework

Phase 2(September 2012 – February 2013)

Core activities:

- definition of the mission, meta theme, focus for the conference
- definition of the draft of the program and the key topics per day
- definition of the innovative elements

- definition of the resources needed
- definition of the model of the conference, model of the leverage points to be observed while emerging towards the thrivable Planet
- definition of the innovative points at the conference

Results: models, draft agenda, alignments

Phase 3 (May – July 2013):

Core activities:

- definition of speakers
- definition of the program
- definition of the operational responsibilities and roles at the conference

Result: formal program; roll out plan (resources, timetables for the planetary and plenary speakers, the structures for the SIG sessions, and the supporting blocks of the conference)

As a group we have faced several **challenges** during our work: the language, understanding of the words and concepts, irregular presence at the meetings, lack of effective tools accepted by all, the volunteering work that still needed to be done professionally, additional stress caused by different time zones, different personal interests, and different levels of commitments. However, we have very successfully overcame all of them and fully enjoyed the privileges to be part of such an exceptional team for which the core advantages could be summarized into: very diversified points of view, incredible human capacity, very deep and valuable comments form everyone in the team, very positive energy from all the team members, a lot of mutual learning, incredible experience about how to manage global teams, a new network of friends for life.

At the end it is worth mentioning few **innovative** additions that we generated for the conference:

- Planetary speakers (Mon, Tue, Thu)
- Field experience with presentations on the daily use of system science principles (Cat Ba on Wed)
- Group work on the use of system science in addressing the current global, regional and local challenge (on Thu)
- The structure of the program (reflections, morning events, market place, focus for the day) (Mon, Tue, Thu)
- The collaborative, participative and co-evolving process for setting up the conferences program

Members of the team: Alexander Laszlo (President of the ISSS), Jacqui Wilmshurst, Pamela Buckle Henning, Barbara Widhalm, Kathryn Bottrell, Todd Johnston, Palma Vizzoni, Karri Winn, Will Varey, Ockie Bosch, Irma Wilson, Violeta Bulc (Coordinator of the Conference Design Team), Nam Nguyen (Coordinator of the Conference Organization & Logistics team), George Por (Coordinator of the Collective Intelligence Enhancement Lab team), Stefan Blachfellner (Coordinator of the External Communication & Coordination team), and Jennifer Wilby (Vice President for Administration and the central reference point for the official ISSS activities).

The Evolutional Learning Laboratory

DEVELOPMENT OF AN INTEGRATED SYSTEMIC GOVERNANCE PLAN FOR HAIPHONG CITY, VIETNAM: ENHANCING CROSS-DEPARTMENTAL COMMUNICATION AND COLLABORATION USING A SYSTEMS THINKING BASED EVOLUTIONARY LEARNING LABORATORY APPROACH

Professor Ockie Bosch & Dr Nam Nguyen
Systems Design and Complexity Management, Business School The University of Adelaide, Australia

In collaboration with
The Haiphong Peoples Committee, Haiphong, Vietnam

WHAT DOES THIS ELLAB INVOLVE?

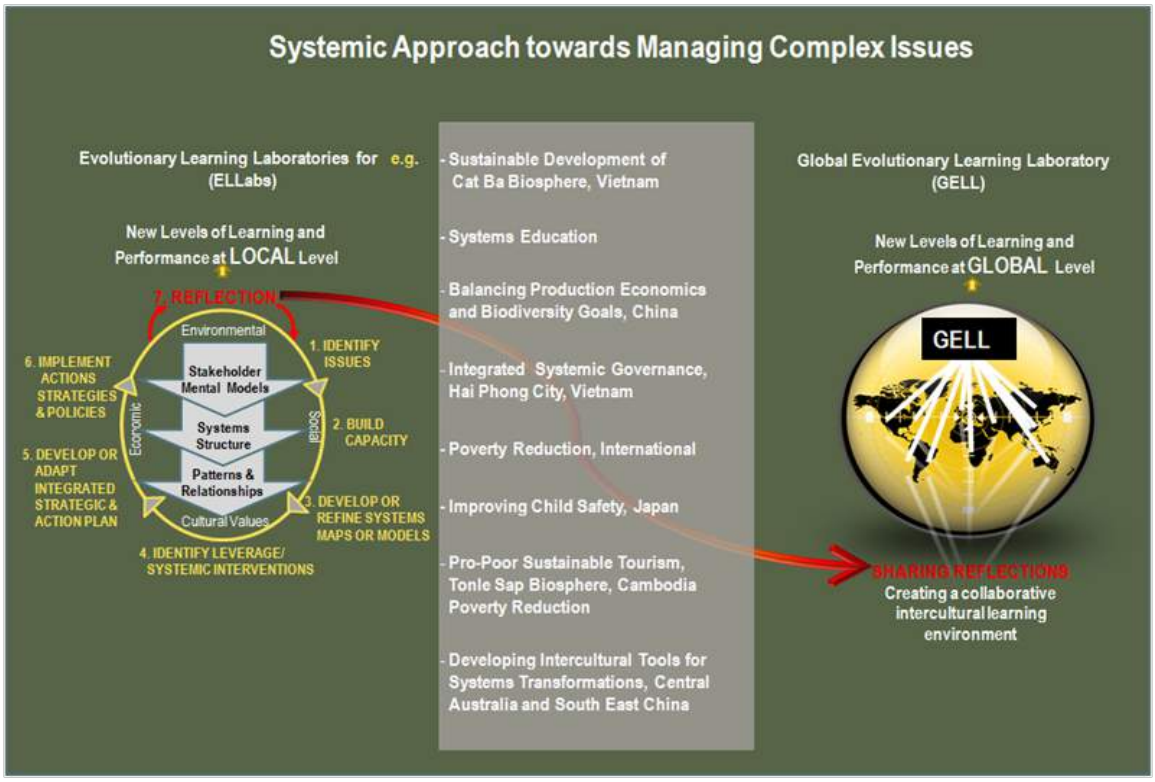
Government and business institutions are under pressure to make the right investment decisions in the face of a continually changing geo-political and socio-economic landscape. Policy makers, managers and leaders today are expected to deliver innovative solutions to cope with increasing change and uncertainty. To make matters more challenging the complex environmental, socio-economic, business-financial issues tend to transcend the jurisdictions and capacities of any single organisation.

There are a multitude of difficult, long-term global challenges ahead, almost all of which are coupled with our most pressing national and local concerns. Despite many efforts to deal with these complex issues facing our society the solutions so far have been seldom long lasting. In order to govern our complex society towards resilient technical, economical and social developments there is an urgent need to step outside our collective 'comfort zone' and to develop new ways of thinking and acting in the interest of our future. It is essential for current and future managers and leaders to be equipped with new ways of thinking that are systems design-led to deal with complex problems in a systemic, integrated and collaborative fashion – that is, working together in identifying and dealing with root causes of issues rather than focusing on short-term fixes.

The Evolutionary Learning Laboratory (ELLab) offers a methodology for creating informal learning spaces or platforms for managing complex issues. It aims to introduce systems thinking, complex decision making, knowledge and integration skills for researchers, research managers, policy makers and other decision makers to develop a shared understanding of complex issues and to create innovative and sustainable solutions using systems approaches. The processes also include generic skills in problem solving, team participation and team learning. It consists of a unique seven step process and methodology for integrated cross-sectoral decision making, planning and collaboration in dealing with complex multi-stakeholder problems.

Participants in the Haiphong project continue to learn about the importance of interconnectedness. Apart from their involvement in each step of the ELLab, a simulation game is also being used in which they act like the government of a country in despair, with the goal to stabilize the country through developing a sustainable balance between education, health, politics, production, environment, quality of life, and population growth - all important sectors of human life, which is interlinked in such a way that each decision results in a chain of effects and repercussions - just like in real life.

Those involved from different Government Departments learn how to integrate the mental models of different stakeholders into a Causal Loop Model (CLM) and how to interpret and explore the model for patterns, how different components of the model are interconnected and what feedback loops, reinforcing loops and balancing loops exist – a process that provides all stakeholders with a better understanding of each other's mental models and the development of a shared understanding of the issue(s) under consideration. Exploring the models also helps the people involved in the workshops to identify archetypes, reinforcing (vicious and virtuous) and balancing loops in order to find leverage points and systemic interventions that could improve the system.



The next step is the use of Bayesian Network modelling to systemically determine the strategies that will be required to achieve the goals of the identified leverages and systemic interventions. Bayesian networks are now used throughout the world as a systems modelling tool within a range of industries including medical science, engineering, business and finance, information technology, mining and exploration, forensic science and environmental management. The popularity of Bayesian networks is spreading due to their flexibility and ability to integrate different forms of data and knowledge (quantitative and/or qualitative; biophysical or social), to accommodate uncertainty and to support decision making through scenario analysis and back-casting. The workshop participants are introduced to a Bayesian Belief Network modelling tool that can directly be used for decision support. However, it is especially the group of Middle to top managers that attended a two-month course in Australia (with the financial help of AUSAID who are taking the lead in these activities. The tool is designed for researchers and managers to integrate knowledge and scientific understanding about the systems, whilst policy makers and managers can use them as decision support tools to improve the performance of the systems they are managing. The interpretation of the CLMs and back casting in the BBN models lead to an understanding of the systemic issues and their interdependencies, the role and responsibility of each stakeholder group and the implications for coordinated actions, strategy and policy - all facilitating the identification of key leverage areas for systemic interventions that will lead to good investment and efficient management and policy making.

Participants are learning how the BBN models can directly be used as a management plan by end-users. The plan is based on the best knowledge (scientific data and information, experiential knowledge, expert opinions) that was available at the time of the systems analysis and model construction. The model is then used to test the possible outcomes of different strategies by observing what will happen to the system as a whole when a particular strategy or combination of strategies is implemented, that is before any time or money is invested in the actual implementation of systemic interventions. Of particular value is the ability of the BBN model to also "back-cast" to point out which of the components, actions or conditions have the most influence on the achievement of the goal. This is a powerful way of determining where to invest time and resources, instead of having just a list of recommendations, without an understanding of how they are interconnected, which ones are the most important to invest in and in what order should the strategies be implemented to ensure an efficient and cost-effective plan of action.

The various BBN models for addressing identified leverages and systemic interventions are ultimately integrated into an Integrated Systemic Governance Plan for Haiphong.

GELL

ELLabs throughout the world are linked through the Global Evolutionary Learning Laboratory (GELL) allowing for the sharing of reflections and development of new ideas on how to deal with complex issues with each other. This does not only lead to new levels of learning and performance at the global level, but individual ELLabs are provided with an opportunity to contribute actively to the global knowledge pool on dealing with complex issues facing our world in an intergenerational and intercultural co-learning environment.

List of Abstracts

(Paper numbers in parentheses)

2013 Abstracts

Plenary Abstracts

MONDAY PLENARIES

WHERE IS THIS SO-CALLED "FIFTH DISCIPLINE" IF PROJECT FAILURES, BLOWN-OUT BUDGETS, DECISION DISASTERS AND POOR INVESTMENTS CONTINUE TO PLAGUE OUR SOCIETY?

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We are living in a complex and ever changing world. Policy makers, managers and leaders today are expected to cope with increasing complexity, change, and diversity. Traditional and reductionist approaches have shown their inability to address such complex problems. Increasing complex issues and challenges in curating the conditions for a flourishing planet require new ways of thinking and a fresh approach to address the multi-dimensional and multidisciplinary nature of complexity. This paper argues that there is an urgent need for a societal change to deal with complexity in a world that focuses on reductionist approaches (breaking into parts; traditional linear thinking; seeking silver bullets). The need to step outside our collective 'comfort zone', develop new ways of thinking and act in the interest of our future is crucial. It is essential for future managers and leaders to be equipped with new ways of thinking that are systems thinking and design-led to deal with complex problems in a systemic, integrated and collaborative fashion – that is, finding long-lasting solutions to the root causes of issues rather than focusing on short-term fixes that doesn't work. System thinking offers a holistic and integrative way of appreciating all the major dimensions of a complex problem, and enables the formation of effective and long-term management strategies (systemic interventions). The paper provides examples of how taking systems thinking out into the real world could help shifting the mindsets of managers and decision makers to avoid project failures and money wasting in complex project management and discusses the importance of 'systems thinking' to become 'everyday language' and a main stream concept embedded in all walks of life.

Keywords: systems concepts; holistic thinking; The Fifth Discipline; systems education; management of complex issues; improved decision making; systemic management.

USING AN EVOLUTIONARY LEARNING LABORATORY APPROACH TO ESTABLISH A WORLD FIRST MODEL FOR INTEGRATED GOVERNANCE OF HAIPHONG, VIETNAM

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We manage the systems we are part of in a highly compartmentalised structure. Government departments are a typical example of how society operates in silos. However, complex political, environmental, socio-economic, and business-financial issues tend to transcend the jurisdictions and capacities of any single government department, which adds significantly to the difficulties in finding systemic management solutions and effective governance plans. This lack of cross-sectoral communication and collaboration in complex national and global environments compromises the leaders and policy makers in government, leading to centralised protocols and siloed departments that undercut local responsiveness. The Government of Haiphong City (HPC) decided to establish an Evolutionary Learning Laboratory (ELLab) to enhance communication and collaboration between the different departments in order to develop an integrated and systemic Governance Plan for HPC.

Workshops and specialist forums were held to gather the mental models of representatives of different Government departments. The "learning" process started with integrating the various mental models into a systems structure using Causal Loop Modelling and continued during the steps of interpreting and exploring the model. A deeper understanding of the potential implications of actions, strategies and policies lead to the identification of leverages and systemic interventions that will contribute to the development of a sustainable HPC.

A series of Bayesian Belief Network (BBN) management models is developed for each of the identified systemic interventions, determining the requirements for their implementation, the factors that could affect the expected outcomes; and the order in which activities should be carried out to ensure cost-effectiveness and maximum impact. The models are combined and used to develop a refined systems model, which forms at the same time a systemic strategic and operational plan for integrated governance of HPC.

Keywords: systems thinking; sustainable development; complex problems; management models; Ecological Cities as Economic Cities (Eco² Cities); ELLab

TUESDAY PLENARIES

DESIGNING FOR HOPE

Chrisna du Plessis

There is a subtle but marked shift in the global conversation on the future: a shift from negative to positive, from fear to love, from despair to hope. Words such as abundant, flourishing and thriving are replacing narratives of scarcity, degradation and limiting growth. This thinking does not come from naïve optimism and denial in the face of scientific evidence, but from a sober understanding that change is necessary, if uncomfortable; that out of adversity comes strength and innovation; and that we do have a role to play in what can only be described as a global healing. And for this shift we can thank our growing understanding of systems.

Systems thinking allows us to see connections and flows; to understand that life is about both change and persistence; that the behaviour of complex systems can be changed by the myriad small adjustments made by individual members of that system; and that causes (and solutions) often sit in very different places than their ultimate effects. But the biggest gift of systems thinking is that it re-unites humans with their world. We can no longer escape from the fact that we are part of the system and that the only change we can affect is from within – not by controlling, but by understanding and influencing the behaviour of our systems through our own actions and the structures we create. This requires a rethink of how (and what) we plan and design, whether we are designing spaces and places, systems and processes, or simply new ways of being in the world.

The built environment as the confluence of all systems is a useful entry point for any discussion on global transformation and what is possible if we come to the problem of designing a thriving future with a different mind, a different vision, a different worldview. There are many examples in the built environment that illustrates how the different perspective offered by various schools of systems thinking creates opportunities for designing the structures of a hopeful and thriving world. Most of these show that at the end of the day the most potent place for systems change lies not in instituting technology or economic rewards or grand master plans, but in the values and ethics that underlies our engagement with the world. Ultimately we choose the kind of world we live in by choosing how we live in the world.

A MODERN MANIFESTO ON TRYING TO PERCEIVE ELEPHANTS

Pamela Buckle Henning

As was the case for the founders of the international systems movement, there are people today who perceive systems in the complex word around and within us. However, for many – perhaps most people – it is easier to discern parts of a system rather than wholes. Those people who are systems thinkers today are fuelled in their work by motivations that are, in many ways, unique to them. Those motivations are a great asset to a systems thinker, if understood for both their benefits and pitfalls. This talk will explore the personal experience of being a systems thinker, along with a review of theories and practices that may help us better understand the skills involved in perceiving systems.

Scholars have identified many ways that humans perceive systemic phenomena. Some have been endorsed by traditional science; others are rarely considered outside their originating disciplines. The work of synthesizing what is known about approaches to human perception into a new form of perception that systems theorists and practitioners can use has yet to be done. Given the cross-disciplinary aims of a general system

theory, a variety of ways of perceiving will be reviewed in this plenary, including current research from cognitive science – some of which is controversial in the systems community.

This community holds the important responsibility of educating the next generation of systems thinkers. Concrete steps can be taken in classrooms to cultivate systems-perceiving skills that people will be able to use outside the classroom in their lives, places of employment, and as citizen-participants in a fast-changing global community. Some of these steps already have been identified by cognitive science; others are yet to be discovered. There will be great benefits to our planet if we expand the numbers and skill of people involved in systems work. It is work that can come with considerable personal cost, and also yield great rewards.

This talk will conclude with recommendations to advance a theory of the practice of systems perceiving, and recommendations for how people who are systems thinkers can advance their systems perceiving capacities.

FRIDAY PLENARIES

SYSTEMIC INTERVENTION FOR COMMUNITY INVOLVEMENT IN SUSTAINABLE WATER MANAGEMENT

Gerald Midgley

Gerald Midgley will introduce the theory and methodology of systemic intervention that he has been developing for over twenty-nine years. This focuses on the importance of exploring boundary and value judgements in problematic situations, as well as identifying processes of marginalisation and entrenched conflict that need to be tackled in an intervention. Gerald also advocates theoretical and methodological pluralism: drawing upon a wide range of theories and methods from across the various systems paradigms, as well as from the disciplinary sciences and humanities. Having discussed theory and methodology, Gerald will then go on to present a case study from New Zealand of a systemic intervention to address a thirty-year conflict between a local Council and its community over water shortages. This case study illustrates how the conflict can be understood as a clash of boundary and value judgements, with the Council marginalising community concerns. This understanding was pivotal to designing a systemic intervention (drawing upon methods from both the systems and social science traditions) that enabled the Council and community to agree sustainable solutions. The location and theme of next year's meeting will also be incorporated into the presentation as we move into the Annual General Meeting for the Society.

Session Abstracts

1966
A LIFE IN SYSTEMS

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The author's career in systems began in 1971 at General Motors Research Laboratories, where he was told to replicate the Club of Rome model, and continues now as he edits the Elsevier journal Technological Forecasting & Social Change. Highlights included years working with Ilya Prigogine; graduating from Abe Charnes' Center for Cybernetic Studies at Texas; visits to the Santa Fé Institute; and introducing information-theoretic methods to the management field (while arguing with Bayesians). The paper offers lessons learned and perspectives drawn over this span, with regard to computation, big data, sustainability, as they pertain to the study and management of complex systems.

1970
META SECURITY IN THE HUMAN HIVE: INTEGRALLY ALIGNING SUSTAINABILITY RESPONSES TO TRAJECTORY OF EVOLUTIONARY THREATS

Marilyn Hamilton Phd CGA CSP

This article explores a meta-theory for Global Environmental Change and Human Security (GECHS) as it relates to the human hive. It explores the Integral City Framework for environmental change in the Cosmosphere, Biosphere and Anthroposphere. Four maps reveal how humans in the city impact global environment, and how human security is tightly bound with global and human evolution. Elements of the maps include subjective/intersubjective and objective/interobjective perspectives; nested holarchies of whole systems; fractal development of holons and social holons; and eight levels of complex structures. A specific example of the city of Abbotsford is used to illustrate an integral approach to GECHS. The article concludes that the integral city meta-framework provides a GECHS approach that is fractal, scaleable, global, local, holistic, comprehensive, pluralistic, interconnected, evolutionary and developmental.

Keywords: integral city, human hive, global, environmental change, human security, evolutionary sustainability

1974
SYSTEMS THINKING APPROACH TO ADDRESS THE COMPLEXITY OF AGRIBUSINESS FOR SUSTAINABLE DEVELOPMENT IN AFRICA: A CASE STUDY IN GHANA

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African countries have comparative advantages in terms of land and relatively cheap labour cost compared to western countries in the production and export of primary commodities. However, there are many challenges such as sustainability issues, and the

danger of “silo mentality” (in which fixing one problem “here” simply shifts the problem “there”) and “organizational myopia” (in which a short term fix “now” gives rise to a much bigger problem to fix “later”) facing the agriculture sector. Since the democratic progresses of many African countries, notably Ghana, there have been a number of interventions to overcome the challenges facing the agriculture industry but with little success. The problem still persists and many budgeted billions of dollars for the agriculture sector have already been spent. The agriculture industry is a complex system economically, socially, and environmentally thus dealing with problems in isolation fails to produce lasting results. A survey and literature reviews was conducted to gather the mental models of all stakeholders involved in addition to the challenges of the agricultural sectors within Africa and for that matter Ghana. Their opinion concerning how the system works, barriers to success and the system drivers, and possible strategies (solutions) to overcome these problems was analysed. This results developed system models for agribusiness sustainability using a “systems thinking” or integrated approach and tools such as casual loop diagrams and Bayesian Belief Network models. Casual loop modeling were used to determine the components and interactions between the policy, social, environmental and economic dimensions to provide insights into potential system behavior and to facilitate leverage points and systemic intervention strategies that are required for sustainable development of the agriculture industry. This will enable and assist farmers, policymakers, researchers and donors to successfully manage the agriculture and food systems so as to strengthen food security, enhance rural livelihoods, and improve environmental sustainability in the context of the challenges arising from agriculture production in Africa. These will also help stakeholders especially governments to anticipate the long-term consequences of their decisions and actions, as well as the unintended consequences of policies and strategies and avoid “silo mentality” and “organizational myopia”. This will further induce innovative agribusiness with an entrepreneurial approach and empower youth to be successful agribusiness entrepreneurs through an innovative-oriented approach.

Keywords: systems thinking; agriculture, Africa, sustainable development

1979

TEACHING COMMUNITARIAN ETHICS FROM SYSTEMIC PERSPECTIVES

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This paper describes and examines a theoretical and empirical proposal for educational practice that appreciate ‘communitarian ethics’ that comes from Eastern (Korean) way of thinking and acting. As a virtual life regards as the good life from McIntyre’s ethical perspective, we offer a theoretical basis for our approach to communitarian ethics that takes place from an experiential approach to social practice, the narrative unity of a human life, and the systemic inquiry to the nature of contemporary society where it needs to reassess where it is going, and how we will build our dreams in future. We explore the nature of the process of action-based learning that examining one’s own actions and learning about the complexity of educational practice from both Western and Eastern systemic perspectives. In particular, we appreciate and present Zhuang-zu (Chuang Tzu)’s theory of Taoism in order to understand social reflective practice. It allows participants to be ‘critical thinkers’ on the given situations.

Keywords: Communitarian ethics; Western and Eastern systemic perspectives; critical thinkers

1982

INFORMATION AND COMMUNICATION IN DISASTER RESPONSE

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Adequate response to disasters is becoming a global need and a social responsibility in view of the seemingly growing number of regional disasters and catastrophes endangering a growing number of people. Disaster mitigation, preparedness, response and recovery are a must.. One of the key success factors for a timely, adequate, and effective response to disasters is information. This implies the ability to acquire timely, relevant, and accurate information and to disseminate it to all stake holders, despite the fact that in the wake of a disaster both acquisition and dissemination themselves might be severely damaged.

Information acquisition must be based on an understanding of the information needs and supply of the various stakeholder in the disaster (government agencies, first responders, emergency control centers, volunteer helpers, victims, general public, and the media). It also depends on the availability of various information sources, human (active response, feedback, passive observation of social media, passive observation of position data) and technical (sensors, pictures, automatic measuring units, …).

Dissemination of information is dependent on appropriate, uninterrupted, and reliable communication channels. Both the ability to acquire information and the dissemination of information might be strongly affected by the disaster themselves or overloaded due to massive enquiries (e.g. in the case of epidemics).

Besides preparing for the actual response to a disaster we need a systemic analysis of vulnerabilities in our society and means to assess actual and impeding hazards and damages in all their dimensions and ramifications. Additionally the design of appropriate communication strategies must avoid or mitigate the impact of disasters on the communication infrastructure.

Fortunately today's information and communication technologies (ICT) can support and improve the above activities, sometimes in ways not anticipated before (e.g. use of social media). They allow for speedy aggregation, simulation, interpretation, and presentation of information as a basis for logistic support for response activities.

Therefore key issues are:

- information needs and access for all stakeholders, including alarms and instructions,
- seamless and uninhibited communication for the handicapped, the helpless, and foreigners,
- wide-area (even global) distance reconnaissance,
- estimating and simulation of immediate and long-term evolution and impact of disasters,
- analysis of the availability, vulnerability, and substitutability of communication channels,
- (semi-)automatic handling of bulk inquiries (during epidemics) etc.

The session will have minute presentations of papers followed by an intensive discussion.

Later in the Conference we will also hold a workshop with the same title, which draws on the contents of the papers presented in the session. Additionally there is already a discussion running on the LinkedIn-In group: Comprehensive Emergency Management Research Network. Contact to LinkedIn-Group: http://www.linkedin.com/ (you have to register).

Keywords: catastrophe, disaster, communication, information, feedback, ICT, systemic analysis, first responders, vulnerability, resilience, disaster mitigation.

1986

ISSS 2013 DAILY MORNING ROUNDTABLE

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Everyone is invited to our ISSS 2013 daily morning RoundTable in Hai Phong, Vietnam!
We meet every morning, 7:45-8:45am, Monday through Friday, July 15-19, near the plenary sessions at the Convention Centre. You are welcome to pick up coffee or breakfast nearby and bring it to the room. Join us every day, or whenever you like.
Our unique format is an eye-opening new practice in democracy. We spend 5 minutes settling in--listening to short clarifying guidelines/readings and the suggested topic. We then spend 55 minutes on individual reflections or learning reports, time distributed equally among all present (e.g. 27 people = about 2 minutes each).
The facilitator and/or group responds to individual comments only with "Thank You" in order to: [1] avoid diverting participants from their own individual learning, [2] support increasing authenticity in comments, [3] promote deeper listening, and [3] allow more and equal time for everyone's comments. Participants are invited to offer longer comments to each other after the session.
Each morning the session is facilitated by a different volunteering facilitator selected from those in attendance. The facilitator-of-the-day suggests a topic of his or her choosing. In the past, our suggested topic for the first morning has been: "What situations and projects did you leave behind to come here, and what could happen here that would be valuable to you in your work and life back home?" On the second through fifth mornings, a suggested second or default topic is: "What did you experience yesterday that was interesting or important learning for you? In what way was it interesting or important?" or "Have you had an "a-ha" moment or perceptual shift during the conference? Please describe it and how you have been changed by it."
Folk wisdom and compelling research indicate that participants experience surprising benefits from this activity after about four sessions. Our own experience with this format has resulted in the following theory: Just as we break the sound barrier when we travel faster than the speed of sound, we break the communication barrier when we hear 25 authentic viewpoints in 50 minutes.

1987

THE ROMAC PROGRAM: MANAGING AND RECOVERING FROM "FAMILY" CRISES IN DEVELOPING COUNTRIES IN THE ASIA-PACIFIC

Shankar Sankaran

This paper describes, discusses and comments on the Rotary Medical Aid for Children (ROMAC) program and its constituent projects supported by the Rotary Organisations in Australia and New Zealand from a crisis and recover from it. The crisis faced by the children cared for by ROMAC cannot be compared to disasters as we know them (natural disasters such as earthquakes or manmade disasters such as nuclear accidents or humanitarian disasters such as an epidemic). The authors would like to classify ROMAC projects as 'family disasters or crisis' for children and their families from developing countries who need lifesaving or dignity restoring surgery and treatment. These families cannot find facilities to for such treatment nor afford to be treated abroad. There is much that we systems scientists, engineers and project managers can learn from the ROMAC programs and projects in dealing with crises and disasters.

Keywords: Crisis Management and Recovery, Complex Projects, Family Crisis, Rotary

1988

EDUCATION FOR EMERGING SOCIETIES

Violeta Bulc, Jacqui Wilmshurst, PhD

Social evolution is showing us some interesting patterns in the behaviour of our society. It seems that we have in some ways trapped ourselves within the structures that we created. Throughout the brief history of the educational systems typical of our time, we have encouraged the development of competences in people that best serve the needs of the structures of the current paradigm in our culture and not the people. It seems that we have been trained and educated to improve technology, processes and organizations as our primary goal, and not the well-being of people nor of the animals, plants or the planet itself. In this article we point out some indicators that are encouraging us to see new patterns emerging that relate to our individual and collective consciousness. In the paper we also share some practical examples that present different approaches to learning. We can sense changes at many leverage points in our society. For example, at the widest level in our ways of organising, ways of learning, ways of understanding, ways of being and ways of doing. We argue that these changes are often provoked by problems and opportunities of an emerging "innovation based" thinking, and by the higher levels of collective and individual consciousness. The paper presents "systemic thinking" as one of the key elements when searching for more effective and sustainable new solutions. It also presents a possible scenario at the higher education level in a connection with the commercial world as viewed by the Challenge:Future global youth, by the authors' experiences from the field (for example corporate environments and local communities) and by the experiences gained from using innovative approaches in teaching.

Keywords: new civilization, leverage points, thinking environments, conscious environments, knowledge, experiences, intuition, innovation ecosystems, 4 ways of knowing, systemic thinking

1989

IDENTIFYING SYSTEM ARCHETYPES AND LEVERAGE POINTS FOR THE PROTECTION OF AQUIFERS IN THE WATER/ENERGY NEXUS

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As the world's population approaches the 9 billion mark (United Nations, 2011) and the demand for energy increases, increased pressure is being placed on freshwater supplies in the earth's 'water/energy' systems. This paper, based on research for the completion of my doctoral dissertation, studies a number of concerns regarding the contamination and depletion of freshwater aquifers as the energy sector continues to grow. To address these concerns, this paper proposes that environmental tax policy, and in particular, ecological tax incentives for aquifer protection – within a socio-ecological systems framework - can play an important role in protecting potable water sources by promoting long-term sustainable practices.

Daly (1996) discusses fifteen principles on sustainable development. Though nearly twenty years old, these principles are as relevant today as they were when they were written – if not more so, now. The principles are integrated into a 'regulatory framework for the protection of aquifers' in this study, in an attempt to link existing ideas regarding 'sustainable development' with new ideas formulated using a systems approach.

The interactions between energy production/usage and potable water supplies is depicted in the paper through a series of systems archetypes, wherein balancing loops are identified as points of leverage for the introduction of ecological tax incentives for aquifer protection. These points of leverage are then identified within the larger framework, where they will later be tested using primary data from various stakeholders (using a grounded theory methodology) in order to discover a theory and themes on the use of ecological tax incentives for water protection.

The study takes an interdisciplinary approach to deal with the multi-faceted dilemma facing the water/energy nexus, and the paper explores the situation using theories of complex open-systems, e.g. (Meadows, 2008; Senge, 1990; Sterman, 2000; Von Bertalanffy, 1969), environmental regulations and tax policy, e.g. (Baumol & Oates, 1988; Di John, 2010; Fullerton, 1997; Gunningham, 2009; Määttä, 2006; Pigou, 1952; Tinbergen, 1952), and resilience, e.g. (Berkes & Folke, 1998; Holling, 1973, 1978; Gunderson et al., 2010; Walker & Salt, 2006). The paper then concludes with the suggestion that economic/environmental policies based on systems thinking will offer a more sustainable and resilient future for the earth's freshwater supplies.

1991

RELIABLE COMMUNICATION - A KEY TO DISASTER RESPONSE

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Adequate response to a wide-spread crisis is becoming a global demand and a social responsibility . Preparedness, disaster mitigation, responses, interventions, and recovery

are a must. The availability of appropriate information is a key success factor in order to respond in time, adequately, and effectively in case of crisis. Several key abilities are needed to fulfill the above goal:

Data acquisition to acquire relevant and accurate data without delay from any adequate source, based on an understanding of the information needs and supply of the various stakehol- der (government agencies, first responders, emergency control centers, volunteer helpers, victims, general public, and the media). This also depends on the availability of various information sources, either human or technical. Judgement of the veracity and importan- ce/scale of reported facts and observations is often problematic.

Collection, processing, and interpretation of data from any available source. This requires basic understanding of the mechanisms of different types of disasters and the appropriate models and/or simulation tools. Pattern recognition in pictures, data mining, comparison with other similar disasters, and similar activities are needed. Suggestions and responses from victims and helpers have to be considered.

Dissemination of information to all stake holders based on appropriate, uninterrupted, and reliable communication channels. Both the ability to acquire information and the dis- semination of information might be strongly affected by the crisis itself. Channels may become overloaded due to massive speech traffic or enquiries (e.g. in the case of epide- mics), damaged by terroristic attack, or disabled by a general blackout.

Interaction and feedback to provide inter-communication and feedback as fast as possible between different stakeholders, yielding better, faster, and more targeted responses. Soli- cited and unsolicitated (e.g. from social media) responses should involve all stake holders (including victims and robots!).

Recording, archiving, and analyzing of relevant data for later learning, disaster prevention, and for decision support in future crises.

All this has to be accomplished despite the fact that in the wake of a crisis needed facilities might themselves be severely incapacitated or damaged, especially communication and dissemination facilities.

Today's electronic media are able to support and improve the above activities, sometimes in ways which have not been anticipated before (e.g. use of social media, pattern recognition, data mining, etc.). It is necessary, however, to plan and prepare this well in advance of potential disasters and provide alternatives and fallbacks, especially since the disaster may damage and disable the very communication and information sources needed.

We will discuss, based on the above needs, the communication means that are vital during the various phases of a disaster and the ways to ensure maintaining communication despite the impacts of the disaster.

Key issues will be:

- Design of a complementary communication structures.
- Empirical analysis of the communication needs, requirements, and behavior.
- Seamless and uninhibited communication for individuals with special needs or disabilities.
- Handling of bulk inquiries.
- Wide-area situation evaluations at a distance.
- Reducing bandwidth requirements.
- Increasing the safety of relief workers.

The paper will draw on sessions and workshops of previous ISSS Conferences: Brisbane 2009, Waterloo 2010, Hull 2011, San Jose 2012.

1994

SYSTEMATIC PLANNING FOR THE MEXICAN SATELLITE SYSTEM

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A systematic planning model for the Mexican satellite system consisting of the analysis of a domestic and international satellite system was diagnosed using SWOT (Strengths, Weaknesses, Opportunities, Threats) it´s mission, vision, values and strategic objectives were proposed and the strategies raised by the following combinations of SWOT: SO, ST, WO and WT. Finally, the plan of action and the feasibility of carrying it out were proposed.

Based on analysis and diagnosis one of the great strengths found in the country is the development of special scientific research, but it is isolated and therefore tends to establish humanist satellite companies to promote and preserve ecology and self-finance public and mixed wealth or private initiatives that systemically integrate basic and applied science among other companies which are engaged in the design, construction and launch of satellites with the purpose of contributing to technological development. This provides an efficient, fast, safe and cheap way to meet the demands of domestic and international users.

Keywords: Systemic Planning Model, Mexican satellite system, SWOT, scientific research, technological development.

1995

THE IMPORTANCE OF THE RURAL TELEPHONE LINE SATELLITE IN MEXICO

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This work is aims to study the importance of the rural telephone line satellite in Mexico, for the period comprising the year 2000-2012.

The rural telephone line satellite service is provided by the government and private companies. The work is focused on the service provided by the Federal government for Mexican localities whose population density is in the range of 60-499 people, where cellular and fixed service does not exist. This has been achieved by targets set in the National Development Plan, 1995-2000.

First, data was obtained from the Secretariat of Communications and Transportation (SCT) which shows as has been for the rural telephone line satellite in the years mentioned above, and based on the data performed a first hypothesis which states that this service has decreased because rural areas have declined.

Information was taken from the National Institute of Statistics and Geography (INEGI) which showed that rural areas in the country have increased over time. This data was included from the years 1995 to 2010, so our hypothesis was rejected. Following the refuted hypothesis, we made a second scenario on which we are working, in which it is argued that rural telephony has declined due to commercial phone penetration (mobile and fixed).

Keywords: satellite telephony, rural telephony, Mexico, rural commercial telephony.

1997

R & D PROJECT SELECTION IN ENTERPRISES, UNIVERSITIES AND RESEARCH INSTITUTES

Elvira Avalos Villarreal

Technological Development is one of the main country goals. In order to be successful in this goal it is necessary not only to have a good technological plan but execute it. This is possible if a technological plan consists of a set of entrepreneurial or academic; feasible and profitable projects. In this paper a structure to carry on that plan, the way to build a technology foresight framework and a discussion about the project selection are presented.

Governments have to allocate funds for R & D projects to enhance some prototype designs. The criteria for that selection in universities and institutes are proposed also in this paper.

Key words: R & D Projects, applied research.

1999

CONVERGENCE GATHERING AS AN EXAMPLE OF A MEDIUM SCALE ACEPHALOUS GROUP

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We face increasingly complex issues today, many of which may be critical to our survival. If we are to survive, thrive, and find new ways of being, we need to be experimenting with innovative ways of organising ourselves to increase our adaptability and resilience.

Top-down hierarchical organisations have become the norm to the point where we rarely consider alternative ways of organising ourselves even though they divide people against each other and impose power differentials. As we gain an insight into the coercive nature of our organisations we begin to seek alternatives that might be more wholesome and humane.

A group mainly living in the South Island of New Zealand called Convergence is exploring alternatives that have much in common with systems principles. It is an acephalous group, in that it has no structured leadership, and yet over three hundred people have been able to gather together as a co-creative alternative community for five days every year for almost thirty years. Avoiding the divisive distinction between management and worker, Convergence has developed a distributed, transient, self-selected leadership style so the group acts more like a forest or a brain without central control that has proved to be robust. This paper explores the organisation of Convergence from a systems perspective to find its strengths and weaknesses, and its applicability to other groups.

Keywords: complex system, organisation, acephalous, co-creation, unstructured leadership

2000

IDENTIFYING THE ARCHETYPES OF AN ENHANCED SYSTEM DYNAMIC CAUSAL LOOP DIAGRAM; FINDING STRATEGIES TO IMPROVE SMALLHOLDER BEEF FARMING IN JAVA, INDONESIA

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More than 70% of the national beef herd of Indonesia is controlled by smallholders, who therefore play a vital role in beef cattle development programs. This paper reports on a study into disappointing results of recent government policy initiatives on practices of smallholder beef farmer groups in rural Java, Indonesia. Despite funding aimed at increasing the national beef herd and domestic beef production though enhancing smallholder productivity, perverse effects of declining reproductive rates and breeding cow numbers are being observed. Smallholder beef farming is a complex system. It involves multiple actors including farmers, farmer groups, farmer households, researchers, government officers, and traders. The interactions of these stakeholders are characterised by power asymmetry, whereby smallholders, whether as individuals or as members of groups possessing social entity, experience less power and access to privileges than other actors. Therefore, as a complex system, smallholder beef farming needs to be studied using not only a systems thinking approach but also one that recognises multi-perspectives and acknowledges power asymmetry.

In the body of systems thinking, System Dynamics (SD) is considered to be a powerful tool, as it enables the construction of rigorous models and visualisation of the causal linkages among variables that might influence the system's performance. One of the fundamental essences of SD is the identification of system archetypes: generic systems structures describing the common dynamic processes that characterize the behavior of the system. System archetypes provide simplified insights into the system's structures. Analysing system archetypes can assist in the identification of system leverage points, i.e. the places where an intervention should have the most influence on systems behavior.

However, when dealing with a social entity like smallholder groups, SD is considered to be a researcher-centrist methodology, as it lacks the instruments to engage multi-stakeholders' perspectives which are likely to be varied, and is insensitive to the issue of societal power structures. This paper reports on research in which these deficiencies are addressed through complementary application of Soft System Methodology (SSM), which has strength in acknowledging multiple perspectives, and emancipatory Critical System Heuristics (CSH), which can explicitly address power asymmetry, in an effort to enhance SD.

A series of interviews and workshops was undertaken to identify the problematic situation of smallholder beef farming in Java. The main research instruments of Rich Picture development, CATWOE analysis of SSM, and the 12 boundary critique questions of CSH were applied sequentially in the problem analysis stage, resulting in a four dimensional structure incorporating motivation, power control, knowledge and legitimacy. Applying SSM and CSH ensured that the perspectives of all stakeholders, including those of the less powerful, were acknowledged, thereby enriching and enhancing subsequent SD modelling.

The structured problematic situation was then used to guide investigation of variables which were thought to be contributory. The results were visualized in a conceptual model which was then translated into a causal loop diagram (CLD) consisting of 17

reinforcing and 13 balancing loops which map the feedback loops of the 4 dimensional situation of the smallholder beef system.

The CLD was then investigated to identify the system archetypes. Four archetypes were identified: fixes that failed, limits to growth, success of the successful, and tragedy of the commons. The nature of each archetype is described, and the implications for identification of the possible system leverage points are discussed.

Keywords: Systems Dynamics, Soft System Methodology, Critical System Heuristics, Smallholder, Beef Farming, System Archetype

2001

MECHANISMS FOR UNDERSTANDING MENTAL MODEL CHANGE IN GROUP MODEL BUILDING

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The group-level goals of group model building have previously been described as alignment of mental models, consensus and commitment to a decision. Several explanations have been proposed to explain these changes. This paper tracks participants in four group model building interventions where delayed evaluations suggested that lasting mental model change had occurred. Semi-structured interviews were used to explore how participants' believed that the workshops changed their thinking. The results are compared with proposed mechanisms for mental model change: operator logic, systems thinking, modelling as persuasion, and boundary objects. Although individuals typically possess incomplete insight into their own learning, interview results support the boundary object model as most consistent with participants' own recollections. The boundary object model may provide useful insights for designing systems interventions to create mental model alignment.

2003

SYSTEM THEORY AND OUR MINDS – A SYSTEMIC WAY OF UNDERSTANDING OURSELVES, EACH OTHER, THE NATURE, THE PAST AND FUTURE POSSIBILITIES

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The application of system theory requires the understanding of ourselves, each other, the nature, the past and future possibilities in a systemic way. That is, we need to understand both the structure and dynamics of our physical body systems, and of our mental observers. Research shows that the composition of our body and that of our mind may be explained by the same system theory relating energy, matter, life and information. We employed this simple ancient system theory as taught by Buddha to investigate how our naturally systemic-structured mind artificially developed all this non-systemic and problematic thinkings. 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 observers,decision makers, systems, the environment, the boundaries and the relationships among 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 constrains of a system that drive the system into a particular desired steady state with a low entropy.

Our mind are both the observer and the decision maker with a major problem. Throughout our life we have been looking for satisfaction that brings happiness. Our government have been relying on economics to achieve this but 80% of the time we are dis-satisfied 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 steps namely self protection, concentration and purification of our mind. We also investigate a 10 days 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.

Death is the end of our lives or just the beginning of another new life? A system undergoes a transition of system state upon death, but will the system continue in other forms at other 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.

Heaven and Hell, Nibbana(Null), Life and Death, happiness and harmony, purification of our mind, Vipassana mental healthcare, Buddha, organizational force, entropy, second law of thermodynamics, energy matter life and information, natural systems

2004

HEALTH AND SYSTEM THINKING - A SYSTEMIC WAY OF MAINTAINING OURSELVES, EACH OTHER, AND THE NATURE

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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 an 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 but different importance ratio is allowed.

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 the application of 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 analysis of 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

Healthcare is our first system employed to maintain human. This workshop will introduce a systemic maintenance program called Traditional Chinese Medicine Healthcare Protection Program which is simple and effective for promotion 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. A 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:

1. the TCM diet on how to choose food from the Cold-Hot food spectrum,
2. the Middle-way exercise therapy on how to regulate our body and Chi (Qi) from the fully Open-Close movement spectrum,
3. the TCM 24h healthcare lifestyle on how to use our health wisely for work and fun from the Human-Environment spectrum.

Keywords: Middle-way exercise therapy, Healthcare Protection Program, Taichi Yin-Yang system theory, Traditional Chinese Medicine, Reductionism, System maintenance, Heath and System thinking

2005

INTENTION ON INTERVENTION: A CONCEPTUAL MODEL

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Intentions serve multiple roles in human action. They help in making sense of our actions and those of others, and on this basis, coordination is possible. They cause, guide and sustain our actions. Additionally, they are about the present when we do act intentionally, but also they are about the future when we intend to do something later. From the aforementioned characteristics, it can be argued that intentions can have a fundamental part in organizational interventions. Based on this assumption the paper proposes a model to make use of intentions on interventions. It aims to help in describing, conducting and learning about intervention processes. The model uses the graphical language advanced by the Soft Systems Methodology. The concept of intention and the assembling of the model, draw from Philosophies of Action, Language and Explanation and by the Theories of Relevance, Boundary Critique, and Complex Adaptive Systems.

2007

GENERAL SYSTEMS THEORY AND SPIRITUAL AND RELIGIOUS SYSTEMS

Somasundaram Rajendran

General Systems Theory has become a useful model to understand human behavior and also every thing in the whole universe. It has provided a more meaningful World View as it has unified all human knowledge about all aspects of living and non living part

of the universe. Prior to Renaissance in Europe the world view of people in different societies and cultures were more mythological, magical, superstitious and religious. Since Renaissance gradually the world view became more objective scientific model to explain everything in the universe including human beings. Such a scientific model has helped to advance in understanding of the material physical world and contributed to rapid development of technology and Industrial and later Information revolution. In the early part of twentieth century the limitations of such a reductionistic mechanical analytical model was recognized especially in biological science. So a new interacting Systems Theory model was introduced especially in biology. Later such a model was found useful in understanding of all fields of studies of living and nonliving things in the universe. As a result a new Systems World view has emerged. According to which every thing in the whole universe can be studied as organized entities or systems that has parts as sub systems interacting with each other and also the whole system interacting with other systems outside of that particular system and form more complex and higher systems. In that model every thing, including human beings are connected with each other directly or indirectly and influence each other systems at various degrees. So this model unifies everything in the universe. According to systems theory human beings are part of universe as a whole system and have sub systems of body as a biological system and mind and behavior as psychological system and by interacting with other human beings form social systems of family, community and nations. Such a model helps to understand human experience and behavior more completely. As the systems theory has developed attempts have been made to explain ultimate philosophical questions like the meaning of life, morality, suffering, death and immortality which may be important issues for many human beings. This paper proposes to include a highest level of all systems called Transcendental system that is different from religious systems that are part of social system. The controversies related to this system and arguments in favor and opposing views will be discussed. The purpose of this paper is to stimulate more discussions among the active members who are involved in developing further General Systems Theory in all directions.

2008

THE GENERAL THEORY OF METADYNAMICS SYSTEMICITY PART 5: MECHANISMS DRIVING THE “SURVIVAL METADYNAMICS SYSTEMICITY”

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The General Theory of Systemicity is being published - part after part since 2004 - from after the application of “The Bioethism Transdisciplinary Paradigm” that the author J.-J. Blanc developed since 1996. Made from an extensive research on "Systems science" that induced to his developing a new systemic paradigm, it was termed as a transdisciplinary approach to "Living systems" he named “The Bioethism”. A paradigm that is meant to support the acquisition of a large understanding on living systems' as naturally structuring and behaving for survival while adapting to their milieu.

The "Cosmo-planetary and terrestrial metadynamics systemicity”, the “Life’s metadynamics systemicity”, and the "Biological survival metadynamics systemicity" processes are the core of the General Theory, which, resulting from a large research and approach of the whole set of universal metadynamics and their retroactivity, shows their interrelationship and interdependency. The systemicity of their atomic and

molecular cycles has made and sustains both cosmic systems and Life on planet Earth. As to exist, living creatures replicate and evolve within global, glocal and local permanently changing endogen milieu and external environmental ecosystems.

The Universe Cosmo-planetary gigadynamics and metadynamics systemicity have participated in the Sun and its planets to form, and particularly Earth orbiting around it on a right “habitable green zone”. The General Theory shows the close links between Cosmo-planetary and terrestrial meta-dynamics systemicity, its forces, fluxes and moves cycles that made Life to have happened and thriven. From proto-organisms to humans, their individualities, social traits and behavioral statuses have accounted for the biodiversity of species developing or getting extinct over billions of years.

For example, when the Earth became a "snowball" from a nearly total glaciation (-600 Mo/y), the survival of some bacteria and micro-organisms escaping the drastic extinction of most species, conversely boosted up an extraordinary explosion of marine species bearing quite new functions (- 545Mo/y), that after volcanism reheated the planet from the systemicity of interrelated terrestrial and cosmic metadynamics.

These metadynamics are the main physicochemical cosmic, galactic, stellar, planetary and terrestrial feedback processing atoms to participate in forming matter and cosmic objects (nebulae, baby stars, stars and planets), within a molecular world as originated from after the “Big Bang”.

Influenced with a certain number of forces, and going towards specific directions in the environment, Life as a whole is confronted with gravitation, electromagnetism, chemical and physical phenomena…, particularly temperature and the “thermodynamics of entropy”, all being forces and fluxes which driving diversity is concomitant.

Furthermore, Life is confronted with the driving of terrestrial dynamic cycles of water, minerals, and climates which currents drive ecosystems metabolism.

Among drivers are the coalescence, conjunction, co-evolution, convergence, symbiosis, percolation, phase transition and threshold output, neighborhood adaptation. Then feedback drives universal atomic, molecular and physicochemical worlds permanently provoking the evolution of the several metadynamics systemicity cycles.

The specific bonds and traits of structures and behaviors as well as the evolution trends of “surviving living creatures” require some knowledge about actions-reactions (drivers) with ago-antagonistic signals and stimuli emerging from their ecosystemic and socio-systemic metabolism and environmental conditions. Since resulting in some sort of a confrontation between the body milieu and the natural environment, the narration and treatment of a general information refers to the fundamental “survival metadynamics systemicity" and “its drivers” like “symbiosis” and “feedback” as processing stimuli and signals to sustain their metabolism balance from both internal and external changing conditions.

Part five of this theory only describes some drivers: symbiosis, coalescence, convergence and synergy, percolation, phase transition, threshold output, feedback… that permanently influence the systemicity of cosmic matter, objects and things interacting among the universal networks of the 3D worlds. Feedback driving the survival metadynamics systemicity sustains “the atomic and molecular cycles from cradle to grave”.

Keywords: survival, metadynamics, survival, symbiosis, feedback, entropy, metabolism, synergy, convergence, coalescence.

2009

COMPLEX THOUGHT AND SYSTEMS THINKING CONNECTING GROUP PROCESS AND TEAM MANAGEMENT: NEW LENSES FOR SOCIAL TRANSFORMATION AT WORK ENVIRONMENT

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This paper proposes some discussions about group process and team management in a different paradigm than the classical theories. We recognize an important trajectory made by both strategies, groups and teams, acknowledged here as living systems in our postmodern society, and we were willing to understand why, at some point, teams were elected as “a group with better performance or development”. Teams thrive in our zeitgeist in different ways since it is a strategy that affects almost the entire active working population. We can say there is a desire for having work made through teams nowadays, even for those who work from home or in virtual teams. On the other hand, groups have been used for social change in many ways. When well-known authors write “from groups to teams” it is possible to see a position taken within one perspective, mostly from Management. In different disciplines of Humanities, a group – thought as a social strategy – is not called a team – understood as an enterprise strategy – to build the results they are looking to achieve. To integrate often isolated areas of human, economic, social and sustainability knowledge, we propose to think different possibilities on how to understand what happen in group process, what a collective can produce for itself and for the environment. We based this paper in three bodies of knowledge. For didactic purposes we present them in a sequence, but they are like a web, composing each other as an integral systems approach. One body is Complex Thought of Edgar Morin as our method of research, especially as we explore three principles of complexity (dialogic, organizational recursion, and holographic) and the concepts of comprehension and explanation. Second, we discuss systems thinking properties applied to living systems (interaction, interdependence, autonomy and dependency, organization and self production). Third, we connect some thoughts based on the work of Deleuze and Guattari around rhizomic structures in organization development as a mode of knowledge, nonhierarchical or centered, and a possible understanding of a current model in our highly interconnected society – alliances in movement. We propose an exercise to think group process through these three lenses presented. We understand group processes based on Seminotti (2006) as immaterial human capital with effects on the intra and interpersonal construction, and seek more comprehension so that their effects converge towards the human development, integrating different dimensions of nature-life-work that cannot be isolated. To incorporate dialogic into dichotomy, organizational recursion into linearity, holographic into unity is a path that allows the expansion for the homo sapiens-demens-faber in other roles in life. We defend we are in an epoch when we can surpass this linear thought of “group then team”. There is a political and economic implication to connect groups and teams, since team members are exposed to group process and sometimes they do not know how to deal with it. Also, if teams at work have access to group process we can prospect another level of right livelihood, self reflection and self production for its members, ergo, to our society. No matters which living system we are talking about, groups or teams, we are facing – hologramatically – concepts for the sake of a sustainable society with an ultimate desire of contributing to social transformation.

Keywords: group process, groups, teams, complex thought, systems thinking

2010

CONSTRUCTING A CLIENT RECRUITMENT SYSTEM FOR RURAL MYANMAR UNBANKED PEOPLE TO ACCESS PACT MICROFINANCE INSTITUTION

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When traditional financial institutions fail to provide financial services to the poor, microfinance fills this gap and helps poverty reduction by supporting self employment. Microfinance institutions provide loans to the poor, unbanked people, without collateral using group based lending methods as social collateral and strict rules and regulations. When these rules and regulations are discrepant with the situations of the rural Myanmar unbanked people, 50% of them could not obtain the loans. This research finds the discrepancies of the rural Myanmar unbanked people with current operational procedures (COP) of Private Agency Collaboration Together (PACT), explores the idea to solve the above discrepancies and draw a system that can help rural Myanmar unbanked people to access PACT MFI. This client recruitment system includes four sub systems entitled, inquisition, adjustment, knowledge contribution and impact assessment system. These systems support not only improving the lives of the rural Myanmar unbanked people by accessing PACT but also the rural development and poverty alleviation action plan.

Keywords- microfinance program, poverty, unbanked people, legal rules and regulations, operational procedures, client recruitment system

2013

STUDY ON A MODEL FOR TEACHER PROFESSIONAL DEVELOPMENT IN VIETNAM BASED ON KNOWLEDGE MANAGEMENT

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The purposes of the study are to propose a new effective model for teacher professional development and examine the model's effectiveness in Vietnam condition. As the first step of the study, the paper proposed a teacher professional development model, which is based on knowledge management in blended learning environment and pointed out how to validate it. The model is designed based on four knowledge management processes namely knowledge co-creation, knowledge internalization, knowledge sharing and knowledge evaluation. The knowledge in the model is co-created by the participatory method of learning community members. The teacher professional development process is based on the constructive approach that including activities as follows: self-paced learning, knowledge sharing, observational learning, peer evaluation, reflection, group discussion, and feedback, etc. The learners will receive the on going supporting, mentoring and coaching processes among community members. As the result, a lifelong professional learning community and a secondary school teacher network are established and developed.

2014

SYSTEMS APPROACHES TOWARDS UNDERSTANDING THE BARRIERS TO INNOVATION ADOPTION IN THE AUSTRALIAN BEEF INDUSTRY

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The Australian beef production is the country's second largest agricultural industry which extends over almost half of the Australia's land mass and across all climate zones. The beef industry not only adds AU$ 8.1 billion gross production value to the economy but also contributes 15% of the total farm export value between years 2011-12. The Australian beef industry is also exportation oriented with 65 percent of beef products is exported, being the second largest beef exportation country in the world, just after Brazil. A healthy beef industry is therefore essential to Australia's economy, society and environment. Under the current pressures from international competition, increasing cost of production, fluctuation of beef price and world economy downturn, the Australian beef industry has to rely on productivity growth to be viable and profitable. A report from the Australian Bureau of Agricultural and Resource Economics pointed out that the growth of Australian agriculture productivity is mainly based on the successful adoption of various innovations during the last three decades. However, research also revealed that the innovation adoption levels within the Australian beef industry are only about 25 percent together with a time lag in the order of 5 years and longer on average. This result reveals the promising opportunity that a significant productivity increase can be achieved by improving the innovation adoption across the Australian beef industry. Identifying what the barriers are to the innovation adoption in the Australian beef industry is therefore of critical importance, especially considering the natural, social and environmental conditions in which the beef industry is operating.

Extensive research on innovation adoption in the beef industry has been carried out in the past. However, two common weaknesses of previous research were identified which are the lack of a holistic approach and applied methods – leading to the incapability to cope with the complexities and dynamics of innovation adoption process. Thus a systems approach is urgently needed to form a deeper understanding of the dynamics of the innovation adoption system and to uncover the complexities within innovation adoption process in the context of the wider domains of the beef industry. This research employed a systems thinking approach to investigate the root causes of adoption failures, rather than identifying and addressing only the symptoms of low innovation adoption.

Based on field work conducted with beef businesses across Queensland, Australia this paper reports on the findings of the systemic analysis of its innovation adoption system. This systemic analysis is founded on a systems modelling of innovation adoption system at beef business level. Analysis led to a deeper understanding of systemic structures and mental models of key stakeholders of the innovation adoption system. Without surprise the identified barriers to the innovation adoption in the Australian beef industry were quite different from those drawn by non-systems based approaches.

Keywords: Systems approach, systemic analysis, innovation adoption, Australian beef industry

2015

ENABLING CREATIVE EVOLUTION THROUGH SYSTEMIC INNOVATION

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At the 40th anniversary of Limits to Growth at the Smithsonian, Dennis Meadows submitted that it is too late for sustainable development; it is now time to secure resilience, i.e. to avoid collapse. The first question asked on the panel was—How can we secure resilience? We show that this question can be answered proactively: By tapping into a vast and vastly underused resource—creative evolution, of humans, culture and society, through a practice we are calling systemic innovation. Urgent need to mitigate large global risks can be answered by fostering even larger global opportunities. We make this proposal concrete by discussing eight systemic innovation projects, currently active in Knowledge Federation,

Building on Erich Jantsch's insight that creative evolution—and other positive manifestations of life including thriving—are natural and happen spontaneously when what hinders them is removed, we undertake to identify the hindrances and develop practical removal strategies. We model the results of our quest as a collection of patterns (abstract relationships, involving hindrances, leverage points and suitable strategies) and systemic prototypes (where the patterns are implemented), which are tested in practice and continuously improved.

A hindrance to creative evolution is our habit of perceiving the existing social order as the (immutable) reality. The Key Point Dialog project develops: a prototype dialogical practice, taking place in physical space and in cyberspace, by which a community can re-create its perception of reality; a prototype worldview in which we see ourselves wasting spectacularly large amounts of time and other resources by entrusting the effects of our daily work to shockingly ill-conceived systems. Systemic innovation emerges from this worldview as a natural and timely way to improve our condition.

Disciplinary organization of knowledge work hinders us from focusing our creative attention on contemporary issues. The Knowledge Federation project develops: the transdiscipline as a remedial organization; knowledge federation as a remedial knowledge-work practice; Knowledge Federation as an institution dedicated to recreating knowledge work.

In its capacity to create systems, entrepreneurship tends to be restricted to ventures that suit the existing order. The Game-Changing Game project creates: a remedial organization of entrepreneurship; the game-changing game as a generic and practical way to change systems. Specific game-changing games are created in key domains.

The Foundations Game-Changing Game alleviates the hindrances imposed by reductionist science and mechanistic worldview. Information and knowledge work are perceived as core components of societal systems and created accordingly. Tesla and the Nature of Creativity and Federating Sheng Zhen Gong prototypes develop practical ways to federate high-impact insights from sciences and world traditions.

The Journalism Game-Changing Game develops a prototype public informing that is continuously re-created (by a suitable transdiscipline) to suit society's needs. The current prototype enables systemic insights and action; it allows the public, researchers, journalists, media artists... to become contributors in a well-organized collective mind.

The game-changing games in education and health aim at similar changes. Programming the Web project develops methodology and tools for systemic innovation.

Two patterns, the next Renaissance and Jantsch meets Engelbart, permeate all projects. The next Renaissance is a compendium of memes that manifest and inspire the spirit of daring and responsible-playful change. Jantsch meets Engelbart points at vast opportunities for systemic innovation that are reachable by combining systems science (to provide theory and directions) with networked knowledge media design (to provides tools and materials). Our intention when presenting this work is to extend an invitation to the ISSS community (a representative of the former) on behalf of Knowledge Federation (a representative of the latter) to develop those opportunities together.

2017

UN-SAFETY: SYSTEMS PATHOLOGY OF THE FUKUSHIMA NUCLEAR CATASTROPHE

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The magnitude 9.0 earthquake and tsunami that struck northeast Japan on March 11, 2011, were unavoidable natural disasters, but we consider the subsequent breakdown of the Fukushima nuclear power plants to be a catastrophe created not only by nuclear engineering systems but also by avoidable organizational errors – principally, neglect of nuclear safety issues without the necessary regulation both within the electric companies' management and from the level of governmental policy making. The present paper reviews, firstly, a complete re-thinking of the non-rational locations of atomic power stations, secondly, an analysis of the irrational decision-making of safety management and nuclear policy, finally, a rational proposal concerning the fade-out of nuclear power throughout the world. These proposals are made with a view to obtain sustainable decision-making for the future, not simply in light of the supply and demand of electrical power, but also in consideration of environmental aspects including the social system and the ecosystem. This article is not criticism against the electric company and their government.

Keywords: organizational disaster, limits of administration, sustainable decision-making

2022

A DIDACTIC TOOL TO TEACH AN INTRODUCTION TO SYSTEMS SCIENCE

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We present a brief description on a teaching-learning process of Systems Sciences using the proposed structural approach published in the Journals ISSS of the 55th Conference.

The proposed structure follows the domain of Science Model developed by Warfield that helps to integrate in four main components all the body of knowledge of Systems Sciences as follows:

- The domain of Systems Science
- The conceptual space and language of Systems Science
- The theoretical relations within Systems Science
- The methods of Systems Science

At the end of the paper we present an application of the didactic tool.

Keywords: Systems, Science model, domain of Systems Science, concepts, theory, methodology

2023

ENGAGING TO HARNESS COMMUNITY CREATIVITY FOR SUSTAINABLE URBAN PLANNING

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The study reflects on different approaches to public participation in the highly complex field of urban planning. It is based on research, personal experience, case studies and theories. Engagement principles are discussed and recommendations made for harnessing community creativity to achieve sustainable planning outcomes for current and future generations.

This exploration is triggered by several factors, primarily: a realization of the shortcomings of current approaches to urban planning to create healthy, integrated, liveable and sustainable communities; increased pressure by those citizens whose lives are affected by planning outcomes to influence planning decisions; and the concurrent increased focus by the Australian government, across all three tiers, on engaging citizens.

These factors in turn are to a major extent driven by the effect of technological advances on communications, which is increasing communities' access to information, fueling the social media revolution and providing ever-increasing potential options to include more voices.

Approaches to urban planning and their outcomes are affected by key issues of democracy and participation in public policy making at local and regional level, the role of the private sector and the balance of markets, government and civil society.

The political system focus on short-term benefits (Hoggett), a containerized approach by government, and a heavy reliance on the market to deliver government policy, results in much urban planning failing to recognize 'the relationship between our choices now and their consequences tomorrow' (Integrated Design Commission) particularly in terms of sustainability.

Increasingly, governments, planners, architects and communities are realizing that 'Sustainable communities cannot be designed using the same methods that produced unsustainable ones' (Condon). Also, gradually, the focus is changing from seeking solutions to identifying problems and understanding how everything inter-connects (IDC).

Urban developments can take decades to plan and deliver, and therefore need a flexible, holistic approach to respond to changing conditions, multiple stakeholders and 'the multiple layers and components of social systems' (Sarkissian et al). There also is no one way in which to plan and design the urban landscape and no one way in which to engage.

At the heart of both planning and engagement needs to be creativity, 'using methods that honour people's individual and collective knowledge about their lives and their environments' (Sarkissian & Hurford).

In identifying creativity as the key to a better future, McIntyre-Mills argues that 'policy and practice needs to consider social, economic and environmental implications for all life' (McIntyre-Mills) the challenges of which 'are unprecedented' (McIntyre-Mills) and she asks 'Can we design systems and technologies that sustain a future environment, or will we design systems that destroy our future?' (McIntyre-Mills).

This raises the question of whose creativity can and should be harnessed, and how. It is neither a task for government alone, nor for experts across the public and private sectors, to determine how communities and individuals should live. Recognising this, the

Premier of South Australia, said recently that community engagement is key to achieving liveable, sustainable urban development.

Analysis of the engagement approaches all emphasise that we citizens 'are the dots and we are the interconnections. They are one. We make or break the connections' (McIntyre Mills & de Vries). Engagement also needs to be guided by principles to determine both the process and the outcomes and to be 'as open and transparent as possible' (Cook).

McIntyre-Mills recommends development of 'a cycle including discursive democracy, deliberation on areas of concern – such as the multiple and complex issues associated with urban planning – based on structural dialogue and then voting on decisions' (McIntyre-Mills & de Vries). The recommended mix approaches to public participation in urban planning explored here can contribute towards achieving that objective.

2024

BEYOND THE "BLACK BOX": RETHINKING THE USE OF MODELS IN THE MANAGEMENT OF SOCIAL ECOLOGICAL SYSTEMS

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Models of social ecological systems are maturing as significant time and effort is focussed on modelling the complex adaptive behaviour of systems with a view to support environmental policy making and management. Yet their actual use in policy and management falls far short of expectations. Practitioners often discredit models as being too simplistic, unrealistic in the face of uncertainty, expensive and disempowering due to a lack of transparency about the assumptions made. While acknowledging these views, we maintain that models can play a critical role in the management of social ecological systems. In this paper, we review the rationale (and critiques) for modelling before comparing different approaches and the purposes they serve. We argue for both modellers and environmental practitioners to rethink the use of models beyond prediction, exploration and learning. When faced with high uncertainty and risk, intuitively designed models can offer practitioners an alternative to expensive or risky policy experiments. By adopting a culture of "reuse and recycle", modellers can create opportunities within models for synthesizing new knowledge with existing knowledge and research output, and thereby alter perceptions of the worth in investments made on modelling activities. This would entail striking an appropriate balance between portability and local context. Moreover, models can serve as tools for integrating disparate conceptual frames, expectations and practices that divide the natural and social sciences, thus creating a common language and a unified purpose for research effort across disciplines and an increase in the uptake of research output by practitioners.

2025

LIFE CHANCES OF CHILDREN AND YOUNG PEOPLE IN INSTITUTIONAL CARE IN SRI LANKA: A CRITICAL REVIEW OF POLICY AND GOVERNANCE WITH REFERENCES TO CASE STUDIES.

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One in every two hundred children undergo alternative care in a children's home in Sri Lanka, denied of basic human rights by being deprived of parental care and by being labelled orphaned, abandoned or destitute. These figures are unnecessarily poor considering the abundant moral ethics of this multi-religious and diversely cultured state. Why does Sri Lanka need institutional care for children? Do these institutions, which have been established for alternative care, satisfy the requirements of children's rights, and do they support the quality of life required by these children? Furthermore, do these institutions enable the re-integration process of institutionalized children wherever possible, giving them opportunities to develop their future life chances through education and vocational training? In this paper I answer these contemporary issues through a critical review of the policy environment and the governance practices of these institutions with reference to specific case studies.

My field study was carried out across all nine provinces in Sri Lanka, involving policy makers and service providers of institutionalized children. All nine commissioners of the provincial departments of probation and child care services were interviewed to gather information on policy implications and their role in the policy making process. All probation officers, child rights promotion officers, matrons and wardens of all 416 children's homes were included in a census approach. Of these, approximately half responded. Information was collected via a questionnaire. Thirty managers from different children's homes were interviewed to ascertain information with regards to their service provision.

My systematic approach in the field has enabled me to reveal many facts about policy implications and service provisions across institutions that are set up for alternative care of children and young people. In this paper, I present the initial research findings regarding the quality of life and the enhancement of life chances of children in alternative care in Sri Lanka. Further, it will also provide direction to policy makers and service providers on the governance of institutions to support children, enhancing their life chances. This is inclusive of their natural birth environments, their institutionalization period and after they have been re-integrated into their societies. This set of guidelines can maximize the potential of these institutionalized children and is well suited to this year's conference theme, "Curating the conditions for a thrivable planet" as the well-being of children and the planet are aligned. A critical approach to maximizing the potential of institutionalized children will, in turn, enable them to positively contribute to the emerging "global eco-civilization".

2026

TAMING THE BEAST: HOW AMERICAN CORPORATIONS UNWITTINGLY CONSPIRE TO MAKE BULLYING A RATIONAL CHOICE

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Although their approach is widely criticized, it is fair to say that bullies represent a functional part of many organizations. They come in all shapes and sizes, all ages and

both genders. Bullying is targeted and abusive behavior. It is personally destructive and should have nothing to do with advancing legitimate organizational goals. Despite its negative connotations, though, anyone who works in an American corporation can easily see that arrogant and abusive leaders are frequently rewarded with promotions, increased pay and bonuses, as well as more power and influence. In a nutshell—bullying pays off. This paper will examine the ways American corporations unwittingly conspire to make workplace bullying a rational choice.

We will explore the dynamics of the problem from three perspectives: (1) individual—the unique characteristics of individual bullies, (2) situational—the influence of the corporate situational context, and (3) systemic—a view which poses larger questions about the nature of the social systems within which we work. Is there some aspect of the "DNA" of organizations—the guiding principles by which they exist—which tends to promote uncivil behavior?

The past has proven that an obsession with profits at any cost encourages leaders to "game the system" and behave badly. When civilized standards of common decency and respect are not required to be observed in our workplaces, leadership by fear and intimidation is validated as a legitimate leadership style. By turning a blind eye to the destruction created by arrogant and abusive leaders—and even rewarding and promoting them—corporations unwittingly enable (and perhaps even encourage) bullying and abuse at work.

Trying to civilize corporations, though, is much like trying to turn tigers into vegetarians. They will always be wild beasts by nature unless we "tame" them by imposing laws (as many other countries have done), or replace them with new forms entirely. Until then, the unfortunate reality is that bullying will continue to be rampant in American organizations. We can—and must—do better.

2027

INVESTIGATING INDUSTRIAL SUSTAINABILITY IN AN AGENT-BASED MACRO-ECONOMIC FRAMEWORK

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There is a growing recognition that current industrial practices and systems, based primarily on the concept of infinite growth, cannot be sustained in the long-term within the boundaries of a finite planet. To develop more sustainable industrial systems (IS) and sustainable societies policy makers and industrialists need to better understand how to respond to environmental, social and economic challenges and transform industrial behaviour accordingly leveraging appropriate investment and implementation of new business models and technology.

Historically, economists, engineers, and planners have addressed these questions with aggregate mathematical models, assuming informed, rational behavior leading to equilibrium that is societally "optimal." Similarly, to date much of the work in industrial ecology (IE) has focused on aggregate flows of resources, waste, people, and capital. Although this work is essential to understanding the broad dimensions and impacts of pollution generation by industry, it is almost certainly an inadequate basis for proceeding to policy. Rather, in assessing the comparative efficacy of distinct policies, one must have a thorough understanding of the values, knowledge, and incentives faced by various actors in both the demand and supply sectors in question.

In recent years a disaggregate approach to analysis, referred to as "agent-based modeling," has been motivated by new insights on the limitations of traditional economic

assumptions and approaches, as well as computational advances. Such models have the potential to give next generation industrialists a needed test bed for safe, low-cost management and public policy experiments. Furthermore, agent-based models are expected to provide guidance on appropriate industrial models and policy approaches to encourage appropriate behaviour of industry and provide insights into the macro-economic implications of the emerging business models being promoted as solutions for sustainability.

Current agent-based macro-economic models provide insights into economic development options for industry, but rarely focus on investigating the emerging demands of environmental and social sustainability. In order to address this important issue, we perform an enrichment of the EURACE agent based macro-economic framework to encompass industrial sustainability considerations. The EURACE framework does not currently include environmental considerations, but was selected as a starting point as it represents probably the most complete existing agent-based macro-economic frameworks available. It is proposed to focus on the role of technological investment on two initial aspects: Reducing waste/emissions with the same output (open-loop), and recycling/treatment of waste (closed loop). The general question the model will seek to explore is the trade-off between investments in eco-productivity improvements versus potential remediation costs of inaction.

To introduce these considerations to the agent-based model, the following enrichments are proposed: Include a new agent to represent the 'environment'; modify the factory agent. Through the inclusion of raw material input and the addition of a second output representing the creation of waste/emissions; introduce the relationship between investment in production technologies and potential sustainability outcomes; and, modify the government agent to introduce investment decision making related to technology for environmental benefit.

For the initial phase of this research the modelling will focus on the introduction and validation of fundamental variables for sustainability perspective analysis. As the research progresses additional sustainability aspects should be explored and added to the model to reflect emerging industrial and social sustainability approaches.

So the contribution of this work is to initiate a new research field into the use of an agent-based macro-economic framework for investigating industrial sustainability. This approach will enable comprehensive assessment of emerging sustainability business practices to better understand their potential impact at a macro level. The work will also assist policy makers by providing a framework to better assess policy options for investments and incentive systems to drive sustainability.

2028

ACTION RESEARCH FOR ORGANIZATIONAL CHANGE

Shankar Sankaran

While action research had its origins in solving social problems (Lewin 1946) and later spread to education (Stenhouse 1975) it found its place in implementing organizational change as sociotechnical systems evolved (Emery & Trist 1960). Some examples of the use of action research in business and organisations can be found in the following areas:

- Marketing (Knox & Bickertos 2003; Vignali & Zundel 2003)
- Product development (Anders and Agnar 2003; Shaw, Burgess, Hwarng and de Matto 2001)

- Manufacturing, Engineering and operations management (Coughlan & Coughlan 2002; Kwok 2002; Waring & Wainwright 2002)
- Organisational change and transformation (Kotnour 2001; Kumar 2006; Sankaran, Tay & Orr 2009)
- Information systems (Goh 2002; O'Sheedy 2012; Stirling, Petty & Tay 2003; Yoong & Gallupe 2001)
- Management Development (Sankaran & Sng 2001)
- Knowledge Management (Mau 2005; Orr 2007; Walker 2007)

How do organisational researchers apply organisational research? Are there specific models that guide them? Is it difficult to carry out action research in organisations? How do you make action research outcomes to be useful to both theory and practice?

This paper will try to answer some of these questions based research carried out by practicing managers who have used action research to implement organisational change as well as pursue doctoral research studies.

During the presentation the audience will also be invited to share their own experiences in carrying out action research in their own or other organizations.

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Keywords: Action Research, Organizations, Management Action Learning.

2029

USING A SYSTEMS BASED EVOLUTIONARY LEARNING LABORATORY TO ADDRESS THE “NEET - NOT IN EMPLOYMENT, EDUCATION OR TRAINING” ISSUE IN JAPAN

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The purpose of social design is to create a feasible solution in order to solve a particular problem. For quite some time now, social designs have been made by social entrepreneurs using unauthorized methodologies which they form through lessons learned from their own activities and experiences. These methodologies are regarded by them as practical, but are often difficult to design, especially in complex social

systems where multi-stakeholders are involved. Participatory System Analysis (PSA) is a valuable methodology to use in social design, as it provides various stakeholders with the opportunity to share their mental models with each other, to recognize and understand issues and identify potential barriers and drivers towards creating solutions. This method is effective in developing consensus in finding the best solutions.

The purpose of this study was to create a model that can be used to design consented solutions for an important social issue in Japan around the high number of people who are “Not in Employment, Education or Training (NEET)”. The mental models of various stakeholders were integrated into a systems structure or Causal Loop Model to develop an understanding of the interrelationships and patterns between the components of the model. This process facilitated the stakeholders to learn from each other’s experiences and knowledge. The model has been used to identify the main leverage points and systemic interventions that could help to design solutions for solving the NEET problem. Bayesian Belief Network (BBN) modelling was used for each of the identified leverage points to design an integrated systemic management and operational plan for addressing the NEET issue in Japan Although many social entrepreneurs continue to provide solutions to the NEET issue in Japan, none have been effectively implemented. The systems models (CLM and BBN) were therefore embedded in an Evolutionary Learning Laboratory (ELLab) to create a cyclical social design through which the solutions can be implemented, reflected upon and adapted over time to find long lasting sustainable solutions for the NEET problem.

2030

PRAGMATISM, MORPHOGENESIS AND SUSTAINABLE MANUFACTURING

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Population increase and climate change projections out to 2050 and beyond will constrain the way we live in the world. By 2050 it is projected that there will be an extra 4 billion middle-class people on the planet. Materials will be scarce; most people will be living in urban centres that are hot, congested and polluted; extreme weather events threaten to disrupt global business operations. Consuming in a similar way as we do today will put unprecedented pressure on the biosphere and it is unlikely that the planet can support this level of exploitation.

Manufacturing is a key activity that provides 14% worldwide employment and contributes 16% to global GDP. Future projections relating to the state of the planet threaten to undermine these activities on national and global scales as resources become scarce and society is required to emit very few GHGs. Manufacturers need to find new ways to make old things and make old things in new ways.

At the UK National EPSRC Centre for Industrial Manufacturing in Sustainability we are attempting to provide creative solutions to these issues through the Configurations for Sustainable Industrial Systems work package. By understanding sustainability as a systemic process we can describe the past, present and future constraints as structures at various scales that have to be successfully negotiated by individuals in order to meet sustainability challenges.

Pragmatism, as a holistic and relational philosophy, allows us to critically posit a plurality of solutions towards a socially desirable end without having to worry about a singularly correct solution. Pragmatism is brought to life through creative action and the generative

mechanisms are experimentation mediated by reflective discussion between consenting individuals. While this speaks to agency it does not account for the ability to act, only the action itself: power is often explicitly neglected in the pragmatic discourse. Margaret Archer's concept of morphogenesis and the "internal conversation" situates action at the level of the individual in the context of social systems. It describes why people act, what they do and how they are affected by systemic structural processes around them, explicitly modelling power relationships. By bringing aspects of these two philosophies together in a pragmatic manner, I argue, we are able to design interventions that show promise in meeting the key challenges of our times.

2032

PHILOSOPHICAL CONDITIONS FOR SUSTAINABLE OUTCOMES TO COMPLEX SYSTEMIC INTERVENTIONS

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Consideration of Alexander Laszlo's inspiring vision for a sustainable thriving eco-civilization shows that it is grounded in three important assumptions. These may seem unremarkable at first sight but an analysis of their implications reveals that they commit us to positions that are deeply problematic in the academy. The systems movement will have to help find ways to resolve these issues as a prerequisite for attaining the presented vision. In my view this can be done, and in my presentation I will show what these problems are and how we might approach helping to resolve them.

Alexander Laszlo's three assumptions are that (1) a sustainable thriving eco-civilization is possible, (2) we can bring it about, and (3) it is important that we bring it about.

I will show that these three assumptions confront us with three problems the systems movement has struggled with since its inception: (a) the disunity of knowledge and fragmentation of worldviews, (b) the semantic divergence between different disciplines, and (c) the absence of scientific support for non-constructivist theories about values.

In situations characterised by complexity and value conflicts these problems subvert collaborative solution design, impede efficient execution of interventions, and undermine broad adoption of the solution features.

I will argue that in order to overcome these problems we have to work towards broad acceptance of (i) a moderate ontological realism according to which the world has at least some properties that are stable and independent of our cognitive acts and that can bracket the possibilities for change, (ii) a modest epistemological realism according to which we have at least some access to true knowledge about these properties and boundary conditions, (iii) a robust model of the connectedness between, but distinctness of, objective and subjective kinds of knowledge, (iv) a principled way of developing a semantic framework that makes different disciplines mutually accessible, and (v) a moderate axiological realism according to which at least some values have an objective grounding in the nature of Reality.

The problems surrounding unity, realism, knowledge, semantics and values are substantial ones, and the subject of deep divisions in the academy. However, I will argue that due to recent developments the systems movement is now positioned to make crucial contributions towards their resolution, and that it is likely that they will be

resolved in a way that will support the validity of Laszlo's assumptions. More broadly, such progress can help to reinvigorate the systems movement in general by improving the possibility of providing reliable interventions with sustainable outcomes.

Keywords: sustainable eco-civilization; unity of knowledge; ontological realism; systematic semantics; axiological realism

2033

REQUIREMENTS FOR DYNAMIC COMPOSITION OF SYSTEM COMPONENTS AT RUN-TIME

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Systems exist as composition of nearly independent parts and interconnections and act as a single entity. Traditionally, parts are designed, constructed, composed and operated as an integral part of the system. In this paper, the focus is on dynamic composition of system parts, wherein the various parts are constructed separately outside the scope of the system design; and these parts are added/removed/modified/replaced 'safely' when the system is in use. The very centre of dynamic composition is bringing together of parts to form a whole, when the system is in use, and involves carrying out a simple set of operations on parts and interconnections. If the elemental structure of parts and its interface requirements are different then composing or performing operations on these parts becomes difficult necessitating the need for existence of a common elemental structure amongst different parts and also the whole.

The key to succeeding with dynamic composition is in comprehending the meaning and significance of the fundamental building blocks of systems: common elemental structures of parts, the connecting interfaces that facilitate dynamic composition, and the boundaries of impact of these parts in the overall system. The requirements for such a dynamic composition of system parts at run-time would then revolve around the questions:

- What should be the common elemental structure that facilitates dynamic composition?
- What should be the interface standards that must be supported by the parts for dynamic composition?
- How to assert 'safety' in the system when parts are added/removed/replaced?
- How to establish local boundaries within the system so that when parts are added/removed/replaced there is minimal impact in the overall functioning of the system?
- What should be the architecture that enables the manipulation of these internal boundaries?
- What are the risks that need to be addressed and mitigated when dynamically composing the system?

In essence, the questions converge towards identifying the different aspects that need to be addressed in order for the resulting dynamically composed system to behave as a whole.

The core contribution in this paper is the separation of concerns across multiple layers of discourse that enables dynamic composition of parts. We examine the implementation

of universal plug and play in hardware devices to further the cause of clarity in Dynamic Composition. Two important aspects of dynamic composition are critical: how do parts get composed together at runtime without affecting the current functioning of the system? And how does the system-in-focus recognize the capabilities provided by the new parts and utilize it effectively? The heart of our contribution is a framework for dynamic composition which when instantiated during system design enables the various external parts of the system to be plugged in when the system is put to use.

2034

PAPER 1: ENGAGEMENT TO ADDRESS CLIMATE CHANGE THROUGH PARTICIPATORY DEMOCRACY AND GOVERNANCE

Janet McIntyre-Mills and Natasun Binchai

How to use the site

http://prezi.com/mmfaghm40kdf/pathway-to-wellbeing/

https://wellbeing.csem.flinders.edu.au/

All data that is used will be de-identified so that your privacy is protected. Thank you for helping us helps the community.

2036

BEING, HAVING, DOING AND INTERACTING: TOWARDS ETHICAL DEMOCRACY, GOVERNANCE AND STEWARDSHIP

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The presentation of the attached user guide aims to address the conference themes by considering the challenge posed by Stiglitz (2010) to the Australian Productivity Commission, namely to foster an understanding that the wellbeing of humanity is dependent on the global commons. The focus of the research is on addressing social, economic and environmental factors that help to mitigate and adapt to climate change. Joseph Stiglitz past president of the World Bank has stressed (at the invitation of the Australian Productivity Commission) that the bottom line is wellbeing – this requires building stocks for the future (Stiglitz, et al, 2010). Wellbeing is crucial to re-designing economics.

It explores the potential for participatory democracy and governance to a) monitor, b) match services to need and c) mitigate risk and adapt to climate change. This is vital for ethics and stewardship on behalf of future generations.

Keywords: wellbeing, climate change, risk, engagement, mitigation

2037

THE NATURE OF MYTH

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Shannon's Law tells us that for any message to be communicated it must be encoded by the sender, transmitted through a medium and decoded by the receiver. We also know that a message is just data unless it has a context that gives it meaning.

A thought generated by the firing of neurons in our brain must be encoded from a binary electrical impulse into a form that is congruent with the nature of the medium through which the message is sent and decoded. The encoded message passes through the medium with noise being introduced until it reaches the receiver. The message is

decoded through a complementary process as the one that created it back into an intelligible binary electrical impulse.

A letter of the alphabet is mere meaningless sound or shape without being embedded in language. Language is meaningless unless it is embedded in a shared culture so the concepts being used have significance. Culture is meaningless without a shared set of underlying mythic images, narratives, and archetypes that enable us to structure our experience into coherent, meaningful patterns. The mythic realm is embedded in and emerges out of the level of awareness that is the foundation of consciousness. The mythic realm is therefore the gateway; the encoding link between awareness and the world we live in.

Archetypes thus form a link between our cerebral processes and the elements in the world with which we must interact. Archetypes appear in a variety of forms.

Our early human ancestors specialised into roles because it was a more efficient way of organising society. In order for the roles to be comprehensible, they needed to exist as shared archetypes in the mind of societal members. The roles of leader, nurturer, warrior and sage were linked by the archetypes of the king, warrior, magician and lover. Societal members now had a cognitive mapping device for making sense of these roles and knowing how to behave when they were encountered.

Other archetypes formed as a mapping of the structures of consciousness, such as the Jungian shadow and ego or mandalas. The monomyth or hero's journey maps the journey through time moving from an unconscious innocence to conscious wisdom.

Further archetypes developed as a map of the various aspects of the world we find ourselves in transformed into a family of gods, each responsible for an aspect of the world, such as the Greek pantheon or the gods of the New Zealand Maori.

Finally, we have mythic stories that answer the questions that emerged as our early ancestors first gained self awareness: Where did we come from? What happens when we die? Why are we here?

Archetypes thus form a bridge between neural processes and the three dimensional world we find ourselves thrown into. They allow us to build meaning in our lives and navigate our way through life. Building a rich, meaningful and relevant mythic realm that connects to the 21st century as it is, is therefore critical to us being able to survive and indeed thrive in challenging circumstances.

2039

FIRST RESPONDERS IN STATE SPONSORED CONFLICT SITUATION?

Dennis Finlayson

Who are the first responders and what rules should apply? In, say, Syria now, Rwanda, Cambodia and earlier historical examples. Have we learnt anything yet?

At first sight the situation in Syria seems novel, though there are overtones from Lybia but there intervention by NATO occurred relatively early and with consequences that place China and Russia on the guard about giving any hint of approval for intervention at the U.N. Other countries in North Africa followed a different pattern with weak regimes giving was relatively easily to the "Arab Spring" uprisings. On the other hand, stronger regimes in the Gulf region have, so far, held firm in part at least because of the apparent threat from the Shia led regime in Iran.

Moving back in time and away from the Middle East however a little reflection allows recollection of numerous occasions in the past of conflicts led by regimes on their own populations who tried to oppose them and demanded change. For the most part the

opposition groups were ‘minorities’ contesting real or perceived discrimination against them as in the case of Tamils in Sri Lanka. What is, perhaps, unusual about Syria is that the regime is supported by the minorities against the rebelling majority.

Generally speaking when minorities rebel the response comes from across their communities with an elite group clearly leading the way often having been at odds with the authorities for a sustained period prior to other groups from their community joining in and participating in active, street level opposition which is then met by a violent reaction from the regime. In Syria it is the demonstrated lack of a coherent leadership from the top that is lacking, while at the grassroots level there seems to be extensive support.

The Sunnis elite in Iraq as well, as in the Gulf, is also reversed and the support from Iran, also Shia led, as well as Russia and China has in some senses turned the situation on its head. The first responders in Syria have been the ordinary people themselves, then joined by returning outsiders and increasingly now by extremist Sunni groups. All of the above being sponsored, or at least supported, by Sunni led minority regimes from the Gulf and in turn encourage by western backers of these latter regimes.

So we have a situation in Syria that sees the opposition as legitimate rather than the Governing regime in the eyes of most of its neighbours and the West on the one hand, while maverick regimes favour the Governing regime alongside Russia and China. Almost exactly the reverse of the situation that pertained in Indo-China, Latin America and so on during the Cold War period. What has changed? Russia and China have certainly changed. While access to information and communications together operating on opposite sides of the equation so to speak in the 1960’s

Most recently Hezbollah based in Lebanon has become actively engaged in the fighting and Russia has supplied anti-aircraft missiles to the Regime on the one side, while some European countries seem prepared to supply weapons to the Rebels on the other. Thus the range of stakeholder involvement has intensified and this suggests that some stakeholder analysis could be required to further the understanding of possible next steps towards a potential re-solution of the issues involved in the conflict.

Two techniques first proposed by Finlayson at the 1999 ISSS Conference held at California might be relevant. The first OD, or organisational diagramming, aims to model the links between stakeholders as well as the strength and direction of such links, while the second OCA, organisation character assessment, sets out to map the relative strength or capabilities of stakeholders along different characteristics or personality traits. Conducting these analyses on each or the stakeholders with respect to their most important links and capabilities could then lead to the setting out of a progress chart or action matrix as recommended by Friend et al in Planning under Pressure 1997. Other tools from the Systems menu such as Rich Pictures might also shed some light on how different stakeholders view the situation now, previously and possible futures.

2042

UNDERSTANDING AND MANAGING MORETON BAY AND ITS CATCHMENTS AS A SOCIAL-ECOLOGICAL SYSTEM

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The interdisciplinary field of study known as ‘social-ecological systems’ uses complexity theory to understand the dynamic interactions between people and their environments. It tends to be strong in understanding landscape ecology processes, but less well

elaborated in terms of social systems or built environments.. Research into these complex systems has led to calls for adaptive governance, including adaptive co-management, involving multi-party collaborations and the practice of adaptive management. The goal in managing a social-ecological system is to maintain a system's resilience to shocks and stresses, rather than solely to achieve and maintain sustainability. This case study of Moreton Bay and its catchments in SouthEast Queensland, Australia, considers the complex nature of Moreton Bay marine park, as an ecosystem and treasured social space, and the river catchments and land uses that affect the Bay. In particular it considers people's values towards the Bay and the feeder rivers, the ways people use these spaces, and how the areas and activities are currently managed. The paper comments on how a systems approach to management might look, illustrating from current management arrangements that are moving in this direction.

2043

METHOD FOR PROMOTING ICT ENGINEERING SAFETY LEARNING FROM CRISIS MANAGEMENT

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In this paper, a method is proposed for promoting ICT engineering safety learning from crisis management. The current majority of methodologies for ICT target ICT reliability. However, safety is the upper layer of reliability in terms of a system hierarchy. Therefore, we need more holistic methodologies to realize system safety, and system safety should include human factors. In particular, ICT engineering arena human factors play a crucial role in promoting ICT system safety. The Tokyo stock exchange was crushed on 1st of November 2005 by an operation error, which had a severe impact on the global . The human factors (operator error, maintenance engineers' error, etc.) cause severe impact to not only ICT systems but also social systems (nuclear plant systems, transportation systems, etc.). A JR West train derailed and overturned on 25th April 2005 due to driver misconduct caused the loss of 106 passengers' lives at Kyoto in Japan. The progress of ICT technologies (i.e., cloud, virtual and network technology) inevitably shifts ICT systems into complexity with tightly interacting domains. This trend places the human factors above other elements to promote safety more than ever. The emergent property interacting between ICT and human conduct should be dealt with in order to promote system safety. Crisis management treats holistic property over partial component. We introduce a risk management framework to promote a holistic view to manage system failures. An application example of ICT human error exhibits the effectiveness of this methodology.

Key words: Risk management; Crisis management; Normal accident theory (NAT); High Reliability Organization (HRO); Information and Communication Technology (ICT)

2044

AN ACTION RESEARCH APPROACH TO CONFLICT RE-SOLUTION: CASCADING TOWARDS CONSENSUS UTILIZING MUTUAL CONFERRING, RICH PICTURES AND SYNTEGRITY

Finlayson, D.E.
Matlock, UK, 2013.

Action Research is usually associated with a workshop type context but sometimes the target group is not easy to convene either because they are spatially dispersed or would be unwilling to come together. The approach suggested here, making use of 'cascading' can be used to allow an 'engagement event' to take place in a workshop context but also in a dispersed situation.

In 2000 the Systems Community hosted a Congress of Societies in Toronto at which a paper on using cascading was proposed to develop 'internal legitimacy' among stakeholders in the context of a ex-post evaluation of donors response to a humanitarian crisis in North Africa. The idea of using cascading had previously been suggested as a response to a requirement from a funding that the effected community in a project in North Lincolnshire be directly involved to the research process. Neither of these proposals was accepted by the sponsoring agency but the idea had taken root in the mind of the researcher. Subsequently it was pointed out that a similar concept of 'snow-balling' was already current in the literature and that it followed the pattern used in ballroom dancing in which a couple begins, the each partner chooses a new partner, and then they in turn split an d so on until the dance floor is full of couples dancing. In cascading a similar process takes place but the initial number would be greater than two i.e. a minimum of 3 up to, say, a maximum of 9. However when the process is combined with Mutual Conferring, following John Friend's concept of Mutual Consulting, the initial grouping is of 3 participants. Normally these would be self selected and be the initiating group or team who first approach or are contacted by the external action researcher. Friend's approach is outlined in the third edition of "Planning under Pressure" published in 2007 in a brief article by Heron and Finlayson, but has been used recently in a workshop for business consultants lead by John Friend at the University of Hull in March 2012.

This approach could be complemented by utilizing Checkland's 'Rich Pictures' to develop a variety of scenarios, perhaps using the Nominal Group Technique as utilized by Friend et al in South Africa for example, and explained in Planning under Pressure III alongside the Heron and Finlayson contribution above. Pictures of the before, during and after situations could be generated in participatory manner which would complement the information input provide by the Mutual Conferring exercise out lined above.

For a proposed workshop originally to be held in Toronto in 2012, both these approaches could have been followed by a 'Syntegrity' session that would not only add yet more variety to the overall methodology but also bring the information provided by the Mutual Consulting and Rich Picture phases of the participatory process into a particular focus. Alternatively, this phase could be carried out using Friend's Progress Chart or Commitment Matrix as recommended by Mingers.

2045

NURTURANCE SPACES: TWELVE PLACES TO INTERCEDE IN APITHOLOGY SYSTEMS

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One of the most powerful contributions to the systems discourse has been the concept of systemic leverage points. These places of counter-intuitive focus enable opportunities for change in situations where significant change might otherwise not be possible. The identification of systemic leverage points provides the means for small interventions to trigger larger-scale transitions in complex systems. On rare occasions this can result in the emergence of entirely new paradigmatic structures.

In counterpoint, the discipline of apithology is used to provide a systems analysis of generative systems, where new emergences are the norm, instead of the exception. Rather than places of resistance, the systemic features of primary interest are the sources of contributions. These are the specific locations of causal effects that provide generative functions for whole of system well-being. These features are not usually identified (or identifiable) by other epistemological inquiries. The discipline of apithology examines, not for the pathology of loss, but for the presences of the necessities of sufficiency in systems of generativity. This acknowledgement of a distinct difference in emphasis presents the question: what is the equivalent concept to ‘leverage points’ in apithological systems theory?

To examine this question, a wider inquiry was made into the causal relations of systemic dysfunctions in macro-scale sustainability transitions. Various causal loops were identified in a multi-tiered system of pathological conflicts and disjunctions. From this analysis, a map of causal relations was developed to examine, at a higher-order of abstraction, the relationships of apithological contributances. This analysis was specifically done within the discourse of apithology theory, which looks at the humanity-level impacts of causal relations in systems of conceptions. This provides a general systems approach to the ecological relations in the ontonomic domains of human conceptions. That process generated twelve distinctive and inter-related junctures of significance.

In this paper the twelve primary junctures identified for complex apithology systems are explained in more detail. First, the specific definition within apithology theory for each juncture is distinguished from the common usage of those descriptive terms. Second, the significance of each juncture is contextualised by the causal relationships of its adjacent junctures. Third, pre-existing contradictory assumptions are qualified with reference to the work of relevant systems theorists. Lastly, the implications of the inclusion and omission from consideration of the twelve junctures are described in an apithological systems inquiry.

The result of this paper is the portrayal of a landscape of systemic relations for whole-of-system health. It discloses the complementarities and contingencies in a generative ecology of contributive intentions. The unexpected finding is that, unlike leverage points, the ‘spaces for intercession’ are actually numerous. The closing reflection is how valuable contributions to systemic health might be found possibly, less in levers of change, and more in the contributive nurturances of new systemic becomings.

2046

STUDY OF INTELLIGENT IMPEDANCE CONTROL USING A FUZZY NEURAL NETWORK

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This paper presents study of adaptive force control that takes into account object characteristics using a fuzzy neural network. This study applies fuzzy theory to position control and force control, similar to those actually implemented by industrial robots, to enable automatic establishment of optimum parameters for different environments and autonomous, flexible motion.

Keywords: adaptive force control, fuzzy neural network, Intelligent impedance control

2048

A STUDY ON WATER RESOURCES IN VIETNAM: CURRENT STATUS, PROBLEMS AND SOLUTIONS FOR SUSTAINABLE CONSUMPTION

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In this paper we discuss the current situation and issues of water resources in Vietnam, and also provide suggestions to improve this status.

Vietnam has 2360 rivers with differently small and big sizes. Annually, flow of surface water is estimated to be about 830 billion m3 in total, of which 63% is water originated from other foreign countries. In terms of water use, the total use volume in a year is about 80 billion m3 with 82% used for agricultural production. The proportions of water used tend to increase for industry, fishery and domestic purposes.

The current main problems of water resources in Vietnam are the pollution of surface water, the decrease in quality of groundwater's quality, and water salinity in coastal areas. Irrational exploitation of water resources is believed to be one main reason for these. In fact, there are 154 industrial and large scale processing zones in the whole country but only 43 of them are equipped with concentrated wastewater treatment systems.

The management models of centralized water supply systems include state-owned enterprises, private enterprises, joint-stock companies, centers for rural water supply and sanitation and co-operatives under management of People's Committees or of communities. The responsibility for state management on water resources at national level belongs to the Government, Ministries and ministerial-level agencies with the major duties belonging to the Ministry of Natural Resources and Environment. The responsibility also belongs to the People's Committees at provincial and lower levels. There have been about 24 issued legal documents related to water resources. The law on water resources was composed in 1998 and ratified in June 21, 2012.

In order to protect water resources from depletion for future's sustainable consumption, Vietnamese Government has been trying to improve water use's management systems, to reform institutions, to set up law, to plan schemes, to raise people's awareness of the water's role water's role, as well as to educate them to use water economically and reasonably. However, the current management is still facing many difficulties, containing technical, managerial, policy and institutional problems. These problems are believed to mainly come from five reasons. First, the information and communication are weak and inefficient. Second, people have not been aware of saving water. Moreover, there is

almost no standard for the use of water in economic sectors and water has not been reasonably priced for each production zones and each types of using. Another reason is the lack of sanctions to penalize those who pollute water resources. Finally, it is seen that citizens have not proactively taken part in water management activities such as irrigation management.

As an effort to tackle these problems, Vietnamese Government has presented a number of solutions in the National Strategy for Rural Water Supply and Sanitation until 2020. These include solutions concerning water resources management, institution and policy, planning and schemes, financial policy and economical solutions, multimedia tools and education on efficient water use. As a support for the Government's solutions, this paper will present and suggest the application of South Korea's Integrated Water Resources Management System to Vietnam. This system consists of identifying, collecting and analysing data for different water resources in order to find the most suitable management schemes afterwards. Since water is considered as "economic goods", the responsibilities of stakeholders such as the government, manufacturers, suppliers, comsumers and water-exploiting enterprises will also be discussed as an essential part of this management system.

2052

ENACTING SYSTEMIC CHANGE OF HEALTH PROMOTION WITH SIMPLICITY AND TRANSFORMABILITY OF Φ [FI]

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In the past decades, health promotion has been undertaken in the linear process between health and disease. Healthcare education has been advocated "multi-professional" for most undergraduate medical students to build "the skills necessary for the priority health problems of individuals and communities that are known to be particularly amenable to team-work" (The World Health Organization, 1988). Nowadays, medical education and clinical practice have become increasingly important approaches to deal with human disease problems. They have yet paid adequate attention to the prevention care which focuses on the core value and knowledge of maintaining a healthy life rather than searching the best treatments of disease. In Taiwan, the many thorny problems challenging the governmental health system, such as the burnout medical staff, excessive medical treatment, unevenly distributed medical resource, food products with contaminated by plasticizer etc. It is time that we collectively counteract these intertwined social, economic and biological problems with a systemic approach applicable to health promotion education and daily clinical practice. Indeed, neither health nor disease is an absolute or static state.

2054

GLOBAL SUPPLY CHAINS, DISASTERS AND EXTERNALITIES: HOW COMPLEX SUPPLY NETWORKS CREATE DAMAGING EXTERNALITIES AND ITS CONSEQUENCES.

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Sprawling and global supply chains are doing a decent job of providing consumers with inexpensive and timely products. However, their size, complexity and lack of accountability make them originators of serious risks and disruptions. Such disruptions are not contained to the closed systems of the respective supply networks, but bleed over into society and the surrounding communities as negative externalities. Consequently, modern supply chains can expect to be subject to greater scrutiny and pressures to reduce risks and provide compensation for the costs imposed on others involuntarily.

Keywords: Supply chain management; Risk management; Globalization; Complexity; Externalities

2055

SYSTEMS THINKING IN THE FIELD BUILDING LEADERSHIP INITIATIVE: ADVANCING ECOHEALTH IN SOUTH EAST ASIA

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Ecohealth is a participatory approach that looks at health as a result of a complex set of social and ecological interactions. In developing countries, particularly in South East Asia (SEA) where agricultural intensification processes have profound implications for ecosystems and health, the utility of the approach is significant The program Field Building Leadership Initiative (FBLI): Advancing Ecohealth in SEA funded by International Development and Research Institute (IDRC), Canada aims at building the field of Ecohealth by integrating research, training, policy and networking to focus on solving human health problems associated with agricultural intensification in SEA countries. The FBLI program implementation process incorporates a systems based thinking approach and concurrently fosters the important ideas of interrelationships; varied perspectives, and transbondary of interdisciplinary participation.

The objective of this poster is to review how the systems thinking principle was used in the FBLI ecohealth projects in SEA to address lessons learned and challenges. We use a systems thinking approach in considering how FBLI incorporates this principle in its research component by describing characteristics of systems thinking that were used in research projects in four countries (China, Indonesia, Thailand and Vietnam). The results showed that generally, system thinking has been well perceived and adopted by partners throughout projects processes.

Keywords: Ecohealth, system thinking, South East Asia, agricultural intensification.

2058

MANAGEMENT OF MAB VIETNAM'S NETWORK OF BIOSPHERE RESERVES THROUGH THE APPROACH OF SYSTEM THINKING, LAND/SEASCAPE PLANNING, INTER-SECTORAL COORDINATION AND QUALITY ECONOMY (SLIQ) – A CASE STUDY OF THE CAT BA ARCHIPELAGO BIOSPHERE RESERVE

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This paper presents the current SLIQ approach for designating and managing Vietnam's network of biosphere reserves in Vietnam, with a case study of the Cat Ba Archipelago. SLIQ approach is first introduced by MAB Vietnam, which stands for "Systems Thinking" (S), "Land/seascape and Spatial Planning" (L), "Intersectoral Coordination with Involvement of Stakeholders" (I), and "Quality Economy" (Q).

The SLIQ approach has been piloted and implemented in the Cat Ba Archipelago Biosphere Reserve since 2004 with several remarkable outcomes. Those include the application of both "soft" and "hard" systems thinking methodology in the motto of "conservation for development and development for conservation" and the intensive research and development of the Cat Ba Biosphere Reserve World's First Learning Laboratory for Sustainable Development; effective zoning plan for harmonious conservation and development, a pioneering management board of provincial mandate; the Biosphere Reserve Certification Label for adding values to local products and services, and the first of its kind Sustainable Development Fund for Cat Ba Biosphere Reserve.

It is emphasized that Biosphere Reserve is not a Protected Area per se, though biosphere reserves integrate conservation as one of the core management objectives. Biosphere Reserve fulfills three main interrelating and mutually-sustaining functions, such as conservation, development and logistics support. In this sense, Biosphere Reserve should be viewed as a practical model for sustainable development. We recommend that SLIQ continue to be a unique identity-defining feature for biosphere reserve performance in the coming decades.

Keywords: Biosphere Reserve management, SLIQ, systems thinking, sustainable development

2059

BIOSPHERE RESERVES AS A MANAGEMENT TOOL TO ADAPT TO CLIMATE CHANGE-CASE STUDY IN CAT BA BIOSPHERE RESERVE, VIET NAM

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Biosphere reserve concept was recognized by UNESCO firstly in 1968, which is designed to promote interdisciplinary approaches to management to reconcile natural resources use and ecosystem conservation. Conceptually, they are designed to reconcile sustainable livelihoods and development practices with ecosystem

conservation by combining natural and social sciences, economics, research, and education.

Biosphere Reserves can offer examples of sustainable development in various contexts with world-wide support. As a means of both conservation and economic development, Biosphere Reserves are a unique management tool to implement climate change adaptation effort. The extreme vulnerability of Vietnam to the impacts of climate change coupled with the potential adaptive capacity of Biosphere Reserves present the opportunity for the country's eight current Biosphere Reserves to learn, collaborate and innovate adaptive measures. With over 610 reserves worldwide, reserves represent different practices, policies and management that can help Vietnam's reserves increase their resilience to climate change while meeting the requirements of the Targeted National Plan in terms of conservation and development.

UNESCO recognized Cat Ba Biosphere Reserve in 2004 with 17,040 hectares of terrestrial area and 9,200 hectares of marine area. The BR is broken up into two core areas, two buffer zones, and two transition zones. The core zones of Cat Ba National Park lies entirely within the core zones of the BR in order to keep with the conservation criteria of the established park.

This study aimed to identify and describe the ability of the Biosphere Reserve (BR) — concepts and practices—to function as a management tool to adapt to climate change (CC), using evidence from the case study in Cat Ba island BR, Vietnam.

Effectiveness of BR management in adapting to CC is expressed through aspect: Good Adaptation, means Adequateness of 6 sources: human, social, natural, physical, financial sources and institutional environment.

2060

CLOSED-LOOP BUSINESS MODELS FOR SUSTAINABLE MANUFACTURING

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Natural resources are a crucial component of our economy: they provide the raw material from which to make the products we use every day and drive national growth.

As a consequence of population growth and an increased number of middle-class consumers it is projected that the demand for raw materials will at least double by 2050. Security of supply will be a major concern for manufacturers as materials become scarce due to poor economics of extraction, protectionism and competition between making things and the basic needs of society.

The traditionally manufacturing process is seen as linear and wasteful: raw materials are extracted, turned into something of value and disposed of. By appropriating the concept of "loops" from ecosystems we can reconceive of this process as one that is circular, where waste becomes food. This has the potential to reduce the reliance on virgin resources, but requires that we develop new ways to value what was previously considered waste.

This poster will explore these ideas, present a recent case study where closed-loop business models have been used by a large manufacturer and introduce research that extends the idea of loops to include networks of influence.

Keywords: closed-loop business models, ecosystems, network of influences

2064

THE CONCEPT DESIGN OF CAUSE RELATED MARKETING UTILIZING WANTS CHAIN ANALYSIS PROPOSING THE METHOD AND VALIDATION THROUGH VALUE CO-CREATION WORKSHOPS

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In this study, we propose a methodology for designing a Cause-Related Marketing (CRM) strategy using Wants Chain Analysis (WCA). To delineate the methodology, the authors introduce the concept of WCA to design CRM through a concrete and effective process in a standardized manner. The methodology can help create new types of concepts of CRM that are not only donation-based but also make relationships and supply substance or service. The authors validate the efficacy of a WCA-based CRM by conducting experiments during workshops held for value co-creation, in which various CRM stakeholders participated to create concrete designs for CRM.

2067

THE RELATIONS BETWEEN TWO KOREAS UNDER ROH MOO-HYUN ADMINISTRATION: MATTER-ENERGY AND INFORMATION FLOW

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Under the Roh Moo-hyun administration(2003–2008), two Koreas continued improvement in relations begun by the previous Kim Dae-jung administration. The flow of matter-energy and information between two Koreas 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 in matter-energy from 1989 to 1994; since 1995, both have run at a similar rate. This shows that the 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.

Keywords: Roh Moo-hyun Administration, matter-energy and information, relations between two Koreas.

2068

THE SOFT SYSTEM METHODOLOGY TO BUILD A SUSTAINABLE SPACE OF A TOURIST CORRIDOR FROM PUERTO ANGEL BAY TO MAZUNTE BEACH, IN MEXICO

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This research paper shows how a spatial arranging was built through the integration of a part of the Soft Systems Methodology of Peter Checkland to obtain a supported diagnostic. The study is applied to a tourist corridor case in Mexico. The development of this arranging is based on the locational theory of space. Moreover to elaborate a matrix

of environmental impact a harvesting of samples was done. The arranging is designed considering the main concepts of the sustainable development as the conservation, preservation zones, the measures of muffling and alleviating, and all of them in order to achieve the appropriated life promotion, dynamical equilibrium, harmonic convergence, integral ethics, intuitive rationality, and planetary consciousness with the management of the natural resources and its preservation to the future generations. After the building of arranging it proposes the instrumentation of itself through the managing of its applying in the proposed corridor with the supporting of federal, state and municipal government in which is located the corridor.

Keywords: Soft Systems Methodology, Locational Theory, Sustainable Development, Muffling and Alleviating

2069

THE GENERAL MODEL FOR SYSTEMS SCIENCE

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Nowadays, despite the numerous efforts expended on sustainability, we are still struggling with all sorts of non-sustainability crises and global mechanism malfunctions, all of which are intertwined to become highly complicated global problems and challenge sustainability and thrivability of the earth. Whether there exists a hopeful opportunity window in 2013 or not, change our awareness of the holos nature of all beings will harness the public's holos vision and perspectives of the earth so as to build possibly an enabling system for the malfunctioning mechanism.

In the literature, it show that the model of meaning systems is an old systemic perspective which is to be reconceptualized to be an enabling system model. In this presentation, the author will propose a dynamic systems model for finding systemic leverage points for an evolving holos-civilization. This general model of systems sciences manifests systemic development as a specific new dynamic model of meaning systems for transdisciplinary interaction of biological, behavioral, sociocultural, and macro-environmental factors, and examines how a global holos-civilization toward the thrivable planet could be possibly designed and simulated across various disciplines.

As Boulding pointed out, general system theory (and systems science in general) "aims to provide a framework or structure on which to hang the flesh and blood of particular disciplines and particular subject matters in an orderly and coherent corpus of knowledge." The multi-method proposed by systems science is to model complex entities created by the multiple interactions of components and structures by concentrating on the dynamic synergy that are internal or external to the system. The general model for systems science the author will propose in this presentation integrates several major models of systemic thought, such as general systems, cybernetics, physical sciences, mathematics, computers & informatics, biology & medicine, symbolic systems, social systems, ecology, philosophy, systems analysis, and engineering. In regard to applications in typology of meaning systems for transdisciplinary interaction, the general model for systems science can model complex intrapersonal, interpersonal, intergroup, and human/nature interactions between humanities, social and natural sciences. It focuses on the emergence of transdisciplinary paradigm in different fields and serves as a platform for the integrated meta-model of complexity in human world.

In order to enhance the generative collaboration among transdisciplinary interaction, for example, the author applied the perspectives of wholeness-praxis to reconceptualize the

concept of reciprocity in terms of social behavior orientations elaborated by Bowel and Gintis from Santa Fe Institute, and furthermore to interpret the emerging the green social enterprise.

The author expects that this general model for systems science could advance inquiry of systemic sustainability initiatives, and help schematize a highly innovative cross-sectoral organic Master Plan for thrivable governance for various societies. It is not designed for the benefit of the few, but for the happiness of all. Hopefully, it could enrich our knowledge of systems thinking and enhance management of complex societal and ecosystemic problems altogether. It is also expected that this general model for systems sciences could be applied to design an enabling system for a thriving society and earth rather than surviving in the many schools of systemic thoughts.

Keywords: general model, transdisciplinary interaction, holos-civilization, wholeness-praxis, reciprocity

2071

INTEGRATED ECOLOGICAL RISK ASSESSMENT (ERA) IN THE CAT BA BIOSPHERE RESERVE: A PILOT CASE STUDY IN PHU LONG COMMUNE, HAI PHONG CITY, VIETNAM

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The Cat Ba Biosphere Reserve is one of the most important biodiversity conservation areas in northern Vietnam, characterized by a mosaic of pristine ecosystems such as forests, limestone islands and coral reefs. In recent years, however, anthropogenic pressures (such as aquaculture, overfishing, shipping and tourism, other development activities) have led to an increased pollution of the aquatic environment, a reduction of mangroves and reduced biodiversity, in turn threatening human health and ecosystem services. Phu Long commune located in western Cat Ba islands includes large mangrove areas and more than 70% of the local people are depending on fishing and aquaculture for their income.

For the first time in Vietnam, an integrated Ecological Risk Assessment (ERA) concept was introduced and adapted including weight-of evidence from ecology, chemistry, toxicology and social-economic lines to assess the risks from human pressure. A case-study was conducted in Phu Long commune, Cat Hai District, Hai Phong City in a joint collaboration between MCD, IMER, HACEM, Cat Ba National Park and Stockholm University, Sweden in 2012 –2013. The ERA method aimed at identifying pollutant sources and stressors, assessing levels of risks posed by anthropogenic wastes affecting aquatic ecosystems and water environment for sustaining the local livelihoods as an evidence-based study serving for management.

The proposed integrated ERA employs a “TRIAD” i.e. a weight-of-evidence (WOE) approach integrating three lines of evidence (LoE) from 1) chemistry 2) ecology and toxicity 3) socio-economic. Four coastal sites were compared in the chemistry, toxicity and ecology LoEs. Chemistry data such as dissolved O2, nutrients, metal and oil

concentrations were collected along with physical data e.g. temperature, salinity, tidal amplitude by HACEM. Ecological data such as zooplankton, phytoplankton, and benthic communities were sampled and analyzed from water and sediment samples by IMER. In addition toxicity assays were also done by exposing shrimp larvae to field water from the four sites. Socio-economic data were collected by MCD and Cat Ba National Park through household and aquaculture producer interviews in Phu Long Commune. The data were first analyzed by each collaborating partner separately and then all the data were gathered in a common data-base and integrated into ecological risk values from 0-1 and compared among sites using the TRIAD approach.

Preliminary results show that coastal waters in Phu Long are being polluted but that the contaminant concentrations do generally not exceed limits from Vietnamese water quality criteria, indicating a relatively low risk from the chemical LoE. Biological data indicate that the biodiversity of benthic invertebrates has decreased severely over the last 20 years and that the biodiversity is lower at the most polluted sites, suggesting a significant risk from the ecological LoE. Socio-economic data indicate that most of the households perceive their aquatic environment as being moderately or severely polluted, which was also generally found to be linked to a reduced household income, indicating an increased ecological risk in the economic LoE.

Further analyses will calculate actual risk values and their associated uncertainties in each LoE and an integrated risk value based on all three LoE. In addition, guidelines for a tiered-based approach will be provided based on a cost-benefit analysis of the various methods used. Though data are still under analysis, preliminary results from this study suggest that the ERA TRIAD method is a powerful and suitable risk evaluation tool in order to make an integrative assessment at the ecosystem level and to provide a decision support system for sustainable management.

2072

URBAN PIONEERING MOVEMENT AS AN EXAMPLE OF EMERGENCE AND CHANGE

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This article examines systemic change through a gradual, self-generating change that can lead to a paradigm shift, using urban pioneering movement in Helsinki as an example.

The urban pioneering movement aims at transforming the urban culture through activities that generate more tolerant and open city with appreciation to citizen democracy. The movement works against controlled and regulated urban experience and aims at a paradigm shift on how the city is used and perceived. Urban pioneering movement has succeeded in its aims with approaches and manoeuvres that may show promise especially in the context of the sustainability movement.

The research that was conducted as a part of future learning environments study in Aalto University showed that the urban pioneers generate emergent culture in their environment and they do so by working as if there were two different environments that they need to affect. One of the environments is the visible urban cultural scene where the envisioned change would be taking place and the second is the invisible environment of rules and regulations that the urban pioneers have to work hard with in order to diminish and remove obstacles that slow down the transformation that they aim

at. The transformation, when successful, happens as a snowball effect, generating increasingly more change towards the desired goals, until the system has gradually transformed also its values.

Keywords: Paradigm shift, positive and negative feedback loops, snowball effect, sustainability movement, urban pioneering movement

2074

DYNAMICS AND VIABILITY OF CRITICALLY ENDANGERED CAT BA LANGUR: A NEW PERSPECTIVE FOR CONSERVATION ACTIONS

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The golden-headed or Cat Ba Langur (Trachypithecus poliocephalus poliocephalus) is an endemic species of Cat Ba Island in northern Vietnam. This is listed as a critically endangered species in IUCN red list because of small, isolated sub-populations and low population numbers. This study was undertaken to understand the population development trend and the risk of extinction of the species in the future. This will help conservationists to minimize the risk of extinction, and optimize better conservation strategies for this species. The conservation status and life history of the langurs were taken by interviews of 21 members of forest protection groups and staff of Cat Ba National Park, gathering from reports and other publications dating from 1997 onwards, and then conducting field surveys. These data combined with focus group discussion were used to construct the dynamics and viability of the langur population simulation model. The study found that 12 groups of the langurs consisting of a total of 50 – 60 individuals with an average group of size of 4.67 individuals survived in the Cat Ba Island. Disturbed social structure is one of the most significant reasons causing the stable population in the past twelve years, and they are predicted to continue stabilizing in the next 10 years, and reach 86 individuals by 2050. The validation tests have confirmed that the model is sufficient to be used as a tool for policy analysis and decision making for conservationists in the island. The effect of reproducing population on birth rate, and birth rate which are two factors have the most influence on langur numbers. This clearly implies that an increase in the reproducing population numbers and birth rate would have a significant effect on the langur population growth in the long-term. Relocation of non-reproductive groups to reproductive units, and strict protection and management are prior strategies to save this critically endangered species from extinction.

Keywords: Cat Ba langur; conservation actions; critically endangered species; system dynamics modeling; extremely isolated population; strategy planning

2075

AN ANALYSIS OF SOCIAL ENTERPRISES AND INNOVATION PRACTICES BASED ON BARRATT'S VALUE SYSTEM: A HONG KONG PERSPECTIVE

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Through years of high intensity economic activities, Hong Kong has reigned among top of the world in regards to economic and commercial successes. On the Hong Kong enterprise landscape, competition sprouts innovation on the land where efficiency and profitability equate to the survival of enterprises. Shadowed by banks and insurance industries that almost represent the Hong Kong image, the territory has quietly bared a large number of social enterprises as an indirect result of its laissez-faire economic model. Though still in its infancy, the social enterprise development in Hong Kong has seen dramatic engagement from both government and sectors of community. Given such scenario, the author attempts to analyze of the early development of SEs in Hong Kong so as to provide a reflection and value prospects for this maturing industry.

The Hong Kong enterprise environment has been under the influence of the territory's major financial and business industries, hence embraces a result-driven strategy that sets efficiency and practicability atop of all goals. This strategy likely forms an enterprise landscape that sees most SEs as results of immediate socially driven concerns. Hence the author sees the Barratt value system particularly beneficial for the transformation and evolution of this industry. Barratt's proposed value-based corporate culture and leadership may instill Hong Kong's social enterprises with valuable insights that are conducive to a sustainable enterprise culture. Value-based system can drive SEs to engage in options that are not immediately viable for enterprise success but are beneficial to the overall enterprise environment. A visible status quo shows there are extremely few SEs based on consultancy for social entrepreneurs due to present yet limited governmental support. Such case reveals the absence of a vital element for a sustainable SE environment and system.

This piece of research will institute a limited focus on Hong Kong, but draws reference from Barratt's value systems as aforementioned. Such combination may yield surprising yet truly valuable findings that conventional enterprise reviews cannot deliver. Preliminary research results reveal that the results-driven mindset and strategy for SEs are insufficient to meet the true goals of sustainable social innovation practices, and therein the entrepreneurial landscape. However, Hong Kong is endowed with an overall business environment that few other places can parallel. The economic freedom that bred a prosperous industry for the small territory testifies to the resilience that freedom can realize. Business freedom was also the major factor to the rise of social enterprises in Hong Kong as the industry has welcomed innovation with light regulation and transparency. This research has a major attempt to reveal how Hong Kong's SE environment and practices can indeed be benefited from a new mode of operation and thinking. The Hong Kong Home Affairs Bureau has recognized the positive impact that SEs have exerted on the overall social landscape. Nonetheless, sustainable practices of social innovation must be the joint efforts from community, market, and enterprises on multitudes of social, human, and environmental goals. This research aims to deliver insights into the transformations of SEs to come while this young industry continues to develop. As the innovation practices and SE environment collectively evolve, so would the system.

2076

THE ART OF CHANGES FOR COLLABORATION AND CO-EVOLUTION OF HETEROGENEOUS ECO-COMMUNITIES—FROM THE WILDERNESS TO THE SOURCE

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Facing the challenging environmental and ecological problems, there emerge a great number of global and local green communities, green organizations, and green cities in different countries in the past decade. Most of them undertake unfailing efforts to help resolve the deteriorating environmental problems. This is also reflected from the rapidly growing green communities in the cyber world in the past decade. Meanwhile, more and more green communities are not content with their self-sufficient living system; they even engage the public in building closer links with them for new collective efforts in sustainability action. It is revealing that the ecological paradigm or green movement has not only aroused the public's awareness of such interconnectedness, but also taken root in many fields of practice, such as organic farming, regenerated energy, green technology, green architecture…etc. Since sustainability has been redefined for regenerating the social, environmental, economic and cultural fabric of life, we need to inquire how the many uncountable eco-communities, eco-cities, green organizations and action groups, and even eco-villages might play a more critical role in this green movement.

Therefore, in this research, the author probes three questions: (1) How do leaders of heterogeneous communities facilitate the necessary collaboration within or across the divergent communities? (2) Do these groups, communities and organizations share core values which the ecological movement or green paradigm advocate? (3)How do the core leaders explore the art of changes in guiding the heterogamous communities within the organization or across the organizations?

In order to tackle these four issues, the author will first overview four thematic literature: holistic development of the green movement and ecological paradigm, cooperation among heterogeneous groups and its implication for green communities and organizations, the art of changes in the Chinese wisdom tradition, and the relationship between WILDERNESS and true NATURE. In the past 4 years, the author has endeavored in many deep interviews and collective dialogues among various green communities, organizations and groups with numerous efforts in deep inquiry of the generative networking process and collective intelligence of the "Green-Praxis Communities". She found that the green community leaders' wholeness spirituality and awakened global consciousness is critical to the depth of the public's collective consciousness of human's shared wholeness.

Among the many green communities and organizations, the author will focus on the Society of Wilderness in Taiwan, which has 15 divergent communities and 11 branches in 14 counties of the island. Though not very resourcefully, it has great resilience in persistent public engagement through enriching forms of environmental education and sustainability action. It has also accumulated abundant experiences in resolving conflicting issues with peaceful but powerful actions. For 15 years, the Society of Wilderness has gained great respect from the public, the government, the enterprises and the NPOs. It is a nonprofit organization with many heterogeneous groups of volunteers and of high capacity of collaborating with communities and organizations across various sectors. By probing how the core leaders master the art of changes and foster the co-evolution of the many heterogeneous communities and groups of people in

this society, the author aims at inquiring the source of their collective power, and how their interconnectedness with the wilderness relate to their inner self, the very NATURE in other words.

The author integrates her 4-year experiences in deep interviewing, personal dialogues and collective dialogues, and co-design of learning activities with the core members of this society. An integral approach to research design and data collection is undertaken, including whole systems design and wholeness dialogue design of collective deep dialogues, images and models integration, textual analysis, site observations and in-depth interviews. Four insightful findings from the 4-year research include: (1) the essence of the leadership with the art of changes among the heterogeneous groups, (2) the emotional and creative tension between its organizational development and holistic development, (3) the ways the core leaders and members reconnecting one another, collaborating with other communities/organizations/groups and engaging the public in the beauty, sincerity and peace of the wilderness and (4) landscape of its generative and transformative journey from wilderness to NATURE.

Keywords: Eco-communities, Heterogeneous groups, Wilderness, Nature

2079

A VISUAL FRAMEWORK FOR INTEGRATING SYSTEMIC METHODS FOR DEALING WITH COMPLEX ISSUES

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Systemic thinking and systems-based problem solving are considered to be important competencies in an increasingly interconnected and complex world. There is still a huge gap between the necessity for systemic approaches and their adoption in education, research and applied projects. One reason for this is that systemic methods, stemming from diverse disciplines, are a rather unorganized field and often treated in separated journals and conferences. There exist many different systemic methods and methodologies with varying strengths that emphasize diverse aspects. This situation can make investigations time-consuming and unnecessarily confuse practitioners and students who wish to search for methods that fit their needs. In order not to leave these important systemic tools solely in the hands of experts, there is a need for improved overviews and increased usability. This presentation aims to interrelate some well-known aspects of systemic methods and show their strengths in different phases for addressing change in social systems. Social change is already complex enough, and for this reason the methods, methodologies and meta-models put into use should be easy to understand for all stakeholders and allow sharing mental models related to the change process. The results presented here consist of a visual representation of important methodic aspects for dealing with complex issues, particularly in social contexts. It provides a basis for discussing methodic aspects across several fields of applications, and facilitates communication between researchers and practitioners. This can be especially helpful in achieving a structured way of designing or evaluating projects in fields such as organizational change and sustainable development.

Keywords: systemic methods, dealing with complexity, problem solving, designing change, visual integration, multi-methodology

2084

TOWARDS A SUSTAINABLE TOURISM DEFINITION FROM SYSTEMS SCIENCE PERSPECTIVE

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The tourism system has as main components, social, economic and natural subsystems, which are linked together to give rise to tourism activities in particular contexts called destinations. Tourism to be regulated under a legal framework on protected areas, to offer interpretations regarding commercial activity and the natural protection, which at first seem contrary relations, arising from excessive use of natural and cultural resources to generate tourism services. However, under the perspective of these antagonistic, Systems Science can be considered as complementary. The purpose of this paper is to study the complexity of sustainability case study taking as a destination in the Mexican Caribbean, to highlight, through the Viable Systems Model, complementary relationships between economic development and natural care which converge in production of tourism services. This implies a holistic view that encompasses the subsystems (social, economic and natural) and the system above (sustainable tourism) described in the elements and relationships that make up the 5 sets of viable model.

Keywords: Sustainable Tourism System, Complementarity, Viable System Model.

2085

BEYOND LEVERAGE POINTS FOR EMERGING AN ECO-CIVILIZATION

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Although the systemic crises of a global economic order with an unprecedented degree of interdependence require concerted intervention across many levels and domains, transdisciplinary conversations highlight that the different narratives and objectives through which experts construct these complex problem constellations are incommensurable or incompatible. Nevertheless, many groups remain convinced that their particular reform agenda is not illusory but has a genuine capacity to steer the evolving world system in a healthier direction. This suggests that current constructions of purpose and intention at this level of abstraction are poorly aligned with the nature of the task. Wallerstein's study of macrohistory indicates that small alterations in perceptual set can lead to large differences in the way societies embed themselves in their context. A science of macrosystem transitions in which human intentionality co-evolves with the existential issues we are trying to address may assist, therefore, to distinguish how much of this process is actually under our control and, in doing so, may reframe problem-setting at this scale.

The "anthropocene" concept (dating a new geological epoch from the point at which human activity began to influence geosphere dynamics) has found ready acceptance, but it conceals a heuristic minefield: if we accept that current climate change and biodiversity concerns are a consequence of population growth and our economic, political and social practices, we are obliged to intervene in our own evolutionary dynamics. On the other hand, the shift in cognitive neuroscience from computational to

contextual models of embodied or enacted intelligence reveals that our interpretation of existential risk, our goal-setting and perceived pathways to transition mutate with the socially-sanctioned narratives, embedded roles and identities, legitimating mechanisms and practicalities of coherent organisation within the current social order. As pervasive changes in technologies and ecosystems restructure the world system in the following decades, our narratives of environmental risk and our role in perpetuating it will co-evolve or mutate with it. Current bio- and info-technologies will mature, interact, spawn novel applications, and develop encompassing metalayers which bring in a very different kind of social order, reshaping the human mind in the process. Actions which appear today to be a reasonable basis on which to emerge an eco-civilization may then take on a very different significance.

The issue cannot rest there, however. An overt recognition that our problem-solving templates are derivative and context-specific cultivates postformal modes of reasoning which decentre "mind" as the primary organising agent of orderly outcomes. This shift accommodates multiple paradigms or frames of reference, liberating perspectives from the instrumental, goal-directed template dominating current concepts of agency, purpose and efficacy. It then becomes easier to work with distributed, decentralised adaptation processes, with dynamic sustainabilities (or an ability to re-evaluate the significance of events as the gestalt in which they are set alters), and "wicked" outcomes within ever-evolving wholes. In consequence, our focus shifts from managing risk through altering the dynamics of systems to seizing the potential within different forms of order for a different level of existence.

2091

FROM IMPLICIT TO EXPLICIT KNOWLEDGE ABOUT SELF IN THE SYSTEM ACROSS THE LIFE SPAN

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Learning and understanding of the self in the system occurs at a fast pace immediately after birth into the relationship with the primary caregiver. As development progresses learning and understanding of being in relationships expands to larger systems. The preverbal wisdom is no less important than the verbal since it is the foundation of multiple intelligences (Gardner 1999) including: natural, social, emotional, musical, mathematical, spatial and kinesthetic intelligences. These are essential infrastructure components that support healthy development and functioning of the verbal individual throughout the life span in small and large interpersonal systems such as: families, educational systems, professional and non professional organizations communities and recreational settings to mention a few in the real world and in cyberspace. The purpose of this paper is to combine system theory (Miller 1975) and field practice in order to illustrate how the universal process of human development can be enriched by systemic oriented self-awareness in the service of a global eco-civilization. The integration of: 1. Awareness and utilization of the ubiquity of communication systems around the globe 2. Concurrent existence of the self in the real and cyber worlds and 3. Brain research result, together afford new insights and opportunities for advancing systemic self awareness in multiple systems of existence. These include for example: family system educational systems, work environments, communities and recreational contexts.

Based on theoretical understanding of systems and literature on neurobiology of interpersonal relations (Iacoboni, 2008, Siegel, 2012) this presentation illustrates how

the developing self can be coached into a tangible systemic self-awareness growth pattern. Enhancement of diverse executive functions during developmental course pave brain based pathways to increased systemic oriented self-awareness development. These include: Sense of belonging, multi-perspective taking repertoire, empathy, emotional regulation, self-reflection and ownership of responsibility for actions that impact multiple systems of. Two contrasting vignettes that feature system oriented self-awareness versus the lack of it will be presented. The respective ramifications of system oriented self awareness or the lack of it will be discussed as they influence the development and multigenerational family transmission of patterns of self in relationships, self management in interpersonal relations, in professional team collaboration, and in parenting practices across the life span and as system oriented self awareness settles into the awareness of formerly unaware parents as individuals.

2093

TRANSLATIONAL COMPLEX SOCIAL SYSTEMS MODELING VIA AGENT BASED APPROACH

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In this presentation, we focus on how agent based modeling contribute to translational research.

Historically, General Systems Research has focused on bridging different categories of scientific researches. For the purpose an abstract systems properties, which are common among different research fields, are stressed on.

On the other hand, we also have to focus on a complex whole systems model that reflects multi aspects of research interests for complex systems and its problem solving. For the purpose, it is required that different research knowledge and aspects are translated with each other inside a hole system to solve total problems. Translational medical research is an example of such translational research. How to focus on systemic properties that are used for problem solving of a whole system. How to bridge and translate the systemic properties, which are proper to one system, to the other systems. We introduce the methodology by using agent based modeling. Where we construct a complex multi aspect and multi agents model that consist of many sub models that couple weakly with each other. In the complex multi aspect systems modeling, we translate properties of a source system into the target system as a boundary condition of the target system.

We introduce a concrete example of translational systems research in an infection epidemiology and its policy making for clarifying how to translate the properties that are proper to a sub model into the whole model.

At first, we introduce a simple model of infection epidemiology that is called The SIR model.

SIR model is expressed by simple differential equations. SIR model is a well known macro model of infection epidemiology. There are three macro parameter S, I, R. S, I, R stand for the number of susceptible agents, infectious agents, and recovered or died agents respectively.

In this model, there are two parameters beta and delta. Beta denotes a contact rate between a susceptible and an infectious agent. Delta denotes a recovery or death rate for infected agents. This model cannot treat many realistic policies, such as stock of

vaccine, rate of vaccination, ring or mass vaccination strategy, school shutdown, and et al, for protecting infection disease from public health point of view. For considering the public health policies we introduce a multi agents and multi aspect model that includes a pathological model of a target infection, a city structure model, cohort and family structure model, an agent activity model in the city depending on its role and an infection process model in the city as sub models. The sub models weakly couple with each other. For example city, cohort and family structures give boundary conditions on the agent activity model. The agent activity model gives boundary conditions on the infection process model. Where many anti infection polices are described in the sub models. For example, school shutdown policy is described on the agent activity model and vaccination policies are described on the infection process model. We generalize the multi agent modeling for translational systems analysis for treating complex social and economic systems.

Keywords: Agent Based Modeling, Translational Systems Science, Complex Social System, Infection Epidemiology

2096
IS IT POSSIBLE?

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The theme of the 57th Meeting of ISSS, systemic leverage points for emerging a Global Eco-Civilization, in view of curating the conditions for a thrivable planet, is a great challenge. As Alexander Laszlo said in the Presidential message of last year, according with Donella Meadows, the most powerful leverage point is at the level of paradigms. So, the task is exhibit current and emerging initiatives to do that. But, as the old adage, attributed to Bertrand Russell, says, “things done by half are never done right”. All who intend to work in this, and want their effort is rewarded with a long-standing transformative action term, and not content with achieve a fleeting feeling of doing the right thing, take this into account.

Is it possible to share, create, and innovated theories, methods, and practices that foster new paradigms in planetary thrivability and systemic conviviality? This paper reviews some issues and difficulties inherent in this subject. And, at least, offer to share an experience in Patagonia, to create a tool for decision-making from the ecological footprint of a little town.

Keywords: Global Eco Civilization, thrivable systems, ecological footprint

2097
AN APPLIED EDUCATIONAL LEARNING CONCEPT FOR “LIVING SYSTEM” FIELDWORK

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The dynamic interactions of very large living systems in which we find ourselves existing and engaging with, can, at the very least be difficult to navigate, or at worst, dictate disastrous directions (Garduno et al. 2013). There have been various descriptions that are based more on perceptions that influence and stress different areas of sustainable

development and sustainability. The Brundtland Report discussed the 'inequality is the planet's main "environ-mental" problem' (WCED 1987, p 6), linking poverty and pollution, social justice with unsustainability. It did however; link these issues, even though there was a focus on the symptoms rather than the cause' (Asghar 2001).

However, more recently it has been possible to view these issues as living systems, that are in themselves, adaptive complex systems, with many multiple components and properties (Nousala et al 2012: Nousala and Hall 2008: Hall et al 2010). Asghar (2001) discusses a broader perspective, by referring to the Brundtland Report (WCED 1987, p3) and the futility of focusing or dealing with the environmental problems without viewing these issues through a wider lens, to encompass the factors that underpin world poverty and international inequality.

These perceptions have also been challenged by increased understanding of richer based contexts, supported by multi-disciplinary processes of all kinds, not least of all, the expansion of educational platforms of exchange, that rely on action based research, but also statistical data base analysis.

This paper discusses the concepts of sustainability, community engagement, methodological approaches (through a social complex adaptive systems lens) and educational experiences based an educational pilot project, namely Aalto LAB Mexico (ALM). This experimental case study was based on previous research, current literature and fieldwork engagement with specific rural communities in Mexico (Garduno et al. 2013).

2098

MANIFEST FOR TRANSLATIONAL SYSTEMS SCIENCES

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The purpose of the present paper is to propose Translational Systems Sciences, a new trend in Systems Sciences.

The concept of translational research originally comes from medical science for enhancing human health and well-being. In the field of medicine, it is used to translate the findings in basic research more quickly and efficiently into medical practice and, thus, meaningful health outcomes. Applying the knowledge gained by basic science is a major stumbling block in science, partially due to the compartmentalization within science.

Translational medical research is often labeled as "Bench to Bed-side" since it involves the movement of research from laboratory to the clinical practice. With its focus on removing barriers to multi-disciplinary collaboration, translational research has the potential to drive the advancement of applied science.

Translational systems sciences is a new trend within systems sciences motivated by the need for practical applications that help people. The term "translational" implies that translational systems sciences is scientific research that facilitates the translation of findings from basic science to practical applications. It is an attempt to bridge and integrate bench (or systems theories and models) and bedside (or systems methodologies and systems practices) .

It takes "two-dimensional approach", that is, the research domain is characterized by two axis. The horizontal axis implies trans-, multi- or inter-disciplinary approach, while the vertical axis means translational and holistic approach. Holistic approach is for deriving understanding of parts from the behavior and properties of wholes rather than derive the behavior and properties of wholes from those of their parts.

We have kicked out a project with Springer to publish a book series titled Translational Systems Sciences. I and Dr Hiroshi Deguchi are serving as Chief-in-Editor of the whole series. Titles of the first three volumes of the series are “Social Systems Design” (ed. Gary Metcalf), “Service Systems Sciences” (ed. Kyoichi Kijima), and “Agent-based Social Simulation” (ed. Hiroshi Deguchi). We are asked from Springer to publish at least five but if possible ten volumes under the series title.

Since we believe the ISSS is one of the most active research cores in systems sciences, I would like to invite to the project as a chapter contributor, volume editor or another.

I would appreciate contribution and participation from the ISSS very much!

2100

INCO MOVEMENT - PRACTICAL EXPERIENCES OF SYSTEM APPROACH WITH LOCAL AND GLOBAL IMPACT

Violeta Bulc

The project described in this paper is a practitioner’s experience about changes that a passionate and a professional movement can make based on systemic approach and heart energy. Thousands of people were touched by it, challenged, encouraged, recognized, and supported in their own pursued for contribution.

It was not done rationally nor due to an extended explicit knowledge about systemic and systems thinking. That came later and helped us to understand better the inner strength of the movement. It came naturally. We were trying to understand the concept of an innovation ecosystem as a whole in order to be able to see which parts we might have a capacity to address, as well as to understand their co-relations. It is based on a local initiative that spread very fast internationally and started to connect with many similar initiatives around the world, e.g., Innovation Journalism Program at Stanford University, Change The Game initiative from Austria, European Journalistic Centre etc.

Our friends and co-creators are from many different countries: India, Portugal, Austria, Uruguay, USA, Brazil, Finland, Sweden, Switzerland, Bosnia and Herzegovina, Serbia, etc. We contributed to the launch of several local initiatives, e.g. Heart of Slovenia, “Forest kindergartens”, InJo and InCo national awards, Management Forums, etc. We co-created with other institutions and professionals many papers, conferences and initiatives addressing the power of movements, innovation, intuition, social responsibility, and civil participation.

The first events and gatherings were followed by a model, than we created a common long term mission, followed by a tangible and non-tangible results, sparkles in people’s eyes and many more tools that we made available to everyone that expressed an interest. In the e-book ”The power of contribution”, which we are officially launching in Vietnam, we show how we came about, what are the results, who we share the passion with, and where our dreams are leading us in the future (for now).

2103

SYSTEMS THEORY AND PRACTICE: THE ROLE OF ACTION RESEARCH IN ORGANIZATIONAL CHANGE AND DEVELOPMENT

Debora Hammond

This paper will explore relationships between the various lineages of applied systems thinking, particularly in relation to the use of action research and related methodologies to support more participatory and inclusive approaches to decision making in

organization. It will examine respective theoretical orientations and implications for practical application in a number of systems-oriented traditions, including general systems theory, critical systems theory, socio-technical systems, organizational learning and organization development.
Keywords: action research, organization development, applied systems theory

2104
THE CONCEPT OF RESILIENCE IN COMMUNITY AND ENGINEERED SYSTEMS - A CROSS SECTORAL FEEDING OF IDEAS

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This paper outlines some recent work in organising the metaphor of “resilience” in application to engineered systems. This work provides an approach to the identification of threat types and magnitudes and the acceptable or desired outcomes to instances of the threats which can be used for specification of engineered system. The paper then explores the usage of the word family “resilience” in The Australian Journal of Emergency Management, a sector journal published by the Australian government. It is found that “resilience” is used as a metaphor, which is often described, in various ways, but not tightly defined. It is concluded that the emergency management sector would benefit from exploring the broadening and application of the engineering concepts to the less crisp issues related to the impact of threats on distributed community systems, so that appropriate disaster resilience development responses are made.

Keywords: Resilience; Emergency management; Engineered systems

2105
AN ACTION RESEARCH STUDY OF ORGANIZATIONAL TRUST IN CHINA

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As economic indicators such as GDP growth, trade volumes, etc. show, China has become in recent years one of the main world economic actors. This very fast growth relied on massive investments in infrastructures, a forced urbanization of the coastal areas and significant exports. This development of the Chinese economic system and society was triggered by the famous saying of Deng Xiaoping no matter the color of the cat as long as it catches the mice. Was the Chinese societal system ready to embrace such a massive and rapid change? Despite expected lower growth rates for the years to come, the World Bank and the IMF still predict a healthy development of the Chinese economy of five to seven percent till 2020. However the fundamentals of the economy are changing and the next wave of growth will mainly be coming from increasing domestic demand, potentially two fold within five years, through better and more reliable products and services? Is the Chinese business system ready? This paper looked at these questions through a system lens approach by focusing on the notion of trust.
The importance of trust in all human activities has been widely researched in diverse fields such as psychology, sociology, economics and management. Previous research has proven that interpersonal trust influences inter-organizational reliance, that personal traits and behaviors do impact trust building and that all human beings make their choices according to four drives, namely acquire, defend, bond and create, which impact trust building. This research looked at how these elements are manifested among

Chinese people. It revealed that Chinese peoples' understandings of trust, and their needs to have evidence of certain elements to give trust, are very similar to what western people expect in order to build trust. However the Chinese societal system has a significant influence on how these elements need to unfold.
The interviews of Chinese business men and women carried out for this study surfaced how still alive is the impact of the cultural revolution on the notion of trust and how new it still is for Chinese to do business outside of known networks, the so called guanxi. With the opening of the society some 40 years ago, many Chinese business people have been influenced by western values and beliefs systems and different trust building approaches but the 2008 crisis let them realize another side of the western promises. Within days, the notions of authenticity, team spirit vanished to serve superior financial interests. It became evident through the interviews that many Chinese, unclear about their value and belief system, are now confused. What to believe in, what to strive for, where to go…and who to trust? They became successful by further developing their acquire, defend and create drives but their ability to bond did not progress much and still mainly functions within known networks.
This other side of the Chinese miracle may have a significant impact on China's ability to move to its next phase of development which requires a deeper collaborative approach with a more diverse set of partners, that is to better be able to bond, even if this study also showed that the new generation is more reflective and critical than the previous one, as well as more balanced in its management of family and friends versus new acquaintances' relationships. This makes them more agile at collaborating and communicating, helping them extend and manage trust more easily.

2106
SOCIAL SYSTEMS DESIGN AND BOOK

Gary S. Metcalf

This book, in the Translational Systems Science series, brings together approaches to the design of human social systems in both retrospective and future thinking ways. It describes the experiences of professionals who have applied systems concepts for decades, including Aleco Christakis, Merrelyn Emery, and Raul Espejo, as well as those who are advancing cutting edge approaches today, including Jim Spohrer.

Keywords: social systems, design, structured dialogic design, socio-ecological systems, Smarter Cities

2115
AUTOMATIC GENERATION OF HYBRID ELECTRIC VEHICLE TOPOLOGY USING GENETIC ALGORITHM

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As fuel prices rise, and environmental concerns increase, people are looking for alternatives to gasoline automobiles. Electric cars are the ideal alternative as they have no tailpipe emissions, are extremely energy efficient, and can be charged with electricity for a fraction of the price of gasoline. Unfortunately adoption of electric vehicles is

limited because consumers fear being stranded with a depleted battery far from a charging station, or they cannot afford the high price tag. As a stepping stone towards electric vehicles, hybrid electric vehicles (HEV) have gained popularity as a fuel efficient, environmentally conscious option.

HEVs combine the internal combustion engine (ICE) drivetrain and the electric drivetrain to create an improved fuel efficient propulsion system. Varying degrees of hybridization exist, including: stop-start, mild, and full hybrids. Stop-start hybrids turn off the ICE while idling to save gasoline, and use an electric motor to immediately restart the ICE upon acceleration. Mild hybrids have the advantages of stop-start hybrids, but additionally allow driving short distances (<5km) on battery power and regenerative braking. Full hybrids include the advantages of mild hybrids, but allow charging from a conventional 240VAC outlet. Full hybrids have a larger battery enabling electric-only propulsion for longer trips (>30km). The increased complexity of the hybrid drivetrain also increases the cost and weight of the vehicle, and is generally not yet cost competitive with smaller fuel efficient ICE automobiles.

Full hybrids come in different configurations, the most common being: series, parallel, and powersplit. Series HEVs provide traction via electric motor only; an ICE connected to a generator to charges the battery. Parallel HEVs are driven by both the ICE and electric motor concurrently. When the battery is depleted, the ICE can provide traction while simultaneously charging the battery. Powersplit HEVs have a planetary gearset, which allow the HEV to switch between series or parallel mode. These three are the most common configurations, however others do exist.

A novel approach employing Linear Graph Theory and the Genetic Algorithm is being developed to automatically generate new HEV configurations. An HEV system configuration can be represented by a Linear Graph, in which the nodes represent components, and the edges represent connections between them. This Linear Graph can be then be expressed as an adjacency matrix. By converting this matrix into a string, the entire system topology can be represented as a genome.

This genome is a description for a mathematical model, which will be simulated and given an objective score for fuel consumption. Using the Genetic Algorithm, an initial population (first generation) of genomes will be randomly created. The highest scoring genomes will be selected to create a new generation of offspring. Offspring are created by selecting a genome substring, and switching it with other genome substring to create two new genomes. To avoid a single genome dominating, substrings can be mutated (altered) at random. After many generations the highest scoring HEV configuration will dominate, which will be considered to be the optimal HEV configuration.

2116

USING A SYSTEMS THINKING APPROACH TO INVESTIGATE THE IMPACT OF CLIMATE CHANGE ON LIVESTOCK PRODUCTION IN AUSTRALIA

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The impact of climate change on livestock production is a complex problem, involving interactions among several sectors such as environmental, social, economic and political systems. Historical data on climate such as monthly temperature, average annual and

seasonal rainfall across the regions and states over more than 100 year record (1910s - 2012) were acquired and analysed; while statistic figures on animal production, land use and annual economic contribution were collected over the last 40 years (1972 - 2012). Overall, changes in frequency of extreme temperature and rainfall reliability have a direct effect and lead to a reduction in animal productivities, crop and pasture production. This causes a decline in livestock product supply and crop and feedstock supply, leading to an increase in food cost and feed cost. In addition, research related to climate change, public media reports, policies and regulations together play important roles in mitigating and adapting to climate change. These factors affect livestock production directly through their influence on public concern of climate change, leading to changes in management practices. Although there have been various scientific evidences on the impact of climate change, it would take time to raise public concern on this matter. A systems thinking approach is employed in this study to understand the overall impact of climate change on Australian livestock production and identify systemic intervention strategies to address this complex problem. It also helps to enhance knowledge and practices in animal management systems in Australia. Through the application of systems thinking and causal loop diagrams, three most important systemic intervention strategies are recommended: enhancing research related to climate change; enhancing public concern by providing appropriate education programs to the public and training programs to relevant stakeholders; and controlling the stocking rate to reduce pressures on crop and pasture production.

Keywords: systems thinking; systemic interventions; climate change; Australian livestock production; management

2120

USING AN EVOLUTIONARY LEARNING LABORATORY APPROACH TO ESTABLISH A WORLD FIRST MODEL FOR INTEGRATED GOVERNANCE OF HAIPHONG, VIETNAM

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We manage the systems we are part of in a highly compartmentalised structure. Government departments are a typical example of how society operates in silos. However, complex political, environmental, socio-economic, and business-financial issues tend to transcend the jurisdictions and capacities of any single government department, which adds significantly to the difficulties in finding systemic management solutions and effective governance plans. This lack of cross-sectoral communication and collaboration in complex national and global environments compromises the leaders and policy makers in government, leading to centralised protocols and siloed departments that undercut local responsiveness. The Government of Haiphong City (HPC) decided to establish an Evolutionary Learning Laboratory (ELLab) to enhance communication and collaboration between the different departments in order to develop an integrated and systemic Governance Plan for HPC.

Workshops and specialist forums were held to gather the mental models of representatives of different Government departments. The “learning” process started

with integrating the various mental models into a systems structure using Causal Loop Modelling and continued during the steps of interpreting and exploring the model. A deeper understanding of the potential implications of actions, strategies and policies lead to the identification of leverages and systemic interventions that will contribute to the development of a sustainable HPC.

A series of Bayesian Belief Network (BBN) models is developed for each of the identified systemic interventions, determining the requirements for their implementation, the factors that could affect the expected outcomes; and the order in which activities should be carried out to ensure cost-effectiveness and maximum impact. The models are combined and used to develop a refined systems model, which forms at the same time a systemic strategic and operational plan for integrated governance of HPC.

Keywords: systems thinking; sustainable development; complex problems; management models; ecological-economic (eco2) city; ELLab

2121

EFFECTIVENESS OF HANDS-ON PRACTICE IN BRIDGING THE GAP BETWEEN SYSTEMS SCIENCE AND SYSTEMS ENGINEERING

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This paper presents results obtained and lessons learned from a trial course on systems engineering in Graduate School of System Design and Management (SDM). This trial course provides students with hands-on education for system design using commercially-off-the-shelf (COTS) components and a sizable amount of development works within the limitation in one semester consisting of 26 slots with 90 minutes per each slot. The objective of this course is to help students to bridge the gap between the methodology based on the system science and a real world practice by an affordable example of development project. The assignment is given to the students to develop a remote control system of an automatic vacuum cleaner operated by using existing network systems from foreign countries. All the hardware components are prepared by the instructors as commercially off-the-shelf (COTS) product. The students are assumed to master fundamentals of systems approach including science oriented subjects such as mathematics for the System Design and Management in addition to mechanical engineering and information technology. They are required to design the total system and to develop a part of software programs referring to the specifications of the COTS. Systems engineering approach is emphasized by starting with defining Concept of Operations (CONOPS) and requirement identification and analysis, and then proceeded to system architecting and design. After the functional requirements are defined, the physical realization and feasibility are analyzed with verification and validation planning. Upon completion of the detailed design was, they proceed to software program coding and manufacturing with purchasing of some parts under a limited small budget,. The components actually used are ‘Roomba’ and a small video camera as COTS and use of ‘Wifi’ networking is assumed. This course is a group work with 4 to 6 students, which includes a few science/engineering and non- engineering students. Nationality and age of the students in a group are intentionally mixed so that communications/facilitations are not easy as in the real situation. The results are summarized to show importance of the effort to bridge the gap of system science and engineering practice of the real world even for this simple case.

Keywords: Education, Hands-on Practice, Systems Engineering and Science

2122

TUTORIAL: SIMULATED TABLETOP EXERCISE FOR ANTI BIO-TERORISM RISK MANAGEMENT – AGENT BASED MODELING TRANSLATIONAL SYSTEMS RESEARCH

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In this tutorial session we present simulation supported tabletop exercise and its application to risk management for bio-terrorism by smallpox. For the purpose we have developed the simulation model of the infection process by smallpox on a virtual city. The simulation supported tabletop exercise has designed on our simulation model for translational risk management by evaluating several types of policy scenarios against bio-terrorism by smallpox.

The simulation supported tabletop exercise has already executed by some professionals against bio-terrorism at Global Security Center, Keio University.

We execute the simulated tabletop exercise as 1 hour participatory session. Participants can play the exercise without using computer and can learn more about translational systems research. Minimum 4 participants are required for playing the exercise.

Keywords: social simulations; agent-based modeling; tabletop exercise against smallpox; translational systems science

2123

SOFT SYSTEMS THEORIES FROM MARIBOR, SLOVENIA, AND THEIR USE IN THE REAL WORLD

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Based on Mulej's Dialectical Systems Theories and Kajzer's work on Business Cybernetics at the University of Maribor, Faculty of Economics and Business, several new systems and cybernetic theories and their applications in the real world have been created, over the forty years since the first publication about the Dialectical Systems Theory. This experience is briefed here.

Most details can be found in the book: Mulej M et al. 2013. *Dialectical Systems Thinking and the Law of Requisite Holism Concerning Innovation*. Litchfield Park: Emergent Publications; and references quoted there (especially in the chapter by Vesna Čančer and Matjaž Mulej). The related further book is: Mulej, M., Dyck, R., editors. 2013. *Social Responsibility beyond Neoliberalism and Charity.* Bentham (forthcoming), in four volumes. Related collection of articles are being prepared for *Systems Practice and Action Research* (on 'Measures and Measurement of Social Responsibility'), *Systems Research and Behavioral Science* (on 'Social Responsibility as a New Socio-Economic Order'), *Kybernetes* (On 'Systemic Behavior, Requisite Holism and Social Responsibility in Tourism') and *Nase gospodarstvo* (On 'Economics of Social Responsibility').

Keywords: *Application; Business Cybernetics; Control Systems Theory; Cybernetics of Security Systems; Dialectical Network Thinking; Dialectical Systems Theory; 4th Order Cybernetics; Innovation Management; Lateral Thinking; Law of Requisite Holism; Personal Requisite Holism; Quantified Dialectical Systems Theory; Six Thinking Hats; Social Responsibility; Standardized Decision Making; Strategic Management; Universal Dialectical Systems Theory.*

2125
INTEGRATED INFORMATION OR NEGATIVE-NEGATIVE ENTROPY

Allenna Leonard

In 2010 I talked about real-time monitoring of key indices and the use of models such as the Viable System Model to provide a template for a whole systems approach. Since then the capacity to access 'big data' through analytics has grown and widespread surveillance of individuals has led to concerns about governmental and commercial invasions of privacy and misuse of information. But, the extent to which this information serves the general welfare remains problematic.

Sustainable environments and democracies are still in danger from a lack of timely, accurate and integrated information. Integrated information may be absent as the work has not been done. In some jurisdictions, standards of information gathering, such as the mandatory vs. voluntary reporting, have been relaxed and data lose their consistency and credibility. Narrowed scope of regulations and monitoring folded into omnibus legislation denies up or down votes on specific aspects. Supposedly democratic governments sometimes muzzle their scientists or even defund well-established research centers if they believe their results will displease an important constituency or source of campaign contributions.

At the same time, thanks to technology, information about individuals is easier and easier to get for targeted marketing of goods or political parties or government surveillance. We are not far from the state of affairs noted by Foucault. In earlier times rulers put themselves forward in public displays of power and little was known of the powerless. Now, it is the powerless whose every move can be tracked while anonymous funders and hedge fund investors manipulate the chess pieces of the world economy. Even when the surveillance is for benign ends, such as preventing terrorism, the level of intrusiveness and the possibility of error raise red flags. There are also questions of filters and channel capacity – the chances of finding a needle in a haystack are not improved by adding more hay.

On the other hand, it can be very difficult for individuals or governments to find out information protected by powerful lobbies. People would genuinely like to know who holds their mortgage and whether they are eating GM foods but it can be difficult if not impossible to find out. The US Center for Disease Control wants to know about gunshot injuries, but the National Rifle Association got a law passed forbidding mandatory disclosure of that information although cribs and playground equipment, which account for a much smaller incidence of injuries have strict requirements.

Unfortunately, information needed for good governance is also threatened by deliberately concocted wrong information – what we might call negative negative entropy. Lies and distortions take time and effort to disprove. Political and industry advertising campaigns at best show situations from only the perspectives of those who benefit from the current situation. Individual citizens, non-profit groups and other parties or levels of government sometimes have to sue to find out what is happening and/or what evidence was present to justify decisions. Sometimes it is enough to confuse the issues until the 'facts on the ground' are too well established to change.

On the plus side, citizens and their advocates are not fooled by these actions and typically resent being lied to and manipulated. Some take to the streets. Transparency is a competitive advantage. It encourages innovation and investment in useful products and services rather than rent-seeing opportunities. Being seen as a petro-state or a country where one industry holds undue sway is a liability as is toleration of corruption and poor contract enforcement. This provides incentives for countries to listen to the people, clean up their acts and diversify their economies to achieve stability and prosperity.

Keywords: negative-negative entropy, viable system model, problems with information

2126

MARITIME AWARENESS DEVELOPMENT AS A KEYEDUCATIONAL ISSUE: A LEARNING SPIRAL TO FOSTER BIOSOCIAL SUSTAINABILITY.

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This paper presents the challenge and opportunities related to the development of maritime awareness in Argentina. The Biosphere is an integrated planetary system. Life renewal occurs by the interaction of millions of living beings in a multileveled network by interactive processes in the lithosphere-atmosphere-hydrosphere. Sea, lakes, rivers, glaciers are key components of these life cycles not properly recognized as such in this country, consequently not sufficiently studied and taken care of.

The country has vast national maritime area, big lakes and navigable rivers, inter-oceanic communication zones, and an Antarctic sector, but an almost non existent maritime awareness in its population. Here arises the opportunity to foster a learning spiral putting systemic concepts at good use.

Collaborative actions to foster maritime awareness is a shared aim of GESI (Grupo de Estudio de Sistemas Integrados), the Argentine chapter of the ISSS, and AcMar (La Academia del Mar). Both not for profit scientific interdisciplinary institutions that share a systemic transdisciplinary methodology.

GESI is constantly in the process of developing and disseminating its (institutional) knowledge, promoting relevant and virtuous processes within its network. By valuing the work done by its founders, the organization undertakes the purpose of achieving cohesion in the present to renew its projection into to the future, fostering a self-ecolearning spiral which moves forward by means of collaborative-synergetic actions.

This leads to a better knowledge of GESI's members and network, and shows to be useful to identify issues and opportunities to reinforce think-link-do. The process also leaded to identify the Ocean as a key system where GESI collaborates with the AcMar.

The Ocean as a complex issue requires an integral State Sea Policy. Policies have to orient action to the emergence of a new set of values in order to manage marine areas. Public and civil sectors have to work collaboratively, taking benefit of their different views on the subject. Fostering a learning spiral around maritime awareness in the country will enhance socio-ecological local-regional-planetary sustainability.

The "Guidelines for a National Ocean Policy in Argentina" provided by the AcMar aim to support policy makers, managers and other stakeholders in their decision making. They stress the importance to think and rethink values and to develop an integrated vision of how to manage the Ocean; in a participatory process of different sectors to promote a

desirable future. The guidelines thoroughly explain why the sea constitutes a *permanent and vital interest* to our society; consequently identify a number of principles in order to develop the necessary state policy.

Furthermore, the guidelines include an Action Plan that provides essential content grouped in the following areas: 1) observation and knowledge, 2) planning, 3) management, 4) education and culture, 5) prevention, 6) security and defense, and 7) dissemination of marine subjects. Integrating the sea into the culture is an iterative process, which implies involvement of different activity areas and stakeholders.

GESI and the AcMar see this complex issue as an opportunity to consolidate and establish new links in order to develop collaborative actions with the purpose of disseminating systemic concepts. Both institutions envision the achievement of educational activities, including action-research projects. The author(s) are convinced that it will be demonstrated by those projects that systemic knowledge contributes to the well being of the local-regional-planetary community.

Author Index

Keyword Index

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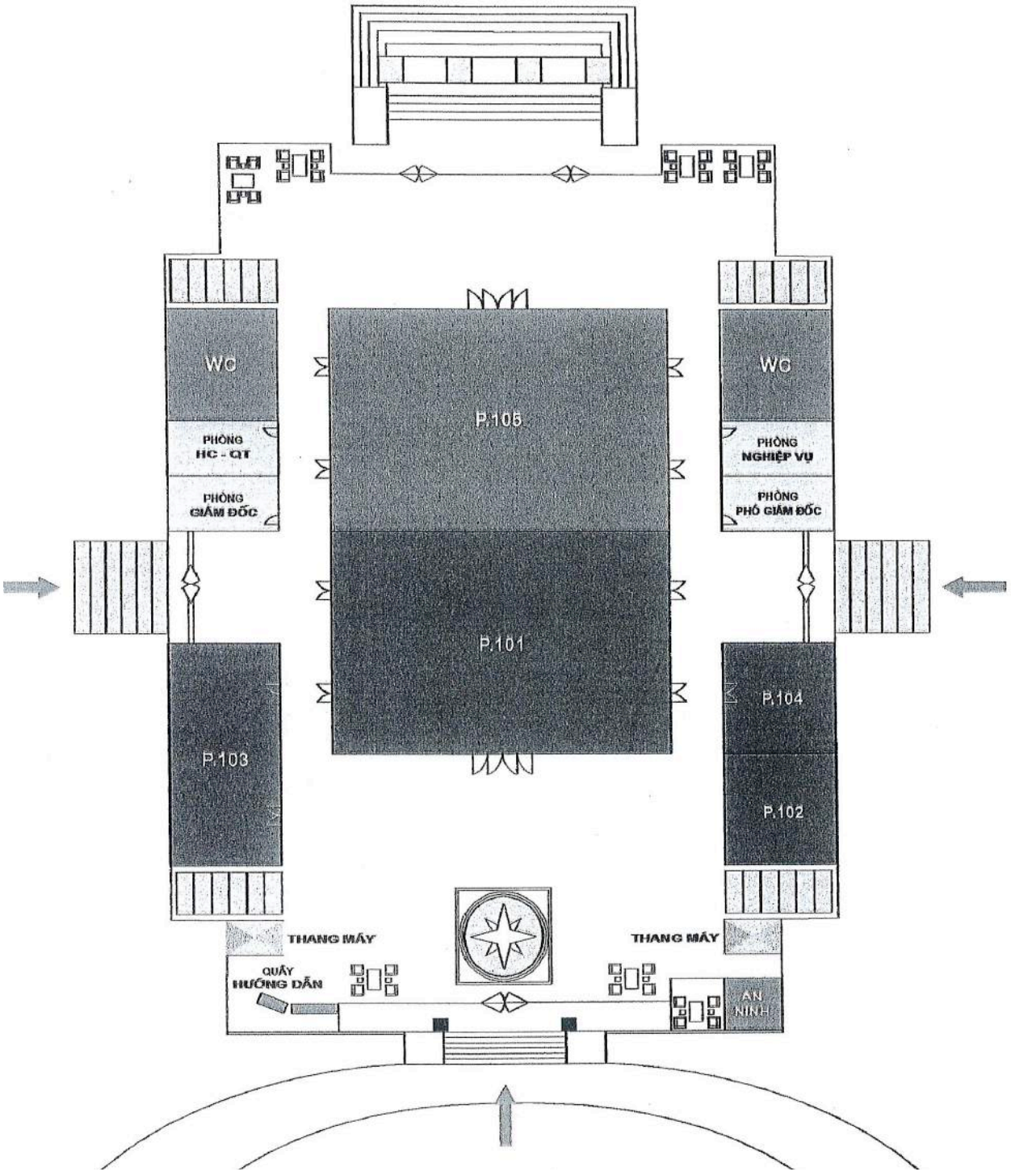

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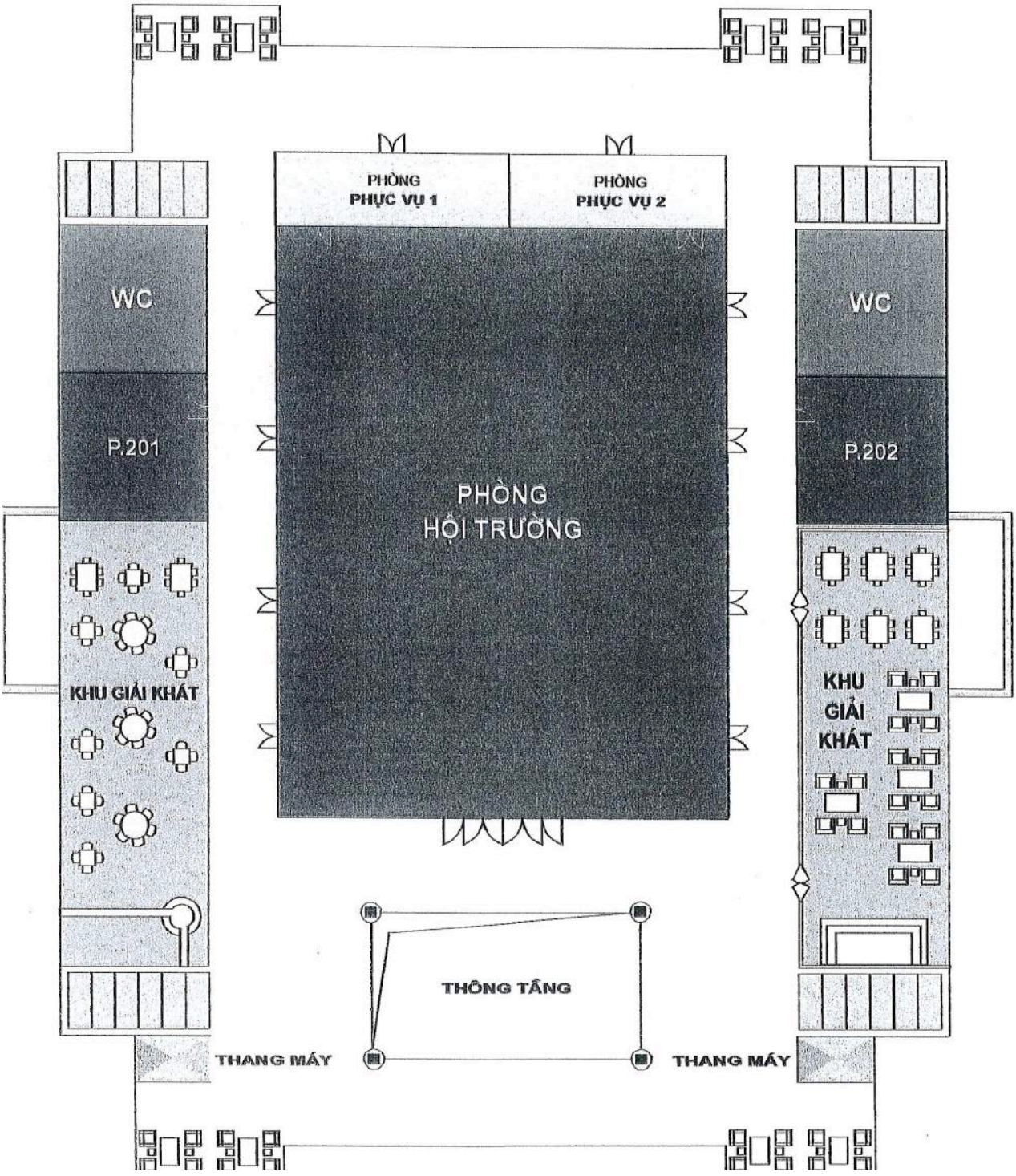

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