Janie Chroust, 2010

International Federation for Systems Research

"Systems Thinking: New Directions in Theory, Practice and Application"

Proceedings of the
Seventeenth IFSR Conversation

M.C. Edson, G.S. Metcalf, G. Chroust, N. Nguyen, and S. Blachfellner (eds.)

April 27 – May 2, 2014
St. Magdalena / Linz (Austria)

SEA-Publications: SEA-SR-41

Institute for Telecooperation
Johannes Kepler University Linz, Austria
gerhard.chroust@jku.at
March 2015

ISBN 978-3-902457-41-7

JOHANNES KEPLER UNIVERSITY LINZ | JKU

Impressum

Schriftenreihe: SEA-Publications

Johannes Kepler University, Linz

Systems Thinking: New Directions in Theory, Practice and Application

Proceedings of the
Seventeenth IFSR Conversation
M. C..Edson, G. S. Metcalf, G. Chroust, N. Nguyen, and S. Blachfellner (editors)

April 27 – May 2, 2014
St. Magdalena / Linz (Austria)

Printing sponsored by the
International Federation for Systems Research (IFSR)

Printed:
WLK Druck, A-2340 Mödling, Austria

Johannes Kepler University Linz
Institute for Telecooperation
www.tk.uni-linz.ac.at
(version 1.2)

ISBN 978-3-902457-41-7

Table of Contents

Vice-Rector for International Affairs
Univ.Prof. Dr. FRIEDRICH ROITHMAYR

Phone: +43 732 2468-3390
Fax: +43 732 2468-3395
friedrich.roithmayr@jku.at

Ladies and Gentlemen, dear participants in the IFSR Conversation 2014 here in Linz!

As the Vice-Rector for International Affairs of the Johannes Kepler University I have the honor to open this academic event . The Johannes Kepler University Linz is a young university, but still has a long tradition of supporting System Sciences.

Already around 1970 an Institute for System Sciences under the leadership of Prof. Adolf Adam and Prof. Franz Pichler was founded, which later was augmented by a department for Systems Engineering which then became an Institute on its own under the leadership of Prof. Gerhard Chroust. Both professors were, respectively are, Secretary General of the IFSR.

System Sciences have continuously grown in their importance and especially in the academic world today are seen as one of the instruments to overcome some of our world problems.

While the technical sciences, especially the computer sciences, as offered in Linz both at the Technical and Socio-Economic Faculty bring forth new ideas and solution to some of our problems, we need system sciences and their holistic and interdisciplinary views to avoid humanity to drift into catastrophes of various sorts.

Linz and the Johannes Kepler University is proud to have this prestigious conference and you as our guests and I wish you on my behalf of the Rectorate of the University the very best success for your deliberations in the coming week.

Univ.Prof. Dr. Friedrich Roithmayr
Vice-Rector for International Affairs
Johannes Kepler University Linz, Austria

2014 IFSR Conversation – Impressions

Gary S. Metcalf, Mary C. Edson

From April 27 through May 2, 2014, the IFSR Conversation took place at Sankt Magdalena Seminarhaus near Linz, Austria. Six teams comprising a total of 40 participants from around the globe spent an intensive week in focused dialogues about future directions for systems engineering, thrivability (systems thinking in practice), cybernetics, philosophy, systems research, and the Conversation itself.

Overall, the 2014 Conversation was a resounding success. Some prior participants remarked that it was, "the best Conversation I have attended." Feedback from participants covered everything from the venue, food, and service to the content of the team dialogues and the quality of interactions during the week. As much as many long-term participants remember the meetings at Fuschl am See, this new venue appears to be working well.

Most participants expressed appreciation for opportunities to have high quality interaction with one another both in their teams as well as in more informal settings, for example at meals and excursions into Linz and outlying areas. Results from the evaluation showed that many participants would like more opportunities for informal discussions. There never seems to be sufficient time for connecting with one another!

We also received excellent feedback from participants for planning future Conversations. One of the important recommendations was more in-team preparation in the months leading up to the Conversation, so the time spent on-site could be used to move team progress along more quickly and focus on matters that can only be addressed in person. It also seems that we need to keep you caffeinated and virtually connected (wi-fi) around the clock.

All suggestions made will factor into planning the next Conversation. The Executive Committee appreciates the keen participation and feedback by all team members and looks forward to the 2016 Conversation.

Special Mention

Special recognition should be given to Ranulph Glanville's passing on Dec. 20, 2014. Ranulph knew that he was quite ill at the time that he attended this conversation, but he made no real mention of it and contributed as any other participant (except, of course, for still being Ranulph). He was only able to attend the 50th Anniversary of the American Society for Cybernetics meeting in Washington, D.C. by video, despite having worked several years in its planning, so this was the last opportunity that many of us had to spend with him personally. Ranulph's contributions to the field of cybernetics are testaments unto themselves, and he is missed already.

LIST OF 2014 IFSR CONVERSATION PARTICIPANTS

TEAM	TEAM LEADER	PARTICIPANTS
1 'Quality Control' of Model Development for Successful Systems Intervention	Janet Singer	Michael Singer Jim Kijima Duane Hybertson Rick Adcock Mike Yearworth Gerhard Chroust
2 Thrivable Systems — from Vision to Reality	Alexander Laszlo	Ockie Bosch Nam Nguyen Violeta Bulc Warwick Watkins Ming-Fen Li Dino Karabeg Stefan Blachfellner
3 New Directions in Cybernetics	Michael Lissack	Allenna Leonard Ray Ison Ranulph Glanville † Tatiana Medvedeva Bernard Scott Stuart Umpleby
4 Future Directions of the Banathy Conversation Methodology		Gordon Rowland Gordon Dyer Jed Jones Silvia Zweifel Yoshiaki Ohkami Yoshi Horiuchi
5 Philosophical Foundations for the Modern Systems Movement	Jennifer Wilby	David Rousseau Julie Billingham Rousseau Manfred Drack Rainer Zimmerman
6 Systems Research	Mary Edson	Louis Klein Shankar Sankaran Debora Hammond Pam Buckle John Kineman Will Varey
President		Gary Metcalf

CONTACTS

Janet Singer		jsinger@soe.ucsc.edu
	Michael Singer	mjsinger@soe.ucsc.edu
	Jim Kijima	kijima@valdes.titech.ac.jp
	Duane Hybertson	dhyberts@mitre.org
	Rick Adcock	r.d.adcock@cranfield.ac.uk
	Mike Yearworth	mike.yearworth@bristol.ac.uk
	Gerhard Chroust	Gerhard.Chroust@jku.at
Alexander Laszlo		alexander@syntonyquest.org
	Ockie Bosch	ockie.bosch@adelaide.edu.au
	Nam Nguyen	nam.nguyen@adelaide.edu.au
	Stefan Blachfellner	stefan@blachfellner.com
	Violeta Bulc	violeta.bulc@vibacom.si
	Warwick Watkins	warwickwatkins@gmail.com
	Ming-Fen Li	samadhi1080@gmail.com
	Dino Karabeg	dino.karabeg@ifi.uio
Michael Lissack		lissack@isce.edu
	Allenna Leonard	allenna_leonard@yahoo.com
	Ray Ison	r.l.ison@open.ac.uk
	Ranulph Glanville †	
	Stuart Umpleby	umpleby@gmail.com
	Tatiana Medvedeva	tmedvedeva@mail.ru
	Bernard Scott	bernces1@gmail.com
Gordon Rowland		rowland@ithaca.edu
	Gordon Dyer	gordon.dyer@btinternet.com
	Yoshi Horiuchi	KHB15476@nifty.ne.jp
	Jed Jones	jed@mindecology.com
	Silvia Zweifel	silviazweifel@fibertel.com.ar
	Yoshiaki Ohkami	ohkami@sdm.keio.ac.jp
Jennifer Wilby		wilbysystems@gmail.com
	David Rousseau	david.rousseau@systemsphilosophy.org
	Julie Billingham Rousseau	Julie.billingham@systemsphilosophy.org
	Manfred Drack	manfred.drack@univie.ac.at
	Rainer Zimmerman	rainer.zimmermann@hm.edu
Mary Edson		maredson.s3@gmail.com
	Shankar Sankaran	shankar.sankaran@uts.edu.au
	Will Varey	wvarey@gmail.com
	Debora Hammond	hammond@sonoma.edu
	Pam Buckle Henning	buckle@adelphi.edu
	John Kineman	john.kineman@colorado.edu
	Louis Klein	louis.klein@segroup.de
Gary Metcalf		gmetcalf@interconnectionsllc.com

Team 1: 'Quality Control' of Model Development for Successful Systems Intervention

Team Leader: Janet Willis Singer, USA,
Team Members:
Rick Adcock, GBR
Gerhard Chroust, AUT
Duane Hybertson, USA
Kyoichi 'Jim' Kijima, JPN
Michael Singer, USA
Mike Yearworth, GBR

Abstract: *Team 1 continued the dialogue of recent years between systems scientists and systems engineers from IFSR member organizations, notably from the International Council on Systems Engineering (INCOSE) and the International Society for Systems Sciences (ISSS). The 2012 IFSR Conversation in Linz had led to the development of the Systems Praxis Framework, relating the terms 'systems science', 'systems thinking', and 'systems approaches to practice' in a common map. This loose framework was intended to allow systems researchers and practitioners to recognize and appreciate their complementary roles in the process of systems praxis without overly constraining the meanings of those terms. A November 2013 'Mini-Conversation' in Cómpeta, Spain had explored implications for systems intervention in general if 'wicked' or 'messy' problems were taken to be the default case rather than the exception. This led to an initial effort to situate systems engineering (SE) within a general view of understanding-intervening-reflecting cycles in systems intervention.*

Our 2014 topic provided a focus on concrete challenges of SE which was also relatable to a very broad range of issues from systems science, systems technology, systems arts and culture, and systems philosophy. At the end of four days we had started development of a broadly flexible new scoping diagram that could provide suggestions for 'quality checks' on modeling activities throughout a systems intervention. That figure placed the traditional SE 'Vee' model in a context of the other activities that must literally 'co-operate' if a systems intervention is to be successful, though these activities are too often left implicit and underappreciated. Following the Conversation, team members have continued developing this figure, its foundations, and its implications through weekly telecons.

Keywords: systems intervention, systems science, systems engineering, modeling, quality, qualia

1. Background

1.1. Why is 'Quality control of model development' a concern?

Since the existing and potential interdependencies among relevant factors in a systems intervention exceed any human capacity for visualization and manipulation, successful systems intervention requires that appropriate models be developed to augment those capacities. In particular, systems interventions that involve engineered systems are 'model-based' in several senses of that label, involving a multitude of models that range from implicit mental models of participants, to shared narratives and rich pictures, to encoded representations of project and process progress, to mathematical models and computer simulations.

Research on failed SE projects consistently shows that the greatest risks in modeling stem not from technical errors in model processing but from non-technical errors in model development and use. Two major challenges for quality management with respect to modeling efforts in SE are therefore

1) Ensuring that the right things are modeled and that they are modeled right, addressing risks from assumptions that are adopted without being subjected to test and evaluation; and
2) Maintaining coherent consistency or congruency among the many actively effective models throughout an intervention across varying dimensions of concern, background assumptions, scales and scopes, media, methods of encoding, participant groups, success criteria, etc.

These challenges provided a backdrop for both wide-ranging and focused exploration of ways to build upon our previous work to help advance the multi- and trans-disciplinary robustness of SE.

1.2. Previous work

The Systems Praxis Framework (SPF), shown in Figure 1, was begun by Team 4[1] at the IFSR Conversation in 2012 as a loose framework to relate the terms 'systems science', 'systems thinking', and 'systems approach to practice' without constraining the distinctive meanings held by their respective academic and practice communities. The SPF seeks to enable both researchers and practitioners to "recognize and appreciate the complementary roles played by all participants and stakeholders on the complex process of systems praxis" (Singer et al., 2012). Note that the clouds represent bodies of knowledge and the arrows should not be read as implying a sequential flow.

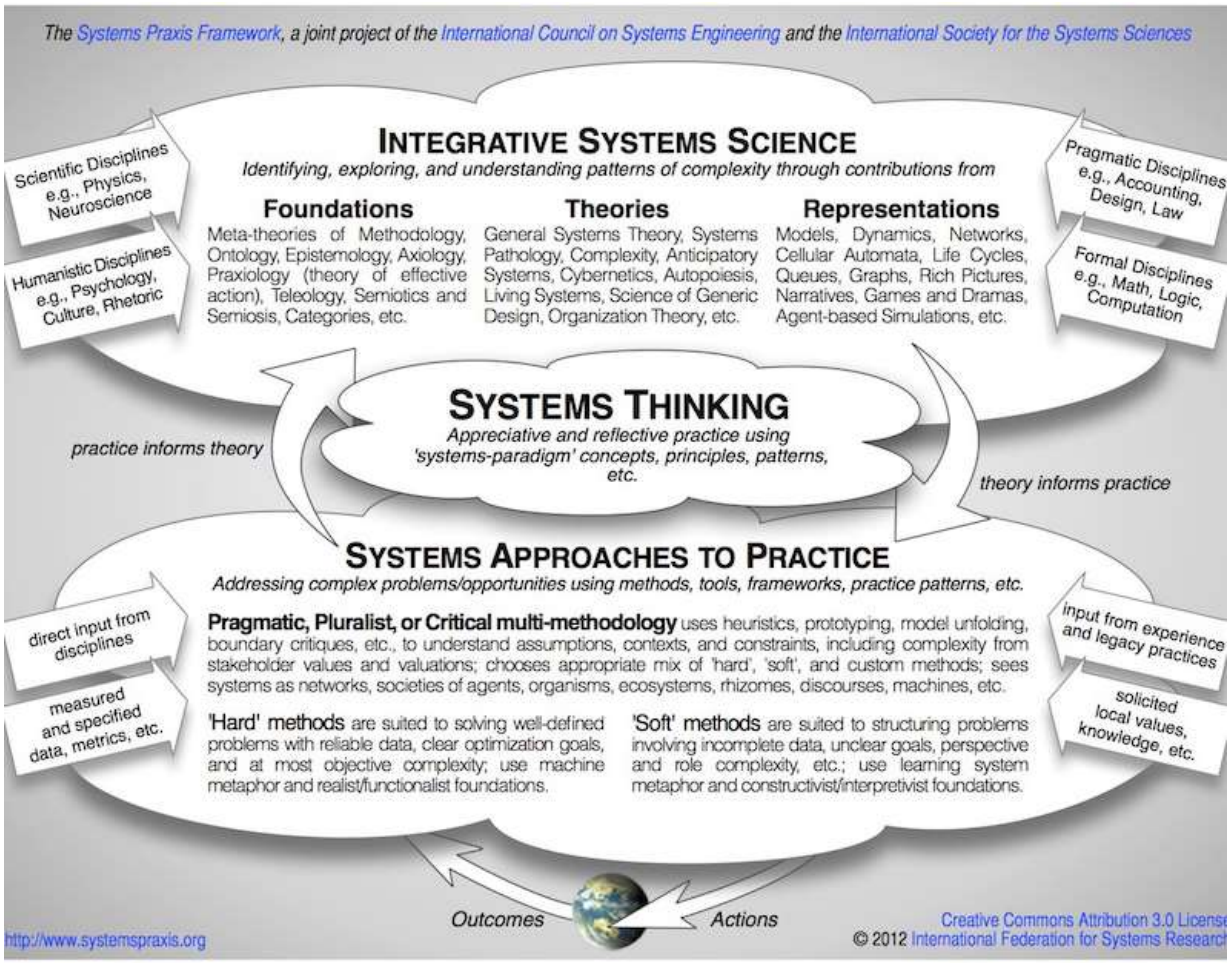


Figure 1. The Systems Praxis Framework (Singer et al., 2012). © International Federation for Systems Research, released under Creative Commons Attribution 3.0 License

At the Cómpeta 'Mini Conversation' in 2013, participants[2] explored how the bodies of knowledge in the SPF might be used by practitioners and researchers called upon to coordinate under resource-constrained conditions in dynamic environments. Such situations fall into the category of 'wicked problems', where (per Rittel and Weber 1973):

1) The aim is intervention in a problem situation;
2) There is no definitive formulation of the problem situation;
3) There is no 'stopping rule'; the problem situation is on-going;
4) Interventions are not right or wrong, there is no immediate/ultimate test of an intervention;

[1] IFSR 2012 Team 4: J. Martin (Team Leader), Bendz, G. Chroust, D. Hybertson, H. W. Lawson, R. Martin, H. Sillitto, J. W. Singer, M. Singer, T. Takaku

[2] Cómpeta 2013 participants: R. Adcock, G. Dyer, W. Hofkirchner, D. Hybertson, R. Poli, D. Rousseau, J. W. Singer, M. Singer, J. Wilby, M. Yearworth

5) Interventions are 'one-shot'; there is no trial-and-error (experiments); every intervention counts significantly; they are essentially unique;
6) There are no enumerable, exhaustively describable, set of interventions;
7) Problem situations can be considered as symptoms of other problems;
8) Interventions can be contested at the level of explanation, as there is likely to be conflicting evidence/data.

In considering the implications of the above for SE, the primary conclusion from the Cómpeta conversation was that there was a need for generic view of SE activities within a broader context of ongoing systems intervention cycles of understanding, intervention, reflection, and learning. An initial sketch of such a framework is shown in Table 1.

	Understanding or Problem Structuring	**Intervening** or Problem Solving	**Reflecting** on outcomes given Understanding, Intervention	**Encoding & Learning** instantiated and spread	
Any Intervention using Systems Science (SS)	Problem Structuring Methods (PSM) framing	General problem solving framing	Appreciation & reflection (A&R)	Change to Body of Knowledge (BoK) for Community of Practice (CoP)	
General Systems Engineering using SS	PSM for SE	General SE problem solving framing	A&R for general SE	Change to BoK for CoP	
Any SE type or domain (product, service, etc.)	PSM for SE type or SE domain	Particular SE problem solving framing	A&R for particular SE	Change to BoK for CoP	Disseminate as relevant to BoKs
My Project or Intervention	PSM for my project	Problem solving for my project	Appreciation of the particular implementation	Document as case study for CoP	

Table 1. Situating Systems Engineering within a robust framework for Systems Intervention (from Cómpeta conversation 2013, unpublished)

In order for this general framework for systems intervention to be capable of handling wicked problems as the default case, it was determined that it should ultimately

- Support organic and agent as well as technical characteristics;
- Support hybrid (social and technical) systems in a seamless way;
- Support arbitrary, fuzzy, uncertain systems boundaries;
- Support appropriate mass collaboration and innovations;
- Support and promote awareness of dualities, tensions, contradictions, dialectics, contrasts, paradoxes, reflexivities and impredicativities;
- Support a balance of stability and change;
- Provide a unified approach to harnessing and organizing knowledge from an array of disciplines supporting SE;
- Be flexible, extensible, adaptable, and evolvable as needed;
- Provide guidance for Quality Control or Quality Assurance on conceptual models.

1.3. Additional sources

Sufficiently broad foundations to support a generic framework for system intervention require an inclusive perspective that is truly trans-disciplinary, multi-worldview, and multi-scale. At the same time the goal is to identify robust simplifications that support improvements in analysis and communication by allowing necessary elements to shine through.

Our approach was to seek complementary and common patterns among known methods, models and theories of systems intervention that could support a generic framing of systems intervention, with a particular focus on understanding and addressing the factors that make 'tame' solutions brittle and preclude communication and coordination across worldviews and modeling approaches.

The System Value Cycle (SVC) from Ring (1998), shown in Figure 2, provided an excellent foundation for envisioning the broader context of activities that play a role in the success of a systems intervention. In the SVC, SE effort is concerned with the identification of an appropriate Problem Suppression System (PSS). The PSS is a system Specified, Developed and Assembled in response to a problem in its context, the Community Situation. While the purpose of the PSS is to 'suppress' the problem, the realized purpose ('purpose of the system is what it does' or POSIWID) could be significantly different from its intended purpose. The SVC illustrates a key lesson that is also emphasized in service-dominant logic: value is not realized until an offering is used in context, and an SE enterprise will ignore the need to foresee and account for the completion the value cycle at its peril.

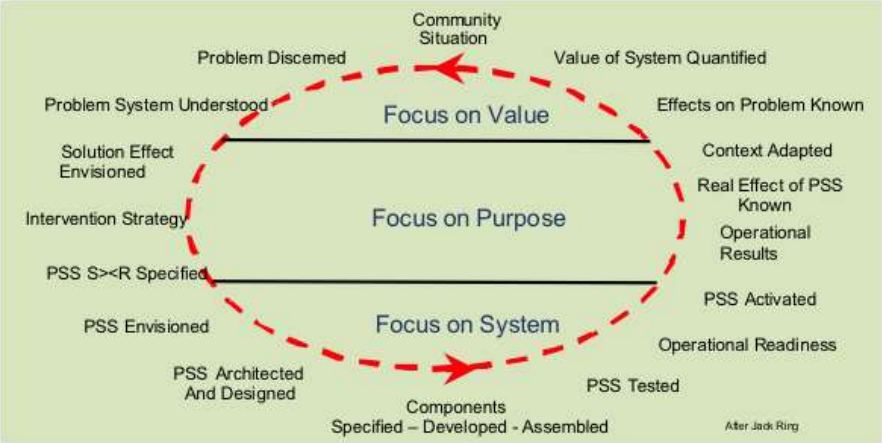


Figure 2. The System Value Cycle by Ring (1998) – reproduced with permission.

Other work and issues our discussions touched on in our discussions during the week included:

1. Boyd Cycle or OODA loop (Observe–Orient–Decide–Act);
2. Shewhart-Deming PDCA loop (Plan–Do–Check–Act);
3. Auftragstaktik or Mission Command doctrine;
4. Rosen's Anticipatory Systems;
5. Beer's Viable System Model;
6. Cynefin Framework;
7. Jackson's System of Systems Methodologies;
8. Miller's Living System Theory;
9. Checkland's Soft Systems Methodology;
10. Warfield's methods of problem structuring and 'work program of complexity';
11. Weinberg's Law of Medium Numbers;
12. Category-theoretic and graph-theoretic modeling;
13. C4ISR frameworks;
14. Real options analysis;
15. Agent-based and system-dynamic modeling and simulation;
16. Stochastic, subjective, intersubjective vs. objective complexity;
17. Types of emergence;
18. Set-based SE;
19. Troncale's Systems Processes and Pathologies;
20. Service-dominant logic;
21. Weaver's 1947 distinction between the sciences for problems of simplicity, problems of disorganized complexity, and problems of organized complexity;
22. Soft OR addresses areas of failure in SE using PSM for messy problems;
23. The purpose of modeling is communication, whether conceptual, mathematical, or simulation;
24. A system cannot be characterized with one view;
25. How is the need for multiple views to characterize a system related to complexity types? To emergence types?
26. What are problems with encouraging 'reuse' of designs that work?
27. Given a problematic situation, what is the history of ongoing problems, problem contexts and series of interventions?

28. How is the SE label related to the systems intervention label in a broadly systemic, dialectical, historical, or evolutionary view?
29. Wicked problems cannot be 'solved'; how do they contrast to hyper-wicked? To tame, wild and natural?
30. How can 5S-Kaizen be extended beyond manufacturing and quality, measured in terms of function and specification, to services and qualia, shared in terms of empathy?
31. How can SE be a key enabling part of an ongoing dialectical, problem-solving process?
32. Is it possible to develop compact, accessible, robust, and practical definitions of ST, SS, and SE?
33. What are roles for humanities and ethnography in documenting interventions: documenting for the future; reflective logs and pattern repositories; what worked and didn't?
34. How do you know in advance what's salient in a modeling effort?
35. How can SE benefit from a critical history of technology and cultural evolution?
36. How do you capture contextual and systemic elements in explicit models?
37. Is it possible to develop a general model of ongoing problem contexts and interventions, with views, phases, time, unique path dependencies?
38. How do you motivate people to take on pain of documentation early?
39. The question of quality needs to be related to capabilities; one needs a process view;
40. How can one anticipate ‘feature collision’?
41. 'Product lines' is a more appealing label than 'reuse';
42. Juxtaposing narratives of experiences – need semi-structured support;
43. What is the role for SE as a specialization with effective skills?
44. What of ST is not just a call for better thinking?
45. How can set-based SE incorporate ROA with aspects co-evolved?
46. How can one identify real dependencies, constraints, and refactoring early for Agile SE?

2. Progress during the week

2.1. Towards ‘hybrid’ theoretical underpinnings

Having considered a breadth of perspectives to be accounted for in a multi-faceted generic framework for systems intervention, the team sought ways to identify key dimensions that could compactly motivate the need for narrative stories, conceptual models, mathematical and logical models, and simulations. The approach that provided a turning point for this view is shown in Figure 3.

Service Experiences (characterized by qualia), Practice Patterns (characterized by social or intersubjective regularities), Work Processes (characterized by Service Level Agreements), and Dynamics (characterized by mathematic models and complexity science) were identified as fundamentally incompatible model framings. They are relatable, however, in a problem space that is partitioned into Technological and Cultural domains, with each of these further divided into Actualized and Latent. This framing supports a general or generic integrative understanding of SE in systems intervention as a constant interplay of Anticipation (A) and Learning (L), and Human and Material agency. This structuring also provided insight into essential theoretical anchors that can be drawn on for evolutionary ‘hybrid’ foundations for systems engineering, such as Actor Network Theory (ANT) (originating with Latour); pragmatism (originating with Peirce, James, and Dewey); and Pickering’s ‘mangle of practice’ (Pickering 1995).

2.1. Towards development of a generic systems intervention model (‘Scoops’)

The diagram in Figure 4, based on current organizational design in the UK Ministry of Defence (MoD), provided a simpler characterization that complemented the SVC view of the wider context within which systems engineering operates. Planning, Delivery, and Generation processes are distinguished. The fourth process at the top provides high-level strategic assessment of the current delivery of operational capability and affordances in the context of current and anticipated needs. This assessment sets strategic direction of the imagined capabilities required to bridge the gaps identified in assessment, i.e., when the value the organization is trying to deliver can no longer be achieved. Planning operates on multiple interventions against current perceptions of overall need. ‘Delivery’ encompasses the traditional systems engineering function or process, while Generation of capabilities of effects being the realization of the PSS in operational context.

An important concept is that each of the four processes has their own purpose and timeline, providing value in their own right: they are guided, concurrent, recursive, interactive, and integrated.

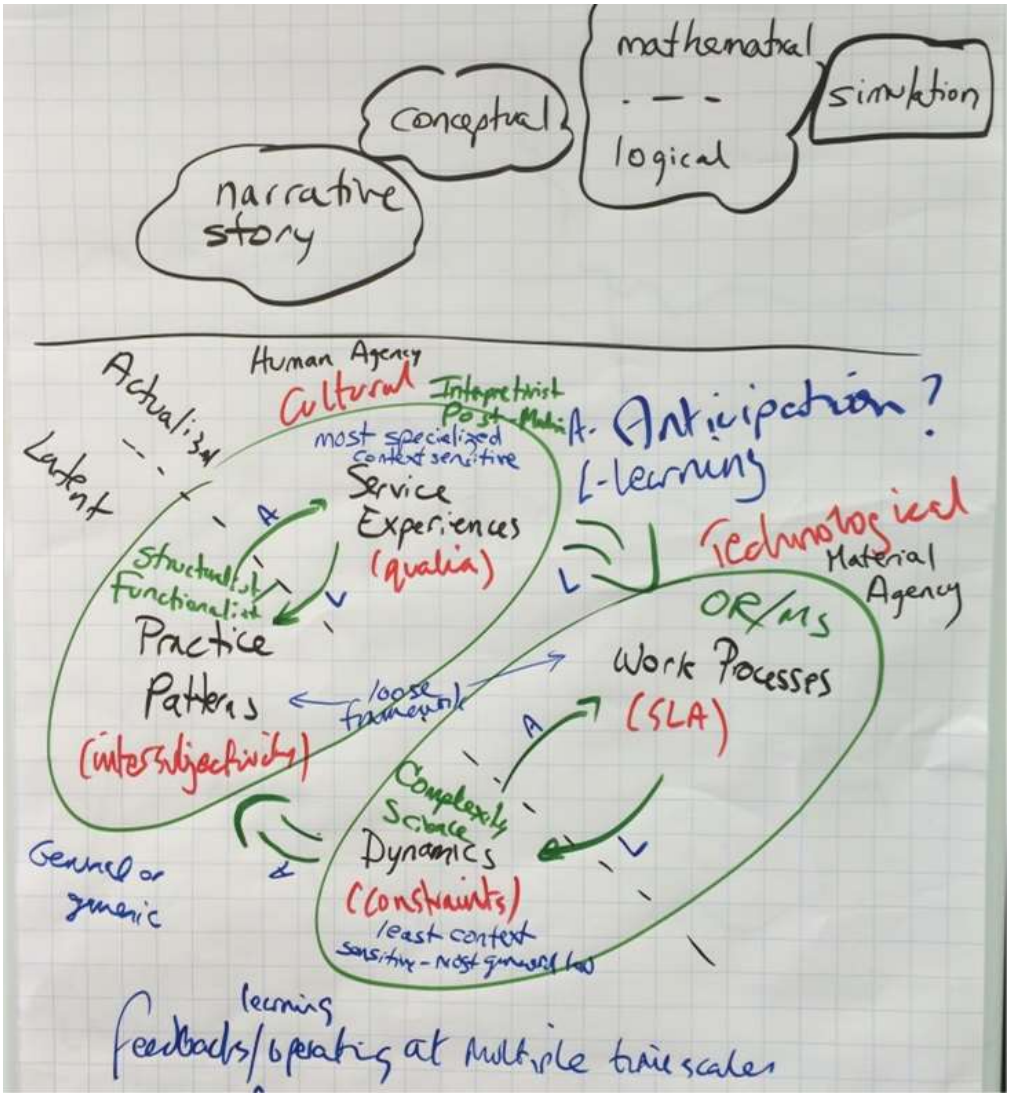


Figure 3. Theoretical underpinnings for an evolutionary view of systems engineering. Exploring the mutual causality between human and material agency, anticipation and learning.

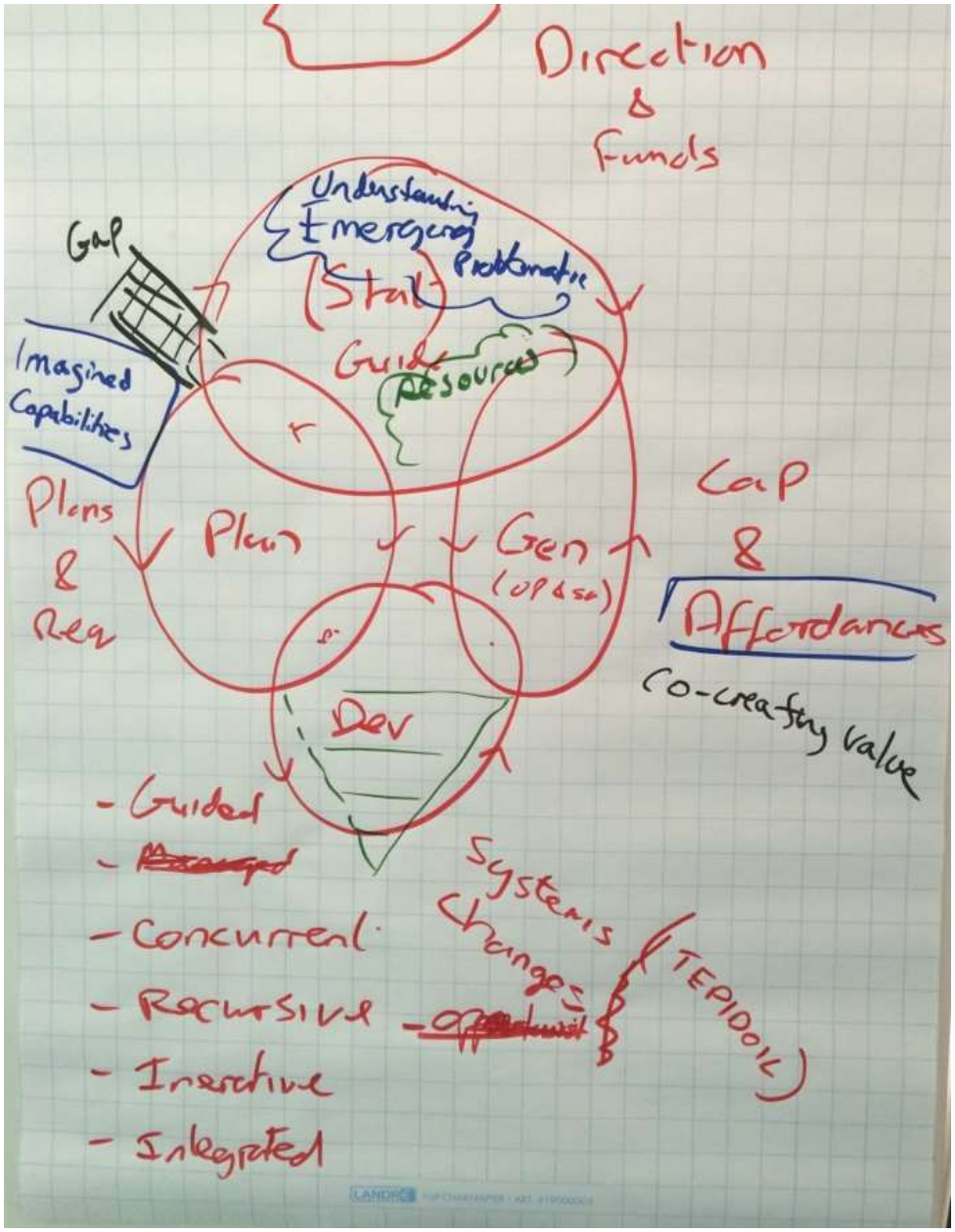


Figure 4. Labeling derived from current organizational design in the UK Ministry of Defence (MoD).

In the view shown in Figure 5 “Direction and Funds” has now become the Emerging Problematic; “Plans and Requirements” is now PSM (Problem Structuring Methods); and “Capabilities and Affordances” has become Operational/POSIWID.

“Dev(elopment)” as signified by the Systems Engineering ‘Vee’ has been labeled “traditional” SE. In this view there is clear distinction possible between the realms focused on understanding and those focused on intervention. The Operational/POSIWID process corresponds to in-service Systems Engineering and management of operations concerns for successful delivery of a service. The Emerging Problematic is concerned with strategic management, capability planning, and anticipatory thinking and modelling. Possible labels for this enlarged view of systems engineering included Emerging SE, Co-Value Driven SE, Human-Centered SE, and Value-Driven SE. Evolutionary SE was the preferred since it related well to the earlier foundational insight into SE

as an ongoing interaction of human and material agency in cycles of anticipation and reflective learning in a 'mangle of practice'.

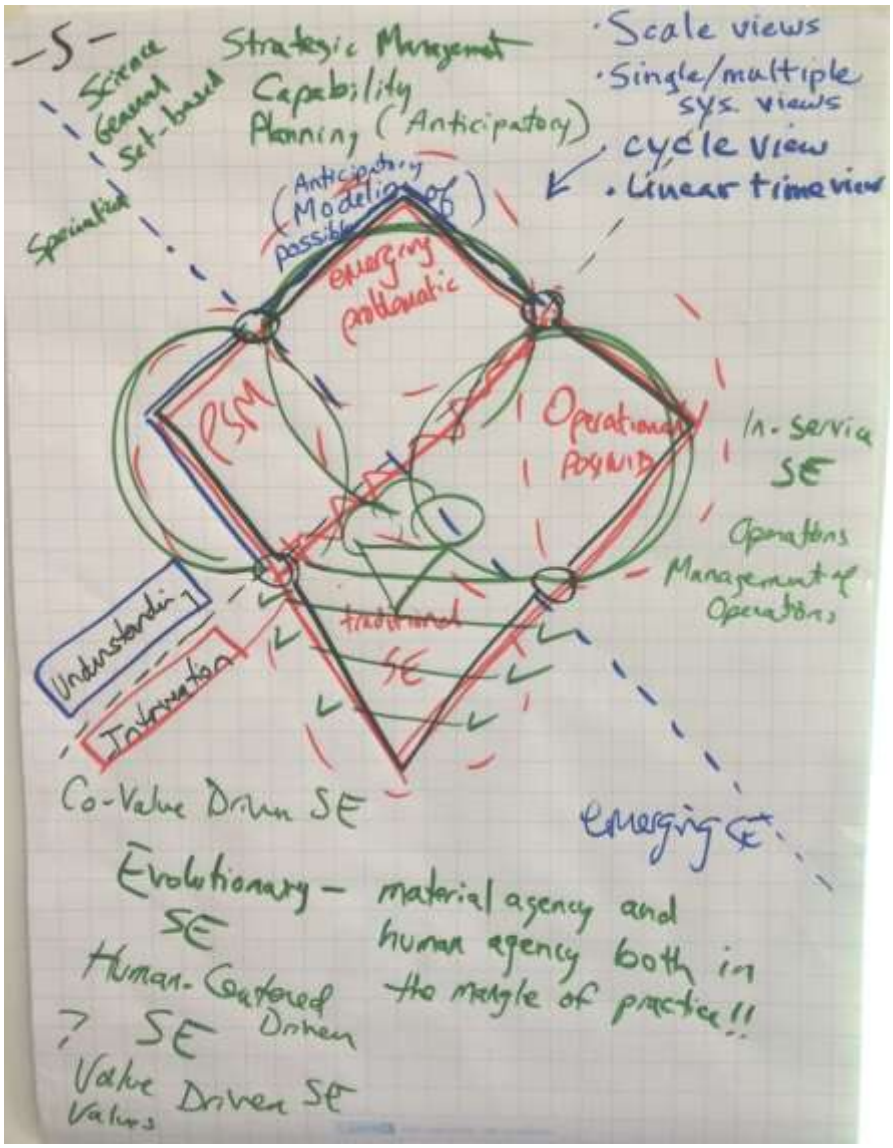


Figure 5. The development of the generic model, with the emergence of problem structuring.

The final diagram developed during the week articulates evolutionary SE in a context of 'systemic cooperative praxis' (or 'Scoops', Figure 6). Again, the existing conceptualization epitomized by the SE 'Vee' is placed in relation to its context of three additional, necessary processes:

1. **Framing Problematic**, which represents the origination of response in some strategic, structured way in order to alleviate, reduce, anticipate, or otherwise bring about change;
2. **Problem Structuring**, which represents the process of translating from strategic intent, reconciling disparate worldviews and limitations into a purpose for specific action, or actions,
3. The effect that a PSS has as realized in context, or **Effecting Service**.

These form the core of the Scoops model and represent an evolutionary development of SE scope expanding to take account of these three new processes. Note that as in Figure 5 these processes operate independently of each other as well as overlap at key points. Thus unlike in Ring's SVC they have their own independent time lines and operate concurrently. However while they may pursue their ends independently, as in the SVC they must cooperate in order to achieve a unified whole, with ultimate value being realizable thanks to their emergent 'co-operation' or coordinated operation.

Two additional boundaries are marked by the wavy diagonal lines. The first, running from bottom left to top right, respects the constant interplay between human and material agency. The Scoops model groups the Framing Problematic and Problem Structuring processes into the conceptual (understanding) realm, and the Systems Engineering and Effecting Service processes into the material (intervening) realm. The second boundary groups Problem Structuring and Systems Engineering into the provider realm, and Effecting Service and Framing Problematic into the consumer realm. These intuitive groupings set up exploration of the implications for methodology (Figure 6). Table 2 following Figure 6 outlines the methodology issues within the four processes of the Scoops model.

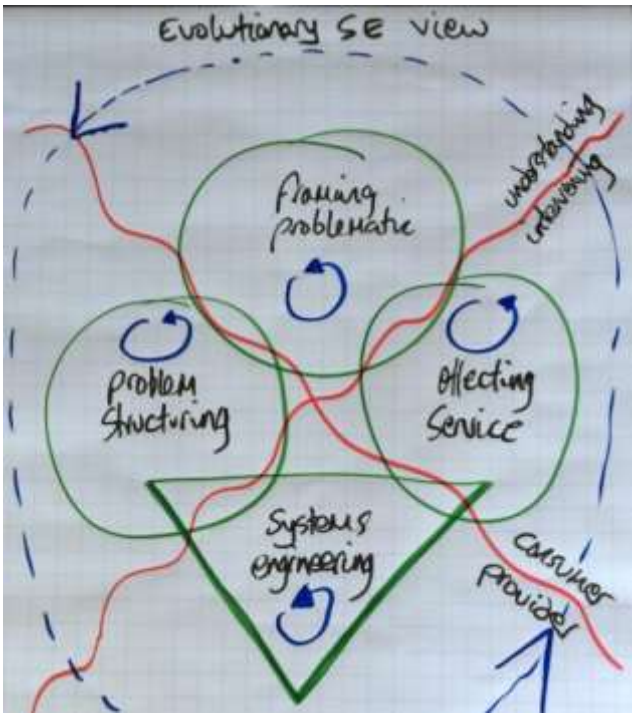


Figure 6. The Scoops model: an evolutionary SE view

	Provider	Consumer
Understanding	Problem Structuring • Conceptual modelling for understanding **/** Dealing with worldviews and subjectivity **/** Directed towards taking action (scoping projects/programs, planning...) • Usual methodological focus: plural, interpretivist, phenomenological	Framing Problematic • Strategic analysis for understanding • Engaging with a messy problem context***!*** • Directed towards initiating action (securing budgets, political support...) • Usual methodological focus: concerned with theories of power
Intervening	Systems Engineering • Modelling for designing **/** • Dealing with requirements **/** • Directed toward producing engineering artifacts **/** The scope of tradition Systems Engineering • Usual methodological focus: unitary, functionalist, realist	Effecting Service • Modelling for operational delivery **/** • Dealing with users***!*** • Directed towards service delivery **/** • Usual methodological focus: aligned to the SSME agenda, Service Dominant Logic, Servitization, but also needing to extend into new areas (e.g., qualia)

Table 2. Methodological issues confronting each of the four processes in the Scoops shown in Figure 6.

Endnotes

Following the Conversation, team members have continued developing Scoops model, its foundations and its implications through weekly telecons. Further reflection on its development and implications for the evolution of Systems Engineering is forthcoming in the proceedings of the 2015 Conference on Systems Engineering Research (CSER).

Team 1: M. Singer, J. Willis Singer, D. Hybertson, M. Yearworth, G. Chroust, R. Adcock, J. Kijima

Acknowledgements

The authors would like to thank Jack Ring, David Ing, Gary Metcalf, the members of Team 4 of the 2012 IFSR Conversation and participants in the 2013 Conversation in Cómpeta for their invaluable contributions to this collective learning effort. We would also like to thank all the other teams at the 2014 IFSR Conversation for the discussions held outside of the working group sessions that enriched the process, provided feedback, and generally made the whole experience enjoyable and rewarding.

REFERENCES:

Churchman, G. W. 1967, "Wicked problems," Management Science, Vol. 14, No. 4, pp. 141- 142.

Pickering, Andrew. (1995). The mangle of practice : time, agency, and science. Chicago ; London: University of Chicago Press.

Ring, J. (1998). *A value-seeking approach to the engineering of systems.* Paper presented at the IEEE International Conference on Systems, Man, and Cybernetics. doi: 10.1109/ICSMC.1998.725069

Singer, J., Sillitto, H., Bendz, J., Chroust, G., Hybertson, D., Lawson, H.W., Martin, J., Martin, R., Singer, M., & Takaku, T. (2012). *The Systems Praxis Framework*, included in Systems and Science at Crossroads – Sixteenth IFSR Conversation, Linz, Austria.

Team 2: Thrivable Systems — from Vision to Reality

Team Leader: Alexander Laszlo, USA
Team Members:
Stefan Blachfellner, AUT
Ockie Bosch, AUS
Violeta Bulc, SVN
Valeria Delgado, ARG
Dino Karabeg, NOR
MingFen Li, TWN
Nam Nguyen, AUS
Warwick Watkins, AUS

Conversation Topic: The Synergetic Relation between Evolutionary Learning Labs and the World Evolutionary Learning Tribe

Summary and Overview:

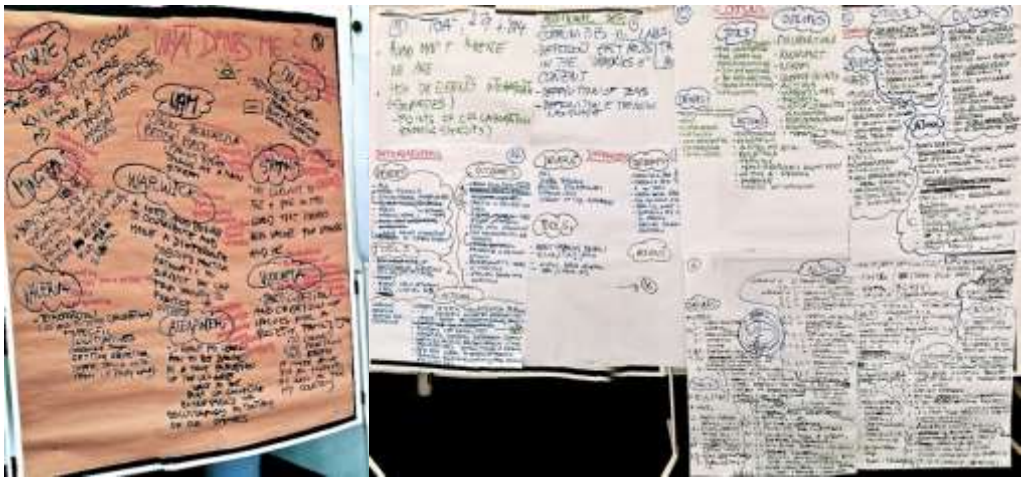


Figure 7. The Process

Team 2 on Thrivable Systems — from Vision to Reality continued an intact line of inquiry begun in 2012 to explore methods and models for curating conditions for thrivability. The work of Team 3 at the 2012 Conversation focused on 'designing learning systems for global sustainability: ramping up for the ISSS 2013 Conference in Viet Nam' and set the stage for the exploration of systemic initiatives that

curate thrivability in various types of community around the world. The 2014 Team 2 participants investigated how the set of vehicles that emerged during the intervening year to carry out this exploration could best work together. To do so, we focused on the synergetic relation between the concrete manifestation of Evolutionary Learning Labs (or ELLabs) as a model of systemic self-directed thrivability initiatives, on the one hand, and the World Evolutionary Learning Tribe (or WELTribe) as a functional construct for inter-relating the various levels of thrivability initiatives throughout the world in a technologically enhanced communications network of mutual self-empowerment.

Our guiding question was *how can we support each other to excel the already existing efforts with which we are engaged around systemic sustainability?* Since Team 2 was comprised of representatives of systemic sustainability initiatives and enablers of such initiatives from around the world, we began by sharing the dreams and drives that motivate each of us to engage in this work. Out of this emerged a list of organizing concepts that we used to create an initial inventory of interventions characterizing our respective systemic sustainability initiatives according to *drives, tools, outcomes,* and *actions* (Figure 7). These we then divided into unifiers (markers of common elements in our respective initiatives) and differentiators (markers of complementary elements). With this framework in hand, we proceeded to take each of the represented organizations and initiatives by the participants on Team 2 and created a roadmap of how they interrelate in order to identify the emerging synergies among them and thereby pinpoint areas of potential synergic collaboration. Accordingly, we heard from Ockie Bosch, Nam Nguyen and Warwick Watkins about Think2Impact (T2i) and its relation to the ELLabs; from MingFen Li about the Green Silk Road in Taiwan; from Stefan Blachfellner about the Bertalanffy Center for the Study of Systems Science (BCSSS); from Valeria Delgado about the Observatorio Permanente de Organizaciones Sociales in Argentina (OPOS); from Dino Karabeg about the Knowledge Federation and the Program for The Future Challenge (PFTF Challenge); from Alexander Laszlo about the World Evolutionary Learning Tribe (WELTribe) and its origins in the International Society for the Systems Sciences (ISSS); and from Violeta Bulc about the Innovation Communication Movement in Slovenia (at a regional level), the Challenge Future initiative (at a global level), and the Heart of Slovenia (at a local level).

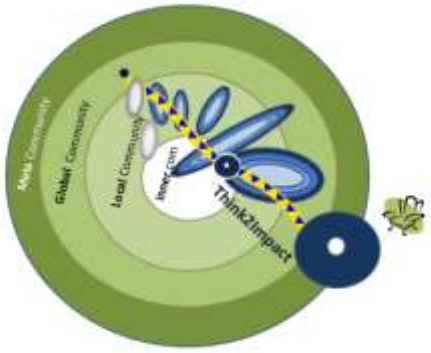


Figure 8. Meta-Frames

In considering the frames and meta-frames of interaction at which the various thrivability projects (Figure 8) of Team 2 members operate, we realized they formed a type of nested holarchy or typology of communities:

- meta-community
  - global community
    - local community
      - inner community

In different ways, each of our projects serves as a vehicle for the interconnection of stories of systemic sustainability at and across these holarchic levels of thrivability. In searching for the synergies among our various organizations and initiatives, we realized that what is needed is an "SoS" – a system of systems – to serve as a meta-platform that interrelates and augments the impact of our individual efforts, and in so doing, emerges a higher level ecosystem of systemic sustainability communities.

In the end, we focused on two complementary systemic modalities. One was represented by T2i as the sort of template or initial framework for inter-relating, correlating, and empowering existing systemic sustainability initiatives for greater impact in the world. This approach would foster a dynamic that moves from inner to local to global community levels in the nested holarchy we identified. The other approach was represented by the WELTribe and, in particular, by its WELTools initiative to

research and identify and provide deeper understanding of the emerging pattern of systemic sustainability occurring in the world today. This approach would seek to provide feedback and improve all levels of the holarchic framework, the approaches at each level, and their impact at the emergent level of the meta-community. As such, Team 2 identified itself as a transdisciplinary community of curators of these two interrelated approaches. The following full report attempts to summarize the conversation process itself as well as the key results of each conversation step.

Step 1: Creating common ground – the individual journeys and interests

To create a common ground the team engaged in a deep conversation about each participant's personal history that enabled him or her to be part of this conversation. This starting point also included sharing the intellectual as well as practical experiences present in the team and interests in future capability developments. As this part of a conversation is not only about the facts and figures and levels of education or professional expertise of each participant, but also about their very personal life journeys and the roots of their belief systems / mindsets, the detailed data is not included in this published full report.

In general the first step enabled the team to draw a map of the present capabilities in the group, on which the team can rely in the upcoming steps of the conversation. It led to understanding, trust and confidence in the shared purpose within the team. Interest in finding what potential exists to take forward the "tool set" approach and the "community" approach to curating systemic sustainability efforts, the passion to make sure that teaching/learning, research and practice are aligned, to engage with people effectively, to take the systems science and knowledge out there to the people, and to provide methodologies for people to tackle their problems by themselves, have been expressed. There is also an interest in exploring new mindsets as indicators of the emergence of a new consciousness for our species, systems thinking and being as a path to be cultivated, and interest in the conditions life creates to create the foundation for new life.

Step 1: Creating common ground - Seven Narrative Frames for "creating a better world"

To expand the common ground from the personal histories and journeys to the current conditions the participants have created through their diverse organizational involvements, seven narratives for creating a better world have been shared through the systematic exploration of the needs that have been or are addressed, the outcomes that have been achieved, and the tools and actions that have been applied:

1. Case example: Think2Impact with the Evolutionary Learning Labs presented by Ockie Bosch, Nam Nuygen and Warwick Watkins

The Evolutionary Learning Labs (ELLab) project was one of eleven out of 45.000 applications funded by the Bill and Melinda Gates Foundation. The needs that ELLab addresses are labor-saving innovations, human and environmental health, and improving the income of the people in the regions where the projects are situated, e.g in South East Asia and Sub-Saharan Africa.
Outcomes achieved so far can be listed as improved lives, prioritized investment options, collective knowledge enrichment, improved environmental stability/conditions, social, business, and technical innovation, improved transparency, holistic sustainability actions, better and improved collaboration, inter-organizational/sectoral projects, emerged knowledge base of systemic leverage points for thrivability, lists of communities and champions, new models, methods and methodologies, and creating theory out of practice. These outcomes have been achieved through the tools of a unique seven step iterative process called the Evolutionary Learning Labs (ELLabs) and the internet based platform called Think2Impact with HUBs, participatory design, guides, learning materials, conversation tools, publications, a transdisciplinary framework, Open Space / dialogue meetings, and systemic models and methodologies. Furthermore these outcomes have been achieved through actions, like training systemic complexity problem-solving facilitators, participatory systems analysis and modeling, starting with the young as participatory stakeholders, development of systemic, innovative and operational plans, reflections and adaptation, transdisciplinary engagements in projects, and writing and speaking out about results.

2. Case example: Green Silk Road presented by MingFen Li

The Green Silk Road in Taiwan addresses the needs of personal growth, integral collective development and growth of green communities, environmental mindfulness, and creating new opportunities. The outcomes achieved can be summarized as holistic sustainability actions, the establishment of green social enterprises, green social innovation programs which comprise four green silk road paths, collective outcomes and collective knowledge and wisdom, better and improved collaboration, lists of communities and champions, and new models, methods and methodologies. The Green Silk Road tools are participatory design, ISEE-U Café (based on the method of the World Café), eco-guides, learning materials, conversation tools, and field research groups. The outcomes have been enabled through the actions of nurturing holistic eco-facilitators and green living guides as process curators, enable and empower these facilitators and guides through environmental mind frames and facilitation methods, networking, a wholeness paradigm proposal/emergence, and constant reflection and adaptations.

3. Case example: Bertalanffy Center for the Study of Systems Science presented by Stefan Blachfellner

The independent research institute based in Vienna, Austria, addresses the need of use-inspired basic research that creates social impact and provides systemic innovative solutions for the complex challenges of Socio-Ecological Systems in today´s world. The outcome is an applied research that combines theoretical and application levels of systems inquiry based on the foundation of systemic ideas derived from von Bertalanffy´s General Systems Theory, social, business, and technical innovations, and new models, methods and methodologies, e.g in Systems Design and Complexity Management for Systemic Sustainability. The BCSSS deploys research groups and expert groups, utilizes the European Meetings on Cybernetics and Systems Research and further symposia as tools for achieving these objectives, engages in creating a scientific body of knowledge through publications, and facilitates the development of models and methodologies through participatory design and transdisciplinary frameworks. The BCSSS generates funding opportunities, creates systemic network opportunities among systems professionals, scholars and practitioners, fosters transdisciplinary engagements in R&D projects that lead to applied research, and creates platforms to write and speak out about the results.

4. Case example: Observatorio Permanente de Organizaciones Sociales in Argentina (OPOS) presented by Valeria Delgado

The Observatorio Permanente de Organizaciones Sociales in Argentina addresses the needs of personal growth, integral and collective growth of the communities, funding, communication and knowledge about complementary initiatives, empowerment of individual and social organizations, network creation, understanding and tackling globalization dynamics and crisis. Outcomes that have been achieved include improved lives, collective knowledge and wisdom, social and technical innovation, social impact, better collaboration and improved group dynamics, inter-organizational projects/actions, higher added value created for municipalities and companies, higher social capital, and new models, methods and methodologies. OPOS deploys tools like participatory design, conversation, face-to-face workshops and seminars/symposia, brainstorming and “heartspeaking” dynamics, game playing for creative learning, and Open Space / dialogue meetings. OPOS has achieved results so far through the actions of training of facilitators, starting with the youth, development of systemic and operational plans, networking, and transdisciplinary engagements in projects.

5. Case example: Knowledge Federation presented by Dino Karabeg

The Knowledge Federation, a project that aims to design a more coherent and more effective organization for the production and sharing of knowledge, in academia and beyond, by working both with technical solutions and social organizations. This includes criteria and values, which address all needs already collected by the other case examples. The outcome is a paradigm proposal to enhance and expand the impact of systems approaches and new models, methods and methodologies through the utilization of knowledge media networks tools and a transdisciplinary framework. Among all other

specific actions previously listed ,the Knowledge Federation is bootstrapping social systemic innovation.

6. Case example: 57th World Conference of the International Society for the Systems Sciences (ISSS) and World Evolutionary Learning Tribe presented by Alexander Laszlo

The WELTribe initiative, originated in the ISSS57, addresses the needs of shared and received communication, networking and connecting, and the need of knowing and learning about other actions. Among the outcomes this initiative achieved or is achieving are an emergent knowledge base of systemic leverage points for thrivability , a list of communities, improved lives, better knowledge, collective knowledge and wisdom, improved environments, improved transparency, holistic sustainability actions, green social innovation programs, social impacts, inter-organizational projects and actions, an expanded impact of systemic approaches, synergies of the learning of communities, and a paradigm proposal which is emerging. To co-create the outcomes conversations, a shell or a virtual hub, participatory design, and research groups are deployed. The WELTribe identifies systemic sustainability communities in the world, provides networking opportunities, identifies champions of a giving region, communicates the champions to the region and to the world, enables self-empowerment, participatory analysis and actions, development of systemic and operation plans, reflections and adaptations, transdisciplinary connectivity, and bootstrapping.

7. Case examples: InCO Movement (regional); Challenge Future (global); Heart of Slovenia (local) presented by Violeta Bulc

These three examples of regional, global, and local successful initiatives address the needs of innovation, personal growth, integral and collective growth of communities, communication, knowledge about other projects, networking, creating new opportunities, discovering weak signals as a potential for emergent flows, and complexity, adding value to a global repository of knowledge, and to share experiences and learn from others. These initiatives have so far improved lives, and knowledge, collective knowledge and wisdom, social, business, and technical innovations, synergy of learning communities, social impact, collaboration, inter-organizational/sectoral projects, a wholeness paradigm enaction, expanded impact of systemic approaches, and added to an emerging knowledge base of systemic leverage points for thrivability, a list of communities and champions, and created theory out of practice. The tools employed are participatory designs, guides/learning materials, conversations, conferences, publications (including books), World Café, workshops, symposia, games, Open Space / dialogue meetings, and models and methodologies. The initiatives create impact through attraction/attention for results, training of facilitators, enabling facilitators and guides, participatory actions, starting with the young, development of systemic operations and plans, reflection and adaptations, networking, transdisciplinary connectivity, bootstrapping, identifying champions, communication the champions to the regions and the world, and writing and speaking out about the achieved results.

Step 1: Creating common ground - Seven Narrative Frames lead towards the shared frames:

In the further conversation the seven narrative frames lead to the shared frames, which are the common ground that will define the opportunities and constraints for the further co-creation of *Thrivable Systems — from Vision to Reality,* the unifiers (markers of common elements in the respective initiatives) and differentiators (markers of complementary elements).

Among the many issues all initiatives share the needs for funding, innovation, and collective development, to tackle crisis, globalization, and complexity, to create new opportunities, and contribute to useful solutions, through shared tools for conversation, like workshops, meetings, conferences, for learning, publications, games, guides, shared tools of models, methods, and methodologies for performing, shared frameworks for participatory design, and even circulating people (experts or research groups). The outcomes all initiatives aim to achieve are collaboration, improved knowledge, wisdom, leverage points, actions and projects, improved lives, lists of communities and champions, advancing models, theories, and methodologies, creating innovation in the feedback loop of theory building through practice and enriching practice through theory, and increased social capital and impact. All represented initiatives are engaged in bootstrapping, networking, analysis and action,

reflections, training, trans-disciplinary engagement, writing and speaking, modeling, and enabling self-empowerment.

The unifiers are always welcome in building the common ground, but each conversation will also highlight the differentiators.

Among the divergent drivers, mainly strategic purposes of the represented organizations defined the markers of complementary elements. The strategic purposes themselves have been largely defined by the owners of or investors in the initiatives, e.g. initiatives of shared economy rooted in diverse socio-cultural context, or funded by research funding agencies, or funded by foundations with a definitive strategic influence. Thus the tools diverged in the not by all shared heartspeaking (as a complement to brainstorming) dynamics, the already existing structure of Think2Impact, the ELLabs, Hubs, and other related socio-technical systems, or the deployment of other knowledge media networks, and virtual hubs. Consequently by the differentiation of strategic interest and the utilization of different socio-technological tools in alignment with the specific strategic intentions, outcomes have been valued differently, such as research that combines theory and practice of system, increase value for municipalities and companies, social innovations, green social enterprises, prioritization of investment options, or wholeness paradigm enaction and creating a path to a new story. Thus the observable actions of the represented systemic sustainability initiatives also differed from creating funding opportunities, systemic network opportunities, identifying communities that manifest systemic sustainability, participatory systems analysis and modeling, training systemic complexity problem/solution facilitators, to nurturing holistic eco-facilitators and learning guides, and a wholeness paradigm proposal for emergence.

Differentiators can be experienced as opportunities for complementary objectives and actions or as the constraint for further collaboration. Thus the team engaged in a second round of exploring the common core values of each participant before any further developments in step 2 of the conversation, the strategic conversation. In case the core values would have also been differentiators, the team would have needed to elaborate the mindsets furthermore or risk losing the common ground. The core values of the participants which are not published in detail in this report led to the creation of the common frame, how to improve the betterment of the world, with less hunger, less violence, more health, and greater economic and political stability. Without collaboration these perspectives will only be meaningful in isolation. But in the frame of collaboration the team can achieve participation and engage others in participating in collective intelligence and emergence.

Step 2: Strategic conversation for action and tactics

In the second phase of the conversation, when all participants took the leap into collaboration, ideas had been exchanged and developed regarding how to engage with each other successfully, with the main focus to strengthen further active systemic sustainability groups and initiatives. A not yet existing but to be developed “community of communities” was identified as the common objective of the team, enhancing the interactions, and the impact and effectiveness by learning with and from each other – with and from other systemic sustainability communities.

Still, team members also insisted on the awareness of the differences between a more business-like project on meta-systemic sustainability initiatives, and a more culture-emerging set of contributions on meta-systemic sustainability initiatives. The team would need to look at which methodologies would be best to enhance the different types of systemic sustainability initiatives, e.g. grass-roots community efforts, which will require certain types of methodologies, or business networks which will require others. Especially the case example from Taiwan highlighted that many grass-roots movements are leading the way to re-introduce ways of living in systemic sustainability that have been lost, but these approaches are not surfaced by businesses or governments. Thus we as systems researchers could help surface these approaches.

A geo-cultural systems map was proposed. This kind of map would have a compass, a guide, and some way of exploring the different boundaries that connect and disconnect us. This map could be a framework that would accommodate different methodologies, different philosophies, and different ontological levels.

The Bertalanffy Center for the Study of Systems Science offered to enhance the process, enhance the networks, and enhance the resources for the research through its hub function, which is currently under development.

The Think2Impact platform offered its technological framework to inter-relate other methodologies than the ELLabs which has been the genesis of the T2i framework, to enrich and continue to evolve the breadth of the Think2Impact framework.

But still the need has been articulated that whatever platform is developed, it must serve as a "community garden" such that each systemic sustainability initiative can cultivate its own plot, in its own way, that affirms its own cultural identity. The fear of losing identity in a community of communities has been present through the whole conversation. An obstacle that remained in the question is whether it would be really possible to collect and connect the diverse global initiatives in one platform, the present scientific management approaches with even quantitative and qualitative accountability tracking, and the present intuitive and spiritual approaches derived from wisdom cultures and grass-roots communities. But the critical function, to provide a platform that would even allow for the emergence of new, different, hitherto unknown and unforeseen systemic sustainability initiatives, could be captured in research orientated functionalities within the platform for the exploration of new levels of collective systemic sustainability.

Step 3: Closing the conversation with commitments for action

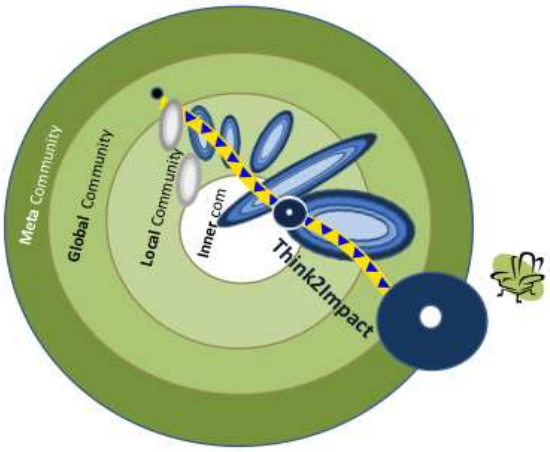


Figure 9. Meta-Frames

Team 2 *Thrivable Systems — from Vision to Reality* gathered around the main question: "How can we support each other to excel the already existing systemic sustainability efforts with which we are engaged internationally?

Through the deep conversation the team decided to organize around two complementary systemic efforts: First Think2Impact will provide the initial framework for inter-relating, correlating, and empowering existing systemic sustainability initiatives for greater impact in the world, from inner to local to global community levels. Secondly there is also a need to research and identify and provide deeper understanding of the emerging pattern of systemic sustainability occurring in the world today, to feedback and improve the framework, the approaches and their impact at the meta-community. The underlying goal is the acceleration of the impact of both localized community systemic sustainability initiatives and the collection and interrelation of such initiatives and it is *also* the listening into and encouraging of patterns of development that herald a more sustainable and flourishing (thrivable) presence on Earth (Figure 9).

Team 3: New Directions in Cybernetics

Team Leader: Michael Lissack, USA
Team Members:
Ranulph Glanville†, GBR
Ray Ison, USA
Allenna Leonard, CAN
Tatiana Medvedeva, RUS
Stuart Umpleby, USA
Bernard Scott, GBR

The field of cybernetics originated in the Macy Foundation conferences held in New York City between 1942 and 1953. Over time, first order cybernetics, focused on the role of feedback and control, blossomed as an academic discipline, often under the name informatics. Second-order cybernetics has had its own developmental path with communities in learning, design, biology, philosophy, mathematics and psychology. This divergence may work from an academic perspective but practitioners are discovering the need for a path for re-convergence. The systems engineering community (well versed in first order cybernetics) has come to place increasing attention on context dependence and observers. The work on human computer interfaces has had a similar evolution. New fields such as bio-semiotics, the mathematics of chemistry, and social network theory have opened at the crossroads amongst first order cybernetics, second order cybernetics, and social cybernetics.

Cybernetics has grown beyond its initial roots as a general theory of control and communication, of information and regulation. While first order cybernetics deals with observed systems and second order cybernetics deals with observing systems, many cyberneticians have begun to focus on "social cybernetics" which emphasizes that both the observer's descriptions and actions alter the behavior of social systems. All three forms of cybernetics have potentially important roles to play as science in general confronts new realities of context dependence, emergence, and volition. But to realize that potential, cybernetics (of both the first and second order kind) needs to evolve – to place greater emphasis on reflexive anticipation and its role (through feed forward and feedback loops and volition) in actions.

Recent years have seen increasing attention in science to the roles of both context and observer. In 2011, the attempts to “map” the neuronal/synapse structure of the roundworm failed once the context dependence of the instantiations of that structure (through the chemical intervention of neuropeptides) became clear. Since 2000, the role of epigenesis has become more widely recognized in the realm of gene expressions. Network theory has evolved to include its own form of context dependence. Porges’ Polyvogal Theory is context dependent. The context dependent environmental psychology of Gibson’s “affordances” has come to play an increasing role in systems engineering. With increased attention to context comes a parallel increase in attention to the role of the observer.

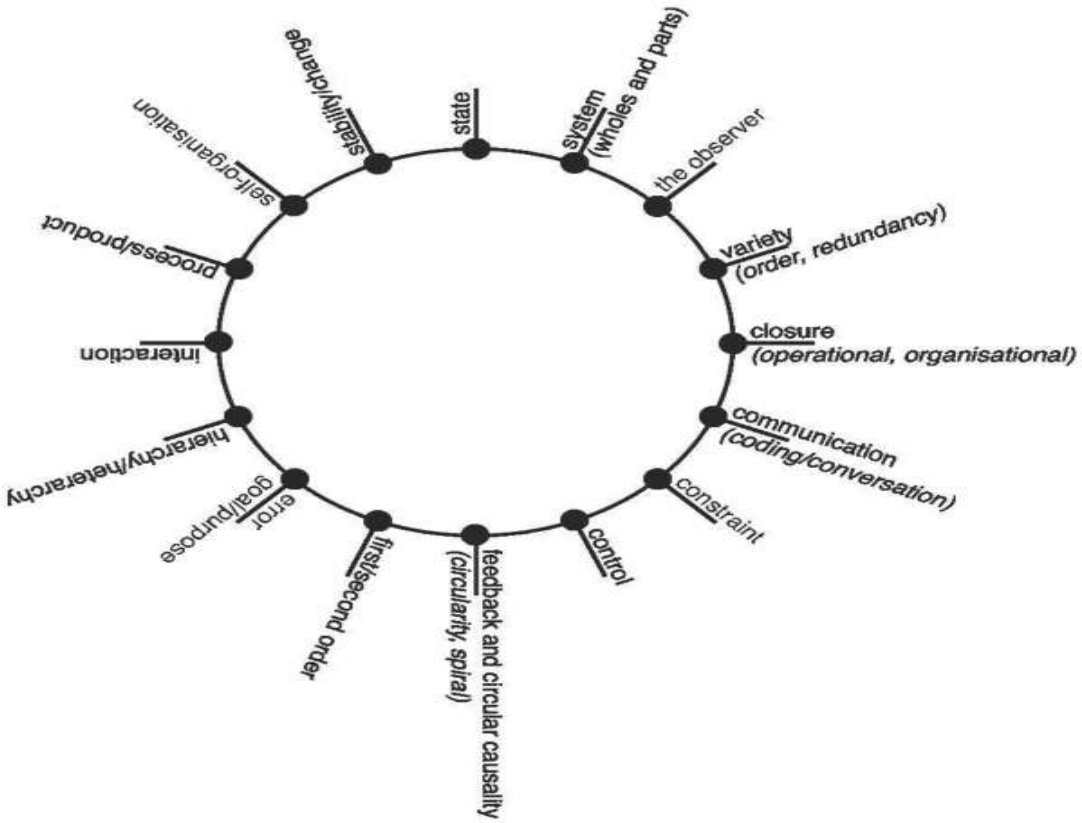
Context dependence and observer questions recur whenever science is less concerned with reliable prediction and more concerned with the modeling of emergence, affordances, and adjacent possibilities (e.g. in design, medicine, psychology, social sciences, etc. -- the “anticipatory” sciences). It is here where pulling together the diverse perspectives of cybernetics can make a significant difference. After many years of research across several social science fields, cybernetics is now converging on a new view of reflexivity in social systems in specific and the anticipatory sciences in general. Both for the shared study of such advances and to help engender an environment which can further such research, the need is great for a common meeting ground.

Indeed in summarizing a Cybernetics and Systems Research (“CSR”) discussion held at the 2012 meeting of the EMCSR, Gershenson et al (2013) note: “There is the need to build a closer relationship between natural sciences and the humanities. … If we do not study it from a scientific point of view, other people will treat CSR from mysterious, esoteric, religious, and similar non-

scientific perspectives. A common language and a common vision are required. CSR has the potential of offering this to both sciences and humanities."

With these observations in mind our meeting in Linz was focused around two ideas:
1) What about cybernetics do we wish to ensure survives through the next few intellectual generations, and
2) brainstorming about strategies to make that happen.
We engaged in considerable debate and deliberation, which we began by trying to synthesize a common understanding of the concepts shown in Figure 10.

Figure 10. Important Cybernetic Concepts



In our discussion we recognized the degree to which there existed multiple definitions of these cybernetic concepts. We began to pin these definitions down to our various concepts of both "cybernetics" and "systems" as summarized in the following lists:

Cybernetics View of Cybernetics and Systems

Cybernetics

- I am talking about areas where patterns are perceived.
- When new connections emerge
- When conundrums about governance appear
- When I am appreciating multiple perspectives
- I am listening to what my body is saying
- Topics associated with the field and their histories are all being discussed. Also metaphors like Black box.
- It includes processes of feedback and self-regulation
- There is recognition of the distinction between context and content and the distinction is made explicit/articulated
- A major component of the dialogue is the mutual exchange of explaining
- Mutual listening is explicitly articulated
- Or the content matter makes explicit reference to items from the history of those who have been labelled as cyberneticians
- When questions of self-reference and circularity arise
- When I am using key cybernetic concepts and insights
- When I am talking with a fellow cybernetician
- When I am learning and teaching
- When I am doing cybernetics
- When I am being perceived as a cybernetician
- I am not insisting on the superiority of my view
- The question I am responding to is not just the question but the question of the question
- The circularity of responding remains more important than the linearity of statement
- I think silently of the silence
- Ignorance (and hence learning) is given its proper place
- I look for similarity in difference and difference in similarity i.e. complementarity
- I act not on facts but on explanatory principles

Systems

- I spoke of things as if they existed independently of me & I could know it
- The organization was more important than the involvement
- Achieving a useful outcome was more important than finding beauty in my involvement
- I claimed to be able to solve problems
- I was in a systems meeting
- I need you to do it for me
- When the question of whole-part relations arise
- When questions of systems dynamics arise
- When questions of systems complexity arise
- When questions of systems emergence arise
- When questions of systems autonomy arise
- When thinking about selves and others as dynamical systems
- The topic of the conversation is explicitly systems variables or labelled as such
- When the causal actors portrayed include items explicitly identified as systems
- When the description includes such words as “Which must/need to be viewed as a system”
- When the topic of the discussion is relationships amongst items rather than descriptions of items
- When there is explicit reference to historic literature commonly labelled as “systems science”
- It involved setting context, focused on relationships and dynamic processes and worked towards identifying essential entities or properties

- What is the important thing happening which most makes a difference

Historically the American Society for Cybernetics (ASC) and its community have focused outreach activities within the broad systems sciences community. This was the result of the history of both the cybernetics and systems science movements, and tended to be characterized as efforts by one group to see the other as a "part" of their "more general" community. Through the early 1980's such an approach and dialogue seemed to bear constructive fruit at an intellectual level (even while being frustrating on the "can't we all just get along" level). For the past few decades, however, the dialogue seemed to be going only in circles and little insight seemed to be a by-product. The time had come for something new.

Moving Forward

As we articulated what we thought were meaningful cybernetic lessons to be passed on to future generations, as a group, we applied the above lessons to ourselves. Indeed, amongst the cyberneticians in the room the number of definitions was usually equal to N+2 (two more than the number of participants) and the philosophical perspectives tended to number N/2. Our tendency to assume that others knew what we were talking about was getting in the way of our ability to communicate.

We began to ground our “cross-community understanding” by circulating a questionnaire which began by stating:

> Ross Ashby defined a system as a subset of variables selected by an observer on the basis of relationships amongst the variables and the purpose the observer has in mind. It has become apparent over many years of dialogue that there seems to be gaps between the variables selected and purposes in mind by those who call themselves cyberneticians and those who instead use such labels as systems thinker or systems scientist or systems researcher. In the cybernetics community key concepts include: stability/perturbation, feedback, circularity/recursion, constraint, variety, state, control, communication, dynamics, complexity, observer/investigator, organization as well as system itself. We have shown more of these concepts on the image attached. It seems that our two communities may define these words differently amongst us, and that those interested could benefit from learning about the definitions and conceptions across the two communities. In preparation for such a learning experience we are seeking input regarding the four questions below. Your answers will help guide us in our attempt to ensure that the learning experience we hope to offer will work toward building common understandings amongst the members of our communities.

We then asked: “What do you understand second order cybernetics to consist of? Given your answer to #1 above what opportunities for synthesis or orthogonality do you see between cybernetics and systems thinking (systems science, systems research)? How do you distinguish between cybernetics and systems thinking?”

The answers, to be blunt, were shocking. It was readily apparent that despite the years of common meetings and the decades of cross-community outreach – the “cybernetics” and “systems” communities were indeed two distinct communities, not one. As we discussed this situation and as we interacted with the other groups in Linz several innate ‘suspicions’ held by the cyberneticians became better grounded:

1) The Linz participants who not affiliated with cybernetics tended to think of cybernetics as it was in the 1960's - i.e. "first-order" cybernetics, the study of feedback -- and was mostly ignorant of the principles of observer-related context-dependent second-order cybernetics as it has been developed from the 1970's to date,
2) Those participants, with a few prominent exceptions, expressed a weak understanding of constructivist perspectives at least in so far as those perspectives are understood by cyberneticians,,
3) As a result of 1 & 2 combined, much of what the cyberneticians were trying to share with the general audience was getting "lost in translation" and

4) While the two communities share a similar vocabulary, the lack of explicitness about definitional and philosophical differences surrounding that vocabulary was getting in the way of intellectual advancement.

If we were going to engage in the productive dialogue we all want to have, much more effort needs to be devoted to making sure that terms are defined, perspectives articulated instead of assumed, and a deliberate compare and contrast across perspectives be made an explicit part of presentations. These lessons are not restricted to our outreach to the systems sciences.

We were fortunate to have Ranulph Glanville with us for these meetings – indeed they would prove to be Ranulph's last major conference participation. His active presence helped to guide our discussions and his approach played a major role in shaping the output which will soon follow below. Ranulph's approach to our task can be summarized with a few choice quotes:

> *If you slow things down then you see nuances that you wouldn't normally see. That is revealing — slowness has a particular quality of its own. It is difficult to slow things down and to simultaneously keep alert. Being caught in between, being a bit lost is good for a human being. Things have their own time, and we should learn to enjoy this, rather than imposing our own, usually rushed time. A little slowness, living in the now, and a reduction of the significance of the nation state might really help us.*
>
> *A lot of my cybernetics is philosophical in nature; a lot of it goes against conventional cybernetics, which is in general focused on purposeful systems — systems with goals. I'm just as interested in systems that don't have goals. So I am better at keeping my eyes open for opportunities than in taking them. If I leave myself open to see possibilities and if I leave space for people to offer "gifts" to me, then I often get some extraordinary opportunities which I could never have hoped for. That's the opposite of the cybernetic goal-oriented system. In cybernetics, I'm interested in the transcendental questions or frameworks within which cybernetics happens, which we tend to assume in order to be able to act. I'm interested in what those assumptions are: what they imply. In that sense I'm someone who looks at the foundations and questions them — someone interested in the relationship between "freedom" and the "machine". The most remarkable characteristic of human beings is that we create patterns. Without the ability to create patterns we wouldn't be able to think. That's what I do: generally at a rather abstract level.*
>
> *I'm interested in a society that minimizes the impact of society and maximizes the space for the individual. I will argue against control. Not all control, but against our assumption of the universal possibility and desirability of control. We are aware that our attempts to control are often inadequate. We usually excuse this as due to exceptional circumstances, or an inadequate description (one without enough variety). But, I would like to suggest an alternative to always making excuses. We can ask ourselves what happens if, when there's a serious variety imbalance, we give up trying to control. If we don't try to force the system we had thought to control into having as little variety as we have? Then we are left with a vastness of variety (and hence possibilities) that goes way beyond our limits. We can be flooded, not by water inundating us, but by possibilities we had never dreamt of.*

In that spirit we developed a list of key principles and ideas which we believe characterize cybernetics in its present state.

Key Principles

A. Cybernetics provides a science of control and communication, underlying the biological and social and design sciences, in much the same way that physics provides a science of matter and energy, which underlies the engineering disciplines.
B. Cybernetics provides a general theory of management, including knowledge management and a general theory of an information society.

C. Cybernetics provides a way of understanding the role of science in society by pointing to "second order science."
D. Cybernetics is providing methods of second order research or research on research. Cybernetics has expanded the philosophy of science by adding two dimensions – the amount of attention paid to the observer and the effect of a theory on the phenomenon observed.
E. The work of Ashby provides a set of laws similar to Newton's laws in their utility:
    1. Definition of a system that includes the observer
    2. The Law of Requisite Variety. This theory enables the amplification of management/regulatory capability
    3. A theory of learning and of adaptive behavior
    4. A theory of self-organizing systems: This theory is a more general statement of natural selection, learning theory, and of social and economic development
F. Autopoiesis explains the nature of living organisms as opposed to non-living systems. It explains autonomy.
G. Soros's Reflexivity theory is providing an alternative to equilibrium theory in economics. This theory is compatible with contemporary cybernetics and is a general theory of the social sciences, not just economics.
H. Lefebvre's theory of reflexivity postulates two ethical systems, shows how to identify/ measure them and explains how the theory can aid cross-cultural understanding, international strategic negotiations, education, psychotherapy and societal development.
I. Beer's Viable System Model describes the structures and functioning of viable systems – individuals, corporations, governmental agencies, NGOs, etc.
J. (From Gershenson, et al, 2013) "It is suggested that Cybernetics and Systems researchers should be humble (since our knowledge and cognitive abilities are limited), cautious (not to believe blindly in our models), and open minded (towards other disciplines and approaches)."

Key ideas

1. The amount of selection that can be performed is limited by the amount of information available.
2. A trap is a function of the nature of the trapped.
3. The hunter must have more variety than the hunted.
4. There is always a bigger picture. There is always another level of detail. There is always another perspective.
5. Never fall in love with your model.
6. Only the undecidable we can decide.
7. In logic only paradoxes create time.
8. Major problems in the world are the difference between how nature works and how people think.
9. The difficulty in science is not so much how to make a discovery but to know that one has made it.
10. Indecision is the key to flexibility.
11. A key decision is the decision not to decide.
12. The systems approach begins when you first view the world through the eyes of another.
13. It is not enough to do your best you must first know what to do and then do your best. Act not on facts but on explanatory principles. No animal can afford to do consciously what it can do unconsciously.
14. Physical concepts are the free creations of the human mind and are not however it may seem uniquely determined by the external world.
15. Few people are capable of expressing with equanimity opinions which differ from the prejudices of their social environment. Most people are even incapable of forming such opinions.
16. Reality is just an illusion albeit a persistent one.
17. When you get circular trains of causation as you always do in the living world the use of logic will make you walk into paradox.
18. The folly of mistaking a paradox for a discovery, a metaphor for a proof, a torrent of verbiage for a spring of capital truths, and oneself for an oracle, is inborn in us.
19. A power relationship requires compliance.

20. Do unto others as they would have done unto themselves.
21. Complexity is a choice.
22. The art and science of goodwill.
23. A science of efficacy.
24. To know is to be.
25. There is no conversation without a listener.
26. A is better off when B is better off.
27. Self-organization is a misnomer. It is self-contained organization with an emphasis on boundaries.
28. Draw a distinction.
29. Experience is a distinction we make in relation to ourselves.
30. We live in experience.
31. Efficiency is the enemy of resilience.
32. Resilience is ignorant of the system of which it is a part.
33. To a river be a canyon.
34. Same is different.
35. The extent of complexity is the degree to which efforts at reduction have failed.
36. Be as simple as possible but not simpler.
37. Everything said is said by/to an observer.
38. Cybernetics takes circularity seriously.
39. Objectivity is a subject's delusion that observations can be made without him.
40. When I distinguish myself and another, the qualities I give myself I must give potentially to the other and the qualities I give to the other I must give potentially to myself.
41. Sustainability is an emergent property of social processes not a property of the ecosystem.
42. Seek to expand possibilities.
43. Every isolated determinate dynamic system obeying unchanging laws will develop organisms adapted to their environments.
44. The logic of the world is the logic of descriptions of the world.
45. One cannot not communicate. One cannot not conceptualize.
46. One does not communicate one enters into communication.
47. There is an exchange relation between cognition and volition.
48. In social systems observers also participate.
49. Difference that matters appears in the tails of a distribution.
50. Good teachers strive to learn about the learner before they try to lead.
51. Cybernetics is not a collection of facts but a way of thinking.
52. Isms lead to schisms.
53. We can only learn from failure.
54. When you see the same, look for the difference, when you see difference look for the similar.
55. The solution defines the problem.
56. Daddy, Daddy what is gravity? Gravity my dear is an explanatory principle.
57. The purpose of a system is what it does. The purpose of a self-organizing system is what it is.
58. A tool is something with a use on one end and a grasp on the other.
59. A medium is a tool that kicks back.
60. In a self-organizing system the rate of change of redundancy is always positive.
61. Same is different (complementarity)
62. Duality versus dualism (orthogonality)
63. Phenomenon versus coming to know

Our belief is that by basing our outreach programs to other disciplines on these key principles and ideas we can provide a meaningful foundation for how cybernetics can contribute to both the world in general and to their particular understanding. Our general observation was that during the fifty plus years of cybernetics' existence the discipline had encountered a number of epistemological challenges. Our history could thus serve as a set of analogous lessons for other disciplines that are faced with similar epistemological challenges. In the story-telling lay the potential for both meaningful outreach and intellectual collaboration.
This outreach effort is now underway.

Team 4: Future Directions of the Banathy Conversation Methodology

Team Leader: Gordon Rowland
Team Members:
Gordon Dyer[1 2,] GBR
Jed Jones, USA
Silvia Zweifel, ARG
Yoshi Ohkami, JAP
Yoshi Horiuchi, JAP

Abstract
Team 4 asked the overarching question, "How might the Banathy conversation model evolve in ways that broaden its appeal and lead to greater application and impact?" We used a variety of methods in seeking an answer, including exploring a case example, considering general models of inquiry, and comparing alternative forms of conversation and dialogue. Our work followed two primary strands, one concerning how we might promote the Banathy Conversation Model to external audiences, and the other concerning how the associated methods might evolve.

In terms of promoting the model to external audiences we articulated (a) features, benefits, and key differentiators (e.g., a structured methodology to address root causes and reframe problems, deal head-on with challenges, gather and capture ideas from all important stakeholders, drawing upon three decades of international practice and theory), (b) how potential objections such as a lack of time and/or understanding might be overcome, and (c) the nature, structure, and function of the method itself (e.g., participants, leadership and facilitation, logistics and tactics, intellectual tools, milestones, outputs and deliverables).

In terms of how the method might evolve, we considered the parts and dimensions of the model and developed and/or tested a number of new tools, including the use of software applications for remote participation, a question algebra, and a model of planned change. We generated a new participant role, tentatively titled Zen Mondo Trickster, and we reviewed and employed parts of the *Draft Guidebook for Designing and Sustaining Effective Conversation* developed by Gordon Dyer.

Intercultural communication proved to be a key theme across all our work during the week and in our planning for follow-up work that will be lead by our members in Ushuaia, Argentina and in Japan.

Introduction
The Banathy conversation model was developed in response to a felt need for a change in the systems science community. Community members, led by Bela H. Banathy, realized that they were accomplishing more in conference breaks than in sessions. They agreed to "stay on break" and to hold conversations rather than conferences. As documented in the Guidebook recently developed by Gordon Dyer, the conversation model involves three phases. During the preparatory phase, teams of approximately 5-8 invited participants decide upon topics, formulate triggering questions, write and share input papers, and begin to get to know one another. During the conversation phase, the teams meet in person for a week and engage in an open-ended dialogue, with limited facilitation and without agenda. Particular roles may be taken by mutual consent, for example to insure participation, and sharing across teams may occur in plenary sessions. During the follow-up phase, teams and perhaps individual participants write reports that are shared as widely as possible. Depending on the context, a conversation event might involve a single team or a number of teams working simultaneously.

Since the development of this approach, conversations have been held in many locations around the world, in addition to the bi-annual Fuschl/Linz conversations of the IFSR. Some have followed the Banathy model, and some have not. Most often, this has been a matter of teams' choice. Comparing experiences from early conversations to today, while many variations have been made and applied, the basic structure of the conversation model has remained intact. Also, the model, or more generally the topic of conversation itself, has been considered a number of times. We chose to do so again for two reasons: first, we saw opportunities to refine the model in new conversations that were occurring

in new locations around the world; and second, we were (and remain) convinced that the model has great potential to help address local as well as global challenges that are becoming increasingly significant and more and more complex.

Recruiting Banathy Conversation Method Participants: Features, Benefits, and Overcoming Objections

The Banathy Conversation Model (BCM) represents an uncommon approach to defining, exploring, and finding solutions for (or transcending) highly complex problems or interrelated problem sets. The vast majority of individuals and organizations who might benefit from engaging in the BCM have likely never come across it – let alone understand how it works or how it might benefit them.

For these reasons, Team 4 decided to take cues from some the world of sales and marketing in order to explore how we might garner interest in BCM from people unfamiliar with it. The fields of sales and marketing have evolved to help businesses garner interest in a given product or service among prospective buyers. It, therefore, seemed like a logical place to inform and organize our thinking about how to convince would-be BCM participants to consider learning more about it and potentially agreeing to try applying it to their own, real-world problem sets.

Team 4 spent some of our time together performing a prolonged thought experiment, whereby we considered the BCM as if it were a saleable service, for the purpose of defining and elucidating what sales people typically call the “so what” factor of BCM. The “so what” factor is the question, “So what’s in it for me? Why should I care about your product or service?”

By exploring the features, key differentiators, and benefits of the BCM—and by outlining solutions for potential objections to a would-be sales effort—Team 4 sought to gain a better understanding of how new prospective BCM participants might react to an effort to expose them conceptually to the BCM for the first time.

Methodology for Defining Features, Benefits and Potential Objections

Our process for defining the features, key differentiators, benefits and potential objections involved recording our thoughts and impressions on large, blank “newsprint”-style sticky notes over a period of several hours. We engaged in this process in several stages, including as a group and as smaller, temporary sub-groups. The results of our work amounted to several sheets of sticky notes containing a combination of loosely-constructed mind maps, flow diagrams, lists and miscellaneous notes and impressions that cropped up, stream-of-consciousness style.

A brief definition of features, key differentiators, benefits and objections is shared here:
Feature: an identifiable trait or characteristic of the product or service; example: if we are selling an automobile, a feature is “200 horsepower engine.”
Key Differentiator: a sub-set of the feature set; among an entire feature set, key differentiators are those features that set the product or service sufficiently apart from alternative or substitutes.
Benefit: a perceived advantage derived from the product or service to the individual or organization considering purchasing it; in the automobile example, the benefit of a powerful engine is “offers exhilarating performance, making the car fun to drive.”
Objection: a negative perception that a prospective buyer might express when considering making the purchase; in the car example, “A powerful engine means spending more money on gasoline.” Overcoming the potential objection would be to come up with a prepared statement in anticipation of the objection that could change the prospective buyer’s negative perception.
The following lists are an attempt to synthesize some of the content generated during these sessions into summarized list form.

Features

1. Attempts to ignore or transcend inherent power differentials among stakeholders, encouraging all participants to make their voices heard and be part of the solution
2. Problems are defined and explored by all stakeholders collectively; everyone’s voice is heard
3. Offers a structured methodology for re-framing the problems/questions/issues
4. Can generate written knowledge—in the textual and graphical form—that can be leveraged later for short and long-term solutions

5. Designed to deal with highly-complex issues
6. Draws upon a rich body of knowledge when things get stuck
7. Moderator-consultant helps the event run smoothly by: getting things unstuck, ensuring all stakeholders are participating, and ensuring that observations and findings are recorded for future reference
8. Gathers all important stakeholders into the same physical or virtual space, with a format to air different perspectives on the issues. Includes all stakeholders in defining the problems and creating solutions.
9. Asks questions that affect all direct stakeholders within a given problem context. BCM can expand boundaries of the problem the stakeholders define in the beginning.
10. Draws upon three decades of practice and theory

Key Differentiators

1. Serves to identify and reveal tacit assumptions among participants, which can help avoid communication break-down
2. Does not require special academic degrees, elevated social status, or special training in BCM
3. Future-oriented inquiry that considers the problem and solution set not only now, but also how it could affect future situations and scenarios
4. Yields deeper insights than with other problem-solving method because it allows for the definition of the problem or problem set itself to evolve as the dialogue evolves
5. Apply a systems approach to dialogue and problem-solving
6. Designed to tackle the intractable problems that might otherwise be hopeless. In other words, the root causes of the problem in concern will be revealed.
7. Participants can feel, often for the first time, heard and validated. Aims for win-win-win solutions. It is a Conversation and not a negotiation
8. Participants can agree to disagree
9. Can have positive personal effects on individual participants, beyond solving the issues at hand
10. This method is applicable not only to academic questions, but also to a wider range of questions in business, society, etc.
11. Can utilize creative capacity of the team and the team members
12. A participant can participate off-site via SKYPE, etc.

Benefits (Answers to "So-what" questions)

1. Fosters collective intelligence
2. Takes a global view of root causes
3. Produces solutions across institutions
4. Exposes interconnectedness of the issues the group faces
5. Promotes stakeholders' taking ownership of problems and solutions
6. Can yield synergistic, unexpected solutions
7. Tailored to the needs of participants since it is participated in and designed by them
8. Deals head-on with the common challenges that stakeholders face
9. Locally-grown solution created by locals
10. Allows for the capture of emergent knowledge that can be referenced in the future
11. For organizational participants, the BCM offers the potential to become a high-profile case study

Overcoming Objections

1. **Objection:** "I cannot afford to take so much time off of work"
    a. **Overcome with:** "Compensation can be offered in some scenarios for an employee missing work. The project organizers can also officially inform employers of the project via written communication."

2. **Objection:** “I don’t understand what you mean”
    a. **Overcome with:** “We will show you examples and will teach you what you need to know”
3. **Objection:** “That won’t work”
    a. **Overcome with:** “Let me show you a video testimonial”
4. **Objection:** “My organization doesn’t know how to do that”
    a. **Overcome with:** “We will show you examples and will teach you what you need to know”
5. **Objection:** “I have never heard of that before”
    a. **Overcome with:** “This method has roots in 30 years of research and practice”
6. **Objection:** “Talking about things won’t help anything”
    a. **Overcome with:** “This is not just talking—it’s a structured method for approaching change”
7. **Objection:** “I cannot share certain information about my organization with others, for privacy, security or intellectual property reasons”
    a. **Overcome with:** “You don’t have to share anything that you don’t want to share
8. **Objection:** “Sounds like a lot of work”
    a. **Overcome with:** “Inaction will not make the problems go away”
9. **Objection:** “Who will pay for this?”
    a. **Overcome with:** (Case-dependent)
10. **Objection:** “What if different stakeholders define the problem differently?”
    a. **Overcome with:** “If there is enough common perception of a problem to motivate action, there is reason to participate in the dialogue process”

Evolving Methods
Simultaneous to the considerations above regarding recruitment of new BCM participants, we explored the model itself. We identified parts and dimensions, and we worked to develop (or further develop) intellectual tools that might be employed.

Parts and Dimensions
In addition to the three phases mentioned early, we identified several sets of parts/dimensions of the conversation model, each taking a different perspective. At a general level, we saw the conversation involving assumptions, problems, causes, stakeholder groups, actions, and other facts and context. As an instance of inquiry, the conversation has a context, purpose, question, methods, findings, implications, assumptions, beliefs, and criteria. More specifically, the model calls for participants to consider the following: stakeholders; location, logistics, and tactics; leadership and facilitation; intellectual tools; outputs and deliverables; milestones; and knowledge management. We agreed that across any of these sets, special attention needs to be given to cultural differences and intercultural communication. We agreed, also, that more successful conversations, at least those with strategic purposes, would emphasize local values, for example, local leadership and internal championing of ideas. We talked of the need for local cultural expertise and began to describe helpful roles, for example, that of cultural attache, and what we came to label “Zen Mondo Trickster.” As Jed Jones explains:

> Zen is a form of Buddhism that is stripped down from the dogma and cosmology associated with other forms, such as Pure Land Buddhism. Zen is about finding enlightenment in the “now” rather than reading what the ancient masters said. That said, as a practice, sometimes a Zen student will sit in the presence of a master who will offer simple phrases (or sometimes a whack of the stick on the back of the head - no kidding) to try to instigate enlightenment in the student.
>
> The Japanese script for Mondo literally means “question and answer,” similar to “Q&A” in English. It represents the dynamic of a teacher asking the student difficult questions, such as koan, that don't really have an answer. The student is supposed to leverage those questions to instantaneously (if they are lucky) transcend the logic of their “small mind" or "everyday mind" into a new understanding.

> So, in our context, a Mondo Trickster is the person who - when the group gets stuck or is too smug in their assumptions about how the dialogue is progressing (such as assuming that they have found a deceptively simple answer to a complex problem) - will ask the group a question to throw them off balance a bit. The purpose is to keep people a bit outside of their comfort zones. The Mondo Trickster, on the other hand, can ask similar questions of the group if the group is totally stuck, thereby nudging them in a new, potentially-fruitful direction. The job, then, of the Mondo Trickster is to gently keep the group between too comfortable and too stuck - without directly leading the question or implying the answer.

While the potential of this role intrigues us, the particular name Zen Mondo Trickster may be difficult to use as a cross-cultural metaphor. So, for the moment we leave the name as an open question to be pondered.

Intellectual Tools

One part that we gave special attention over the week was the intellectual tools that we used. We tested a shared notetaking method that had been developed at a previous Fuschl conversation. This involved simply placing a flipchart page on the table between us and capturing notes ourselves—at whatever physical angle the page was oriented—rather than leaving notetaking to a facilitator. This maintained individual authenticity in the notes; they were not a facilitator's interpretation. We photographed the pages at the conclusion of the conversation and the photos serve as a lasting record of individual and collective contribution.

We explored language and symbols, also. In the case of symbols, we found that as we considered the phases and the experience of the week, we benefited from distinguishing different types of questions. Some were purposely open-ended, and were best left as such for contemplation over time. Others were more closed and intended to be answered in the short term. A third type were questions that led to further, hopefully more powerful questions. Recalling a symbol that had been created years ago and called the "quemma" (Rowland, 1999), we found that three variations of the question mark could be used to distinguish these; at the bottom of the question mark could be an empty circle, a full circle, or a comma (Figure 11).

Figure 11. Symbols for three question types.

We saw that as answers were sought and circumstances changed, the question type might change as well. In particular, an open question could become closed as the group moved from long-term contemplation to short-term answers, symbolized by filling in the circle; and new questions might be generated by the inquiry, symbolized by turning the filled circle into a comma. We extended this "question algebra" to include a range of symbols—more than a dozen possibilities—and have since turned them into a font useable within Microsoft Word. We will experiment with these in future conversations.

A third intellectual tool we explored was the notion of "over-the-edge thinking" (Rowland, 2014), an alternative to "thinking outside the box" thought to better reflect the perspectival change and relationships among ideas that are more typical in innovation. We combined this notion with the question algebra, for example, recognizing that the quemma seen from the top or side would look like a line or an exclamation point, respectively.

A fourth tool that we found interesting was the CHRIS model of planned change (Rowland, 2012; see Figure 12). The CHRIS model is a heuristic emphasizing some aspects of a planned change effort that are frequently not given enough attention. It calls for Honoring the good in situations, which allows us to Release the connections that prevent movement away from the status quo, which gives us greater ability to Imagine new possibilities, then to Create by bringing a selected possibility into existence. The cycle, essentially a shift of attention back and forth between *what is* (Honor and Release) and *what might be* (Imagine and Create) is Sustained, as illustrated in Figure 13.

Figure 12: The CHRIS model of planned change.

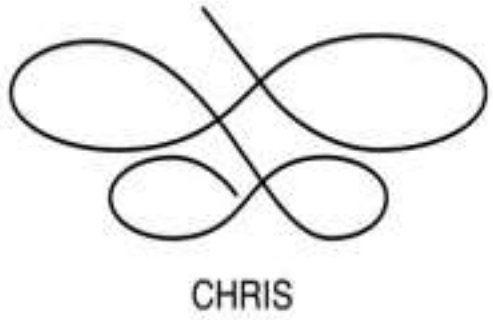


Figure 13: The CHRIS model sustained.

The fifth and most substantial tool we used was Gordon Dyer's *Draft Guide for Designing and Sustaining Effective Conversation* (2014a) along with its *Addendum for Team Leaders* (2014b). Prior to the week, team members reviewed and commented on the Guide. Their positive impressions led to the Guide being circulated to other teams and their leaders. A brief discussion on the Guide identified one very useful suggestion, which was to add a section in the Addendum on dealing with contrary or disruptive behaviour. Pending comment from IFSR and any further comments that might be received from other Teams, Gordon Dyer will offer to update the documents. Dyer states that "As author of the guidelines I readily accept that as written they are not necessarily to be applied rigidly in any conversation scenario, but hopefully prove to be a source of advice or tips to think about. In any given context, one section may be more important than any another."

To represent all of the parts, dimensions, roles, tools and so on, we wondered if the name Banathy Design Conversation might be more useful than Banathy Conversation Model.

The Experience of Remote Participation via Skype

The Linz conversation afforded a unique opportunity to test remote participation. Below are accounts from two sides.

1. From Remote-Participation Side by Gordon Dyer

I was forced to withdraw late from Linz2014 due to health consideration. However, I was keen participate via Skype as much as possible for a number of reasons, including to receive feedback on the Draft Design Guide for Conversation and on the Addendum for Team Leaders.

For some reason Skype on my laptop is problematic but it works perfectly well on my iPad. My connection to Linz was generally good and after a few problems setting up the team's laptop, overall the conversation worked well for me as a remote participant over the five days. The initial issue was the camera in Linz. The one in-built to the team's laptop did not have a sufficiently wide field- of-view for me to see all colleagues when they were seated around their table in a way which served them best. When a separate camera with an adjustable focal length was used the view for me was much better, but I could still normally only see three of the five members of the team. I had some problems seeing what was written on the flip charts at the end of the table, but I was helped in two ways with this. Yoshi wrote key points on an A4 sheet and showed this to the camera. When detailed lists were being put on a flip-chart he took photos and sent the images to me by email. All this meant that I mostly felt I was up-to-date. I estimate that I was able to participate in the conversation to an 80% extent. Two obvious things were missing (1) for members who were out of my sight I could not see their body language and could not always tell how happy they were with the direction of the conversation (2) clearly I was unable to participate in conversation in the margins i.e. during coffee breaks, lunches etc. and to speak with members of the other groups. These are always great occasions to take stock. Feedback from the team members on my participation was very positive, to the extent that I was told that it felt to them that I was a full member of the team. It seems that having my face filling the screen on the laptop sitting on the table in a space that would normally be taken up by a team member helped to create this feeling. My recommendations for future:

(1) use a separate camera with a wide angle lens and adjustable focal length
(2) impress on colleagues always to print clearly and use large lettering on any flip charts

2. From On-site, Linz-Participation Side by Yoshi Horiuchi

Gordon Dyer was participating in the Team 4 Conversation almost all the time via Skype. I went to his home after the Conversation and saw his actual place for the Skype conversation. Hence, I could see how Gordon Dyer saw our Linz side, as well as how we at Linz side saw Gordon on the PC display.

1. When we learned that Gordon could not come to Linz but was eager to participate in our team conversation, we offered him conversation by Skype. At that point my expectation was Gordon could be on Skype several times a day, perhaps about 30-minutes each time, so that Gordon could follow the flow of our conversation with his feedback several times a day. Hence, it was unexpected pleasant surprise that Gordon participated in the conversion via Skype almost all the time. His almost full participation demonstrates that the IFSR-style conversation can be successfully implemented via Skype, with the following conditions, I would consider:
    a. The off-site participant and the on-site participants know one another very well beforehand.
    b. The off-site participant understands the general nature of the IFSR-style conversation very well. Fortunately, Gordon Dyer wrote a Guidebook for the IFSR-style conversation, hence, is fully familiar with it.
    c. The off-side participant is one person. If there are two or more participants on Skype, I wonder the interactions between two off-site participants would work out reasonably well.
    d. The team leader and the on-site participants make efforts for equal participation of all the team members including the Skype participant. I would think our team4 and Gordon Rowland, the team leader, did very well in this role.
2. Gordon's image filled screen of the PC in Linz, which happened to be about the same size as a real human face. Therefore, we on the Linz side felt as though Gordon was actually in our meeting room, without his body.
3. We did not fully realize that Gordon could not see all of us at a time, therefore, could not see gestures, etc. of all the participants on the Linz side.

4. Gordon was participating in our conversation following our conversation and break schedule. I wonder if off-site participants need different schedule for break, etc. In other words, we the Linz-side participants unintentionally dominated the scheduling of our conversation.
5. Basically we showed ourselves in the Skype camera, and emailed photographs of the flipcharts and other materials. I wonder if that was the best communication method. Or, perhaps we can have a video screen with 3/4 of the frame showing us, and 1/4 showing the flipchart, etc.

Continuing Work
In addition to future IFSR conversations, team members identified two specific contexts for application of our work. The first is an actual application in Argentina; the second is an example of a situation in Japan where application might be beneficial.

The "Conversaciones del Extremo Sur" and some experiences of "mini-conversation" by Silvia Zweifel

The Banathy Conversation Model offers something unique; this is what participants of different Argentine institutions reported each time after having attended an IFSR Conversation. No matter what subject, their reports were full of enthusiasm: "when the Fuschl Conversation ends one is a new person" (Charles François).

This practice of enthusiastic sharing over the years kindled the aspiration to start a Latin American version. It is remarkable that in the small group who treasured this longing only Enrique Herrscher attended the IFSR Conversations on several occasions. Ricardo Frías and Ricardo Barrera, the main operational organizers never did. In spite of that they encouraged Enrique Herrscher to design and coordinate the event and committed themselves to involve the authorities of the Universidad Nacional de la Patagonia San Juan Bosco to host the event.

The "1st Conversaciones del Extremo Sur" were hold in the emblematic city of Ushuaia, the most Southern city of the world, in coincidence with the inaugural ceremony of the newly created Universidad Nacional de Tierra del Fuego e Islas del Atlántico Sur. Demonstrating an important IFSR institutional support to the endeavor, Matjaz Mulej accepted the invitation to participate. It was an event enhanced by symbolic coincidences.
The university inaugural venue was held in the core hall of the Museo del Fin del Mundo, the former "End of the World Prison" that had been turned into a cultural center. Some, or perhaps most of the conversation participants, had a feeling of being part of a very remarkable moment.

Another fact was that Lara, Ricardo's one year old daughter, enhanced the function of the "empty chair," which is a clue of the Conversation model. Lara's babbling kept reminding the group that whatever they were working at, it was also meant for others not present in the personal interactions of the program. She attended the welcoming dinner as well as most of the conversation meetings with her mother Maia Gessaga, and Lara's participation was even recorded in the final report. Inclusion was an issue at stake: we also considered contributions of the input papers from participants who, for unforeseen reasons, couldn't attend Ushuaia. These members were included in the final report as "non presential" participants of their team.

The first edition of the "Conversaciones del Extremo Sur" was unmistakably enlivened by enthusiasm. The group of 16 participants, organized in four subgroups (from here on we will call them teams) engaged itself to explore different aspects of the overarching theme: "Transdisciplinarity." They conversed intensely acknowledging their different perspectives on the subject, getting to know each other, building relationships. Each day, they began to fuel the process at breakfast encounters only to finish past midnight by sharing again, seated in the hotel in front of the big windows to the surrounding forests and mountains.

Moving and nurturing are significant words to describe the process: moving from the hotel in the high area of the City to the University building in front of the Beagle Channel, and then from there to another building located in the City center; going for a walk, visiting a place of special interest, staying in silence alone or in company of colleagues, expressing ones viewpoints, sharing experiences, aspirations and difficulties related to the subject, or professional and even personal issues.

The event ended with “The Ushuaia Initiative” declaration. In the document the organizing and supporting institutions expressed their commitment to immediately engage to organize the next edition to explore deeper the same subject: “Across disciplines and generations.” They also expressed their intention to support the “Conversaciones del Extremo Sur” as an ongoing biannual event to be held in Ushuaia.

The second edition took place in April 2013 with more than 30 participants from Argentina, Chile and Uruguay, and Alexander Laszlo from USA, at that moment President of ISSS (International Society for the System Sciences; see report in IFSR Newsletter, December 2013).

Participants were hosted at a hotel located a walking distance from the University building were the groups met for their sessions. Glimpses to the Beagle Channel and to the mountains blessed by favorable weather conditions enhanced the supportive atmosphere. This time (for me as a coordinator of one of the teams) the role of the plenaries became more obvious than in the first edition; I really became aware of the importance of plenary meetings in conversation processes after the Linz Conversation experience.

Plenaries help to foster unity/diversity and the overall performance. At the beginning the plenary offers a welcome and opening to the personal interaction phase. The intermediate plenaries nurture the process. First, it is the urgency of the team conversants to gather their findings and experiences and organize themselves to share the most significant to the whole group. At the plenum similarities among the different team processes become evident, as well as interrelations among particular aspects of the subjects they are addressing. After a plenary the energy is refreshed, insights and further steps of each team and the whole group are fostered, even aha moments are reported. Each one has the chance to enrich his or her perspective. At the closing plenary every team shares the most significant of its journey to the whole group; it is a moment of celebration.

The group took advantage from the context offered by Ushuaia, navigating the Beagle Channel, climbing to the nearby Glacier and walking in the area. Also, at least three of the teams took the support of moments of intentional silence. One of them visited the National Park in the vicinity with that purpose. They sat together in the fresh air looking at the sea, the forest, the sky, silently. Of course, there were also special dinner occasions to socialize, to sing and dance which helped to strengthen relationships.

The result of the 2nd Conversations was most enriching. Enthusiasm was fueled. Again the organizing team immediately began to work at the next edition. The idea to gather the experiences in a text and publish them circulated among the conversants. The intention to that endeavor was to share the clues of what happened and spread out the value of the conversational methodology. The book was published a year later (Herrscher & Barrera, 2014) by The Universidad Nacional de la Patagonia San Juan Bosco.

A more challenging issue was set for the 3rd. edition which will be held in 2015. The overarching theme will be “Aspects of a regional plan” with four subthemes: The integration of nature; The integration of minorities; The respect of identities; How to attain a sustainable size? Like the former editions, the subject was suggested by, the Chair of the Universidad Nacional de Tierra del Fuego, Dr. Domecq during an informal welcoming meeting before the 2nd Conversations began. In this way the organizing group had the chance to explore the proposal during the conversation program, which was acknowledged by the group as an opportunity to better address subjects of interest for a wider audience.

Another line of action was explored by GESI (Grupo de Estudio de Sistemas Integrados Asociación Civil) in collaboration with a University. Jointly with ITBA (The Buenos Aires Technological Institute) GESI offered mini dialogue-conversations addressing complex/transdisciplinary issues, moving from dialogue among two experts to the interaction in the whole group. The most remarkable outcome was the creation of a friendly atmosphere where all had the chance to express their point of view and be listened to. The experience shows that the methodology, if skillfully handled, serves to foster genuine

encounters, which is a base for collaborative actions and team work in any group or organization. Brief conversations also serve to offer an opportunity to introduce the methodology.

The Linz experience shed new light for me on the Banathy Conversation Model. Most of it became clear back home, after reflecting on what happened and exchanging some e-mails with the team members. Conversation is an overarching event in time: the preparatory phase, the personal interaction and the post meeting from a unity. The three phases are of utmost importance to kindle the fire and gather knowledge and experience that serves the chosen purpose. Also an overarching theme and subthemes to it serve wonderfully to sustain the unity/diversity of the teams and the whole group and richness of encounters, understanding, and outcomes.

In our team sessions at Linz listening intently, openly, was an outstanding feature. It is a rare social capacity, most likely in our case probably gained by practice (former experience of the team members in dialogue-conversation). Careful listening was enhanced by practices to include everybody's voice, particularly the shared note taking on a sheet placed on the table where each one wrote from his own angle and the care to facilitate participation via Skype.

On the second day I felt very natural having Gordon Dyer seated at the conversation table trough a computer screen. It surprised me when at some point, probably the third day, he asked us to tell him about the facilities and the environment of our site. At that moment the big windows to the garden were covered by the group's A4 sheets. We offered details: The Danube flowing through the City down the hill, a castle far away on one top of another hill towards the South and the forest behind Saint Magdalena where we had chances to walk during pauses. We also shared some details of atmosphere at meals and informal encounters of the whole group at Linz.

The conversation spirit was very present in our team during our stay at Linz, particularly trough the willingness to participate and assist participation. I was amazed when the Inquiry Algebra was put on the table because of the tool itself and the way it fostered the ongoing conversation. Here I also acknowledge the previous preparation of some participants, their care to bring something rich to kindle the fire of conversation. No doubt: preparation, attitude and commitment are important clues for the process and the outcomes.

"Open or Close" Disputes on the floodgate of Isahaya-Bay dike by Yoshi Ohkami

In the context described below, conversation or dialog may play a key role, or may not be applied because of traditional sectionalism and hierarchy inherent in Japanese culture.

Figure 14. Problem: Disputes over Isahaya Bay reclamation project through negotiations (Mainichi Newspaper Editorial, August 29, 2014)

The government has appealed a provisional injunction issued by the Nagasaki District Court last year that bans the floodgates of the Isahaya Bay dike, built as part of a reclamation project, from being opened, as demanded by those farming in the reclaimed area (Figure 14). At the same time, the government lodged a protest with the Saga District Court against a demand made by fishermen operating in the bay that the government keep paying a fine until the gates are opened for environmental assessment. The situation would remain confused if the government, fishermen and farmers in the reclaimed land area strengthened their confrontations with each other in the courts. Conflicting parties should try to sit at the negotiation table.

Background Facts:

1) Japan is consisting of four major islands governed by approximately 50 local governments, or 50 prefectures.
2) Nagasaki and Saga are the names of prefectures of Kyushu Island.
3) Agriculture and Fishery are both governed by Ministry of Agriculture, Forestry and Fishery (MAFF).
4) Situations surrounding agriculture are changing during these decades. Increase in agricultural products was required until 1980's, but since then the demands sharply dropped because of low-cost products imported from U.S., China and other countries. A substantial part of the farmer's lands are abandoned. However, recently, autonomy in food supply has become a central issue to promote agricultural business.

Observation:

1) Stakeholders:
   - Farmers
   - Fishermen
   - Farmers Union (strong power in case of election)
   - Fishermen Union (strong power in case of election)
   - Politicians (Central parliament)
   - Politicians (Local governments)
   - Landowners
   - Etc.
2) Debates across organizations are not common at various level of social structures. I would guess that even in the MAFF it is not easy to exchange opinions between two sections of Agriculture and Fishery.
3) Local or regional governments are controlled by another body, Ministry of Internal Affairs, by means of funding provided by Central Government.
4) Ministry of Environment has certain level of influence on such issues, but usually its voice is weak.
5) Most of the politicians focuses on the next election, and has no interest in strategic issues which are not visible to the voters.
6) Etc.

REFERENCES

Dyer, G. (2014a). *Draft guidelines for designing and sustaining effective conversation*.

Dyer, G. (2014b). *Addendum for team leaders*.

Mainichi Newspaper Editorial (August 29, 2014). Retrieved from http://mainichi.jp/english/english/perspectives/news/20140110p2a00m0na011000c.html

Herrscher, E., & Barrera, R. M. (Eds.) (2014). *Las primeras conversaciones del extremo Sur*. The Universidad Nacional de la Patagonia San Juan Bosco. Retrieved from http://www.economicasunp.edu.ar/home/extension/publicaciones/libros.html

IFSR Newsletter (2013, December). International Federation for Systems Research. Retrieved from http://www.ifsr.org/index.php/ifsr-newsletter-2013-vol-30-1-december-2013/

Rowland, G. (2014). Thinking over the edge. Special issue of *Educational Technology*.

Rowland, G. (2012). *The CHRIS model of planned change*. Unpublished manuscript.

Rowland, G. (1999). *A Tripartite Seed: The future creating capacity of design, learning, and systems*. Cresskill, NJ: Hampton Press.

Personal Perspective Paper
Gordon Dyer[1 2]

1. Introduction

In this paper the word metaphor is interpreted very broadly, and is assumed to be inclusive of the wide range of images, analogies, concepts, models, theories, and inputs from the outside world that we receive and interpret through the five senses individually or collectively. An essential requirement for an effective conversation is the need for it to be based on transcultural metaphors (TM). A footnote on page 5 of the Linz 2014 Conversation guide reads:

> "Conversation methods as described here are no longer restricted to those involving "scholarly practitioners". The techniques described are equally applicable to any context where the aim is to draw on the creative capacity of everyone involved. Hence it can be applied to a business context where there is genuine openness to contribution from all."[3]

However, even if there is genuine openness to contributions from all, any conversation will founder if there is a lack of transcultural metaphor. This short paper offers an approach considering cultural layers and subcultures, as a means to understand why difficulties occur. A successful case study of a transcultural metaphor used to motivate and teach inner- city teenage youths to use a sewing machine is then described. The paper then suggests some general lessons for identifying TM that emerge from the case study. Colleagues are invited to share their own experiences of using successful TM so that this first attempt at identifying general lessons might be refined and exploited by the conversation community.

2. Cultural Layers

For simplicity, only three cultural levels are considered: national or society dimension; intra-societal subcultures; individual level. The levels are not discrete but have systemic interactions.

2.1 National or societal dimension

First we take a view at a national or societal level. The problem of identifying an effective TM between two different "societal" cultures is dependent on a complex cluster of factors. These include differences of language and idiom, belief system, political system, degree of openness, history, ethics, state of development, national potential (resources, military-industrial complex), perceived international standing and power, and national objectives, and the trust and compatibility that currently exists between the two cultures. The intensity and systemic interaction of factors will affect the extent to which this culture has become integrated (or "fixed" in the case of the fundamentalist) in, say, any two individuals who may reflect their own "societies" in a conversation.

We generally have little difficulty in finding TM with other members of the Linz conversation groups. Despite the differences in our cultural heritage, in joining a group we share a common objective: to experience, to co-learn and to develop, and there are many rich metaphors to convey this. In contrast, we (the participants of this team) would have severe difficulty in finding a TM with a member of the Taliban.

[1 2] Gordon Dyer authored and contributed this paper.
[3] Dyer, Gordon (2014). "Designing and Sustaining Effective Conversation", Draft Guidelines for the Linz Conversation, Version 4, April 2014.

3. Intra-society

3.1 Inter-Organisations

In this case the cluster of factors affecting the difficulty of finding TM will have analogies with the kind of considerations mentioned above. There will be differences in detail. Language will be the same; idiom might be different. There may be internal "political" systems involved which will influence communication styles. Organisational ethics and objectives may be different. Relative organisational potential, size, power and influence in their operating environment, and the imbalance in any of these could be key factors. Also, any perceived threat from the other will also influence any decisions to cooperate during discussions.

3.2 Intra-Organisations and the Professions

Problems with finding TM also exist within organisations and systems within any society. Members of organisations fulfilling particular functions will exhibit the traits of their own professional sub-cultures. This will have a cluster of factors (not dissimilar to the cluster at societal level) which generates their world-view. This will include: professional language and idiom, traditional work practice, belief system, ethics, perceived standing and power. This represents an additional layer which may provide problems when searching for TM between professionals of different disciplines, even within their own organisations and/or societies. For example – in a business or company setting in conversations between any of, say:

- a development engineer, marketing manager and a company accountant
- a lawyer and production engineer
- unions and management

In an education context: between a teacher and a pupil, especially where the gap in perception is accentuated by age.
And in further examples like:

- Politicians and their supporters of different political persuasions.
- Scientists and social scientists in relation to methodology
- Spiritual belief systems.
- Young and old.

4. Individual level

While an individual will be influenced to a large degree by the two levels of culture mentioned above, through family upbringing, learning and experience they will also develop a "personal" culture which will also influence their attitude to the style of conversation described in the Linz guide. Again, the cluster of factors affecting the difficulty of finding TM between individuals will have some analogies with the considerations mentioned above. The equivalent of national and organisational standing or power is analogous to the physical presence, charisma, personal power and reputation of individual representatives, and severe imbalances in these could make TM similarly difficult to find.
In the business sector, size of organisation could be a key factor in having openness to ideas. As a small company grows, the owner-entrepreneur can be expected to have some problems with letting go and being open to ideas.
In other organisational types, a personal culture might involve an excess determination to achieve personal objectives and success, or indeed other forms of greediness, at the expense of others. We hope that such instances are rare, but unfortunately they exist.

5. A Successful Transcultural Metaphor

Despite the problems outlined, there is evidence that successful TMs are found through careful thought and individual innovation. As illustration, here is an example of a successful TM from the education sector. In this case, a design technology teacher (aged 45) was faced with teaching a textile design module, including needlecraft and sewing, to a group of inner-city multi-racial 14 year-old youths (mostly black). This was a real challenge. She successfully found a TM, by presenting the task as "learning how to drive". She used the form of a racetrack template, shown in Figure 15, around which the boys were challenged to sew. The skills of keeping their sewing as close as possible to the middle of the template track are presented as the driving skills of maintaining a car in the centre of the

road. The boys were motivated by this TM and tackled this “driving task” with great enthusiasm and thereby learnt to operate a sewing machine (Figure 15).

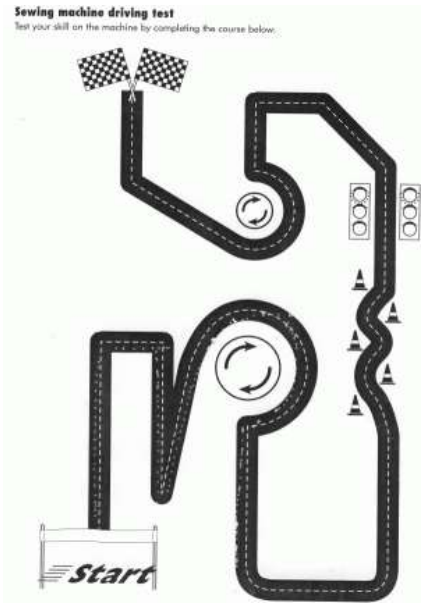


Figure 15. The racetrack template as a successful transcultural metaphor for educating sewing

6. Reflection on the case-study

The value of metaphors in conversation can be highly significant; however it is also well documented that they must be used with caution (Aubusson, Harrison, & Ritchie, 2006). Crucially, as highlighted in the Guide, they must be appropriate and relevant. We also note that in his consideration of electronic communication in the internationalization and acceptability of software product design, Chroust[4] has identified cultural divergence as a key factor underlying misunderstandings, highlighting taboos, metaphors which might founder (e.g. those based on sport if not played in that country), and puns, jargon and humour as possible sources of misunderstanding. Humour very rarely transfers to another culture. We seem to have more clues on what “not to try” rather than “what to try” in selecting metaphors to sustain conversation. Yet, given the success of the sewing machine example, some obvious questions follow:

1. Why was it successful?
2. Are the lessons transferable to any other context?
3. If so, to what contexts and levels?

The answer to Q1 would seem to be that the teacher (1) reflected on and analysed the desired learning context[5] to identify a metaphor which mapped onto the teenage boys’ culture and aspirations (2) mapped this driving metaphor to a topic in which they have interest and which they might become engaged (3) used a metaphorical style (chicanes, sharp-bends, finish flag) which enthused them and sustained interaction in an enjoyable atmosphere.

This seems to imply that whatever the complexity of the cultural mix, for any conversation context, a similar process to the above needs to take place. So, (1) there needs to be pre-event reflection and system analysis on the cultural context[6] of participants in the group, to avoid metaphorical pitfalls (2) identification of metaphors to reflect common goals and aspirations of the group members, and (3) use of a metaphorical style – which is both optimistic and understandable within the cultural mix - to reflect the goals of growth, development, betterment, and co-design that are typical of conversations.

[4] Chroust, G. (2008). Localization, Culture and Global Communication. In G. D. Putnik & M.M. Cunha, (Eds.), *Encyclopaedia of Networked and Virtual Organizations, Vol II (G-Pr), pp829-837.* Information Science Reference, Hershey, New York

[5] It would be too much to claim that the teacher carried out a “systems analysis” as she was not familiar with this , but arrived at an effective solution intuitively

[6] In conversations with a strategic context especially those with an international dimension, advice from a “cultural attaché” or advisor may be necessary. See Report from Team 4 Conversation Group, Linz 2014

It would be helpful to know whether colleagues have any other examples of successful TM that they have used. If so please share them with the conversation group, so guidelines might be refined.

REFERENCES:

Aubusson, P.J., Harrison, A.G., & Ritchie, S.M. (2006) Metaphor and Analogy. In *Metaphor and Analogy in Science Education*, *30*, 1 – 9. Netherlands: Springer. doi: 10.1007/1-4020-3830-5_1

Team 5: Philosophical Foundations for the Modern Systems Movement

Team Leaders:
Jennifer Wilby, GBR
David Rousseau, GBR, (co-leader)
Team Members:
Manfred Drack, AUT
Gerald Midgley, GBR
Julie Billingham, GBR
Rainer Zimmermann, DEU

Abstract: We met to reflect on the lack of progress towards the founding ambitions of the systems movement, and to consider whether these original ambitions are still credible and could be re-energised. Our intent was to first clarify the meaning of the term "General System Theory" (GST) and expose the philosophical assumptions behind the "Research Agenda" of the early general systemists. We hoped that from this we would be able to assess the current credibility and remaining potential of this Research Agenda. We found the analysis more complicated to do than anticipated, and soon focused on the narrower objective of developing frameworks for guiding such an analysis. We did conclude that the idea of a GST is still credible and important. For guiding this future effort we evolved a new question, namely "What (if any) would be suitable philosophical foundations for Systems Science, and how would that help us improve our practice?" From this we were able to identify several projects that the IFSR could support and facilitate towards advancing the field of Systems Science in a systematic way.

Keywords: General Systems Theory, GST, systems science, systems research, systems philosophy

The IFSR Conversation

We met in Linz, Austria in April 2014 as Team 5 of the IFSR Conversations 2014.
The aim of this team, Philosophy, General Systems Theory and Modern Systems Sciences, was to review the background assumptions and arguments of systems thinking from the 1950s to the present, and assess them in the light of recent developments both within and outside the systems movement. A key aim of the meeting was to consider whether it may now be possible to find a way forward in which the presently discordant paradigms can be seen as valid perspectives of a deeper coherence after all, and whether this might provide a basis for a revitalisation, in modern terms, of the promise originally foreseen in the development of a general theory of systems.

Team 5 Introduction

The modern systems movement traces its origins back to General System Theory (GST) and the 1950s vision of the 'founders' of the *Society for General Systems Research* (SGSR), who had an ambition to develop a GST and leverage it to promote the unity of knowledge, develop an interdisciplinary language, establish transferrable methods for developing exact models in sciences that lack them, create methods for making scientific discoveries in predominantly heuristic disciplines, and eventually bridge the gap between the naturalistic and the social/human sciences in a non-reductionistic way.

In 1988 the SGSR changed its name to the *International Society for the Systems Sciences* (ISSS), but the original objectives are still in place. The last half century has seen many important developments in the systems movement, including the development of soft systems science and critical systems science. However, the original vision associated with GST, discovery and unity, remains unfulfilled. The modern systems movement's contemporary vision of transdisciplinary working rests to a large degree on this earlier vision, but this ambition too remains elusive.

The 'founders' of the SGSR had a largely unified vision grounded in specific philosophical outlooks combined with systemic arguments, and having a particular focus on social applications and on humanism. This unity of outlook has become fragmented since the 1980s under the influence of a general move in the social sciences towards polar versions of constructivism, postmodernism, and relativism. These developments raise questions about the credibility of the original vision of the SGSR, and hence about the viability of the present ambition of finding principled ways of transdisciplinary working towards a 'better' world. Furthermore, the soft and critical systems methods developed despite the lack of substantive progress with developing GST, and so it is now unclear to what extent soft and critical systems practice depends on or exploits principles from GST. The fragmentation of methods and communities within the systems movement might therefore have been to some extent aggravated by the lack of progress with general systems research.

However there have recently been important academic debates and developments in philosophy that have a bearing on this issue. These suggest that there may be an opportunity now for a return to a more unified philosophical perspective for the systems movement, with potential for a modern vision that bears some resemblance to (but does not exactly replicate) the original vision of the SGSR.

Initial Review

At the outset, our review focused on three aspects:

(a) What does the term "GST" actually stand for?
(b) How does GST fit into the "territorial map" of the systems sciences?
(c) What are the philosophical presumptions behind the "General Systems Research Agenda"?

The meaning of "GST"

There is today considerable ambiguity in the use of the term "GST". An overview of the many ways in which members of the systems community have used the term can be found in Hammond (2003, pp. 252–255). In part this polysemy exists because we do not yet have a GST, as many systemists have affirmed, e.g.:

> Who knows what General Systems Theory is? In my opinion General Systems Theory does not really exist as a unified theory. Claims to the contrary seem to harm our credibility. "Systems Science(s)" is also a dubious trademark. Everyone understands it and defines it in her/his own way. Nobody seems to be able to offer a coherent and all-embracing view of what it is… (Francois, 2007).

From the outset it was unclear how to proceed to develop a GST, and what happened instead was that specialised systemic theories were developed on the basis of individual systemic behaviours that recur isomorphically across disciplines:

> … historical analysis shows that it was the practical offshoots of theories originally heralded as the forbears of a "GST" which took precedence. The evidence is there in Information theory, Cybernetics, Organisation theory, Control theory and even Management Science. Development of practical methodology was emphasised in these and related spheres (Flood & Robinson, 1989, p. 63);

The problem arguably originated with von Bertalanffy himself. He proposed the term "General System Theory" as a translation of his original term "Allgemeine Systemlehre". However he did not like this translation, as the term "Lehre", which has no direct equivalent in English, refers not to a theory as such but rather "an organised body of knowledge".

Von Bertalanffy used the term "GST" in a polysemic way, and on various occasions he used it to refer to a fundamental theory, a new scientific discipline, a new philosophy of nature, a worldview, a paradigm, a methodological maxim, a new field, a new realm of science, and so on (von Bertalanffy,

1968, p. 33, 1972, p. 414; 1975, p. 12; 1976, pp. xix–xxiii, 32). All of these meanings were relevant to the Bertalanffian vision (Pouvreau, 2014; Pouvreau & Drack, 2007), but by using the same term to designate all these different meanings he created considerable uncertainty about what needs to be done to establish a GST. For overviews of different subsequent views on GST, see Hammond (Hammond, 2003, pp. 252–255) and Drack (Drack & Schwarz, 2010).

In our discussion we focused on the narrowest and the widest uses by the early systemists. In the narrowest case, more common in the earlier writings, "GST" is taken to stand simply for a foundational theory that encapsulates the principles that apply to systems in general and describes the schema ("gestalt") that connects them (von Bertalanffy, 1956, p. 37; Boulding, 1956, p. 198). In the widest case, emphasized in later writings, "GST" is taken to encompass all the science, technology, and philosophy to do with systems (von Bertalanffy, 1976, pp. xix–xxiv).

In our discussion we converged on the recommendation that it would be clearer if the term "GST" were reserved to refer only to the foundational theory identified above as the "narrowest" meaning of the term, because the term would then reference a theory, one that is general, and that is about systems.

For the widest use of the term we converged on the recommendation that "Systems Science" would be more apt term, and that it would be clearer to divide Systems Science into "Systems Theory", Systems Practice" and "Systems Philosophy", as indicated in Figure 16, rather than using von Bertalanffy's three categories of science, technology and philosophy. We considered that one major reason why GST cannot serve in this wide sense is that what is included here is much more than a theory, not all of it is general, and there are now several philosophical positions in Systems Science, not all of them consistent with each other and not all of them compatible with the existence of a GST.

However, it would be useful to have a term for the "body of knowledge" that is centered on GST, i.e. the combination of General Systems Practice, General Systems Theory[7] and General Systems Philosophy. Manfred Drack pointed out that he and David Pouvreau proposed the term "General Systemology" for this, because "Systemology" is an apt translation of the German concept "Systemlehre" (Pouvreau & Drack, 2007, pp. 282–283), and "Systemology" has in fact already been suggested as a name for the field of systems by Russ Ackoff (Ackoff, 1973, p. 669), and used in that way by von Bertalanffy's friend the philosopher and systems thinker Jan Kamarýt (Kamarýt, 1973, p. 88).

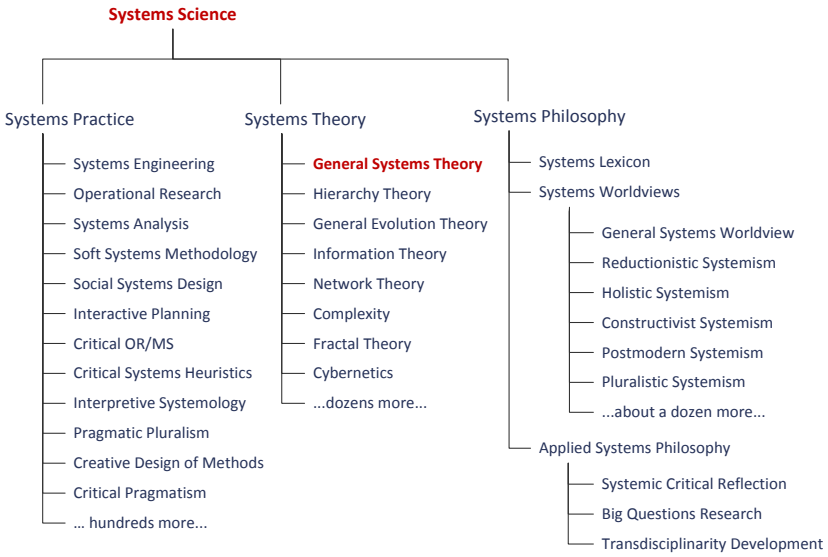


Figure 16: The scope of "Systems Science" and the place of "GST" within it

[7] Von Bertalanffy originally named the new discipline "General System Theory" (with "System" in the singular), but in practice others quickly adopted the plural form "General Systems Theory", and von Bertalanffy used the two interchangeably from the 1950s onward (Hofkirchner & Schafranek, 2011, p. 177). In 1954 the plural form was used in naming "the Society for the Advancement of General Systems Theory". The plural form is more commonly used, but clearly both versions are valid.

We think that if "GST" and "Systems Science" are disambiguated in this way, clear terms might be found for the other ways in which the term "GST" has been used historically, e.g. "General Systemology", "General Systems Paradigm" and so on. However, we did not delve into this beyond recognizing the need for clearer terms than we have today. Instead, we recommend that the IFSR as a governing body support and facilitate a project to disambiguate such terms for the field, and relate them to each other in something like a "map of the systems territory", which we can all use to understand the scope and range of systemic work and interests.

The meaning of "system"

Our discussion of the polysemy of "GST" brought out that there is a general problem regarding the systems science discourse domain, in that many of the basic terms are vague or polysemic. For example, even in the case of a fundamental concept like "system" the six members present suggested between them seven (sic!) ways of defining what constitutes a system:

(a) Something that behaves as a whole and consists of parts and interactions
(b) A network of interacting agents producing a space with a well-defined boundary that is open in the sense of thermodynamics
(c) A whole that exhibits properties and behaviours that are essentially due to the interactions between its parts
(d) A system is what I say it is
(e) A system is present when I see relationships and interactions, which establish a boundary
(f) A whole that functions as a whole in virtue of the interactions between its parts
(g) A whole comprised of an organised relation between closely interacting parts that give rise to emergent properties from a point of view.

It was clearly beyond the scope and authority of our conversation to resolve this matter, but we recommend that the IFSR as a governing body support and facilitate a project to establish a clear discourse domain for the field. If we do not have clear concepts, and distinct labels for referring to them, progress in the field will be severely hampered.

The philosophical framework of the early SGSR

The philosophical assumptions of the early general systemists provide all the components of a worldview, and therefore are sometime collectively referred to as the "General Systems Worldview" or General Systems Weltanschauung". A worldview typically comprises:

(a) an ontology (theory about what exists most fundamentally),
(b) a metaphysics (model the nature of what exists, i.e. what is possible given the ontology),
(c) an epistemology (theory about what kinds of knowledge is possible),
(d) a cosmology (high-level model of the structure and dynamics of the world), and
(e) an axiology (value system and theories about what is important and why).

The early general systemists held a range of *moderate* views, some of which were already contentious in their day but have become much more so since the 1980s. Basically, the General Systems Worldview largely corresponds to what would now be called "Critical Realism" combined with a systems perspective. The essence of a "critical" or "moderate" view is that the extremes of both Naïve Realism and Radical Constructivism are rejected, so that for every metaphysical tenet we have a moderate view according to which knowledge is possible but not straightforward to come by. Very briefly, the General Systems Worldview can be characterised in terms of the following tenets:

T1. **Moderate Ontological Realism**: A real concrete world underlies some of our experiences (but experiences can also be distorted or constructed or hallucinated);
T2. **Broad Naturalism**: Nothing supernaturalistic exists, but concrete phenomena cannot all be comprehensively explained in physicalistic terms;

T3. **Moderate Epistemological Realism**: We can progressively gain more complete real knowledge of the real world (even though we are limited by our cognitive and cultural context)
T4. **Moderate Systemic Realism**: The concrete world is inherently systemic (but we can also project systemicity onto our experienced world);
T5. **Systemic Universalism**: Every concrete thing (i.e. everything that has causal powers) is a system or part of one;
T6. **Moderate Axiological Constructivism**: Values are largely constructed via cultural processes, but natural systemic principles also influence the outcome.

The classical defence of these views is von Bertalanffy's paper *An Essay on the Relativity of Categories* (von Bertalanffy, 1955), but relative to T6 see also von Bertalanffy's book *Robots, Men and Minds* (von Bertalanffy, 1967, pp. 46–47). In recent times there appears to be growing support for such moderate views (Archer, 2013; Boghossian, 2006; Psillos, 1999).
David Rousseau presented an argument for the existence, in principle, of a GST, on the basis of these tenets, as follows (Rousseau, 2014):

(a) If we assume that a real concrete world exists (T1), and that we can have a scientific model of it (T2), and that there are real systems in the concrete world (T3), then by implication, there is a scientific theory that models the systemic aspects of the concrete world.
(b) Granted this, if we assume that every concrete thing is a real system or part of one (T4), it follows that there is a scientific theory that applies everywhere and always and centrally involves systemicity.
(c) Hence there exists a GST.
(d) This GST is relevant to both naturalistic and humanistic concerns (T6).

This argument implies that GST is a theory involving principles that apply everywhere and always, and therefore that GST has the same ubiquity and utility as general 'Laws of Nature' such as Conservation of Energy and the General Theory of Relativity, and hence will provide a route to new discoveries in all disciplines. By corollary, it is clear that if any one of T1-T6 is false, a GST that applies always and everywhere does not exist in principle.
This argument provides a principled basis for the claim that a GST exists and is important. However, the success of the project developing von Bertalanffy's GST clearly rests on the viability of the underlying metaphysical tenets. By corollary to the argument given above, it is evident that if any one of T1-T6 is false, a GST that applies always and everywhere does not exist in principle. Carefully articulating and defending these tenets is therefore one of the key tasks facing contemporary general systems researchers.

Assessing the contemporary credibility of these views turned out to be difficult to do, because of differences between the philosophical views of the participants. Our conversation soon focused on what we each have to say to make our own positions clear. We developed a small model for this, according to which one's philosophical commitments could be clarified by answering just seven questions (belonging to just four categories) using multiple choice answers.

These questions concern the nature of knowledge, the nature of Nature, the nature of systems, and the nature of values. The first category is subdivided into three questions. The categories, questions, and model answers are given in Table 3.

Table 3. The components of a philosophical perspective

Question Category	Question	Answer Options
nature of knowledge	Can we have some knowledge of how the world really is?	(a) yes, in some sense (b) no (c) not the right question (d) context dependent (e) we can't know
	What is the relationship between our knowledge and what there is?	(a) knowledge reflects things as they are (b) knowledge represents some kind of mapping onto how things are (c) the relationship metaphors are unclear (d) in principle indeterminate (e) matter of judgement in a particular moment
	Can we improve our knowledge?	(a) yes (b) no
nature of Nature	Is there some kind of reality "out there"?	(a) yes (b) no (c) not the right question (d) don't know (e) can't know
nature of systems	Are there real systems in the world or are there only constructs?	(a) only real (b) only constructs (c) both real and constructed (d) not a relevant question
nature of values	Can there be objective criteria for value judgements or only constructed ones?	(a) some objective criteria (b) only constructed ones (c) constructed in relation to non-normative considerations

Using this model as a test case, the participants in our conversation answered these questions as given in Table 4.

Table 4. The participants' philosophical perspectives

Question Category	Question	P1	P2	P3	P4	P5	P6
Nature of knowledge	Can we have some knowledge of how the world really is?	yes	yes	yes	yes	yes	yes
	What is the relationship between our knowledge and what there is?	mapping	mapping	metaphors are unclear	metaphors are unclear	as they are	matter of judgement
	Can we improve our knowledge?	yes	yes	yes	yes	yes	yes but relative to context
Nature of Nature	Is there some kind of reality "out there"?	yes	yes	yes	yes	yes	yes
Nature of systems	Are there real systems in the world or are there only constructs?	both	only constructs	both	both	both	both
Nature of values	Can there be objective criteria for value judgements or only constructed ones?	some objective criteria	only constructed ones	some objective criteria	only constructed ones	some objective criteria	no, but contextually relevant criteria

The test exercise revealed a broad consensus on some matters (e.g. the existence of an external reality and the possibility of knowledge), but also significant divisions regarding others (e.g. the nature of values). We regard the model as in need of further refinement, but we think that such a model can be valuable to help make people's philosophical positions clear, and help guide focused discussions regarding philosophical differences. We recommend that the IFSR as a governing body support and facilitate a project to refine and publish such a model that can be used to facilitate clarity in thinking about philosophical assumptions for those working in systems science.

An important lesson that we took from this exercise is that current debates about the philosophical positions of systemists are overly simplistic and hence unnecessarily polarizing. For example, such discussions often try to classify someone as a “Constructivist” or a “Realist” or somewhere on a spectrum in between the extreme positions. As our model exercise made clear, philosophical positions involve many tenets, and people can be realistic about some and constructivist about others, making their overall position nuanced in a more sophisticated (and more interesting!) way. By analyzing positions in a more detailed way as we suggest, it is possible to show that there is substantial common ground between people who nevertheless have differences on some aspects of their philosophy. Such a mutual understanding would form a strong basis for building affinity and mutual respect, and hence a much more productive basis for a critical discussion on differences.

The future of GST

The test exercise revealed that we had broad agreement in the group on the philosophical tenets that have a bearing on the potential existence of GST (T1 to T6 discussed above). In this light we felt that the objectives of the SGSR remain credible and important, and we therefore urge the IFSR as a governing body support and facilitate projects to develop and establish GST.

A Model about the development of Systems Science

In our discussion of the meanings of concepts, terminology, philosophical assumptions, and scope of the systems field, it became clear to us that there is a linkage between the philosophical frameworks people employ and their activities as systemists, and that this has significant consequences for how systems science develops. We spent some time trying to untangle these relationships. Jennifer Wilby drew a useful diagram of the interaction between systems philosophy and the philosophy of systems (see Figure 17), and this proved seminal for our discussion.

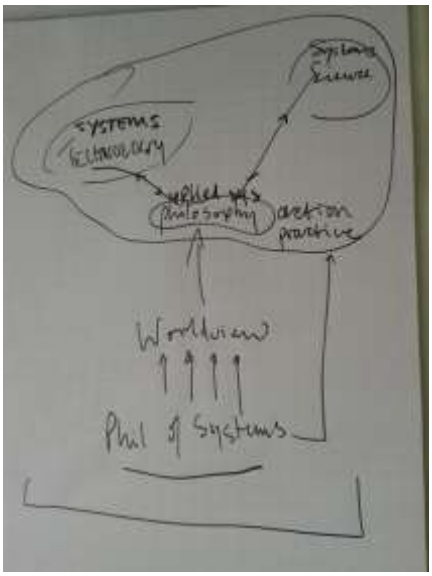


Figure 17. Interaction between systems philosophy and the philosophy of systems

From this focal point we were able to develop a more detailed model for how Systems Science progresses in practice. According to this model, illustrated in Figure 18, at present the application and development of Systems Theories and Systems Methods depends critically on implicit personal, rather than explicit communal, philosophical frameworks.

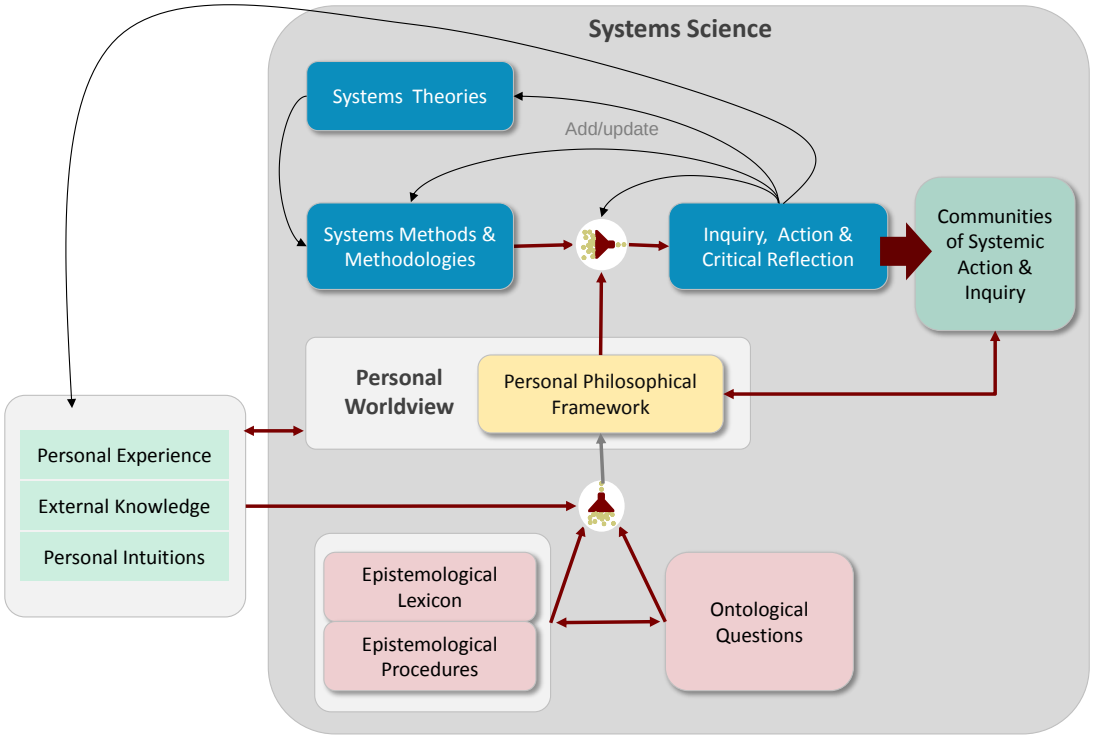


Figure 18. The foundations and dynamics of Systems Science

As illustrated in Figure 18, the personal worldview of individual systemists plays a key role in how they select and apply systems methods and methodologies when they engage in systemic inquiry, action and critical reflection.

This personal worldview can be characterized in terms of the systemist's personal philosophical framework (as per the model we discussed earlier). This philosophical framework is the result of a "percolation" of ideas regarding their philosophical concepts (here associated with the "epistemological lexicon"), their ideas about how knowledge can be obtained (here associated with "epistemological procedures"), and their engagement with issues surrounding what exists and what is possible (here associated with "ontological questions"). Their worldview, and the way in which this "percolation" proceeds, is, in our view, heavily conditioned by the systemist's personal experiences, knowledge and intuitions.

Based on their worldviews, systemists select the methods/methodologies that they will employ, and also the targets for their systemic inquiry, action and critical reflection. Systemists who share a combination of selected methods/methodologies and focal targets create "communities of systemic action and enquiry", and such engagements generate experiences that impact not only personal worldviews but also the development of systems theories and also systems practice (here associated with "systems methods and methodologies").

This model illustrates that individual worldviews are of central importance to how Systems Science advances. The concern this raises is that reflection on worldviews is not a significant focus within the Systems Movement, and hence the development of Systems Science is a hostage to fortune. We recommend that the IFSR as a governing body support and facilitate a project to refine and publish a model that can be used to facilitate the development of Systems Science in a consistent and structured way. As a first step towards this, we have undertaken to write up a fuller exposition of this model for publication in a peer reviewed journal.

Conclusions

Our intent was to first clarify the meaning of the term “General System Theory” (GST) and expose the philosophical assumptions behind the “Research Agenda” of the early general systemists. This analysis was extensive and proved more complicated to do than anticipated, which resulted in the narrowing of the Conversation to the development of one particular set of frameworks to guide the analysis of a person’s worldview and the development of a GST.

In the reporting stage of the Conversation, it became very apparent that other teams had reached similar perspectives, and produced similar models and frameworks, based within and developed from their own ontological and epistemological starting points. From the overall Conversation in practice, we conclude that the idea of a GST is still credible and important, but clarifying projects will be needed to aid its development. For guiding this future effort we evolved a new question, namely “What (if any) would be suitable philosophical foundations for Systems Science, and how would that help us improve our practice?” From this we were able to identify several projects that the IFSR could support and facilitate towards advancing the field of Systems Science in a systematic way.

Recommendations

As outlined and motivated above, we recommend that the IFSR support and facilitate projects to:

(a) establish a consistent lexicon (discourse domain) for systems philosophy,
(b) refine and publish a model for articulating systems-philosophical perspectives,
(c) develop a “map” of the scope of Systems Science, and
(d) develop and establish GST,
(e) apply GST towards fulfilling the founding ambitions of the systems movement.

In our view, Systems Science has a bright future, but progress hinges critically on the abovementioned activities given priority and institutional support.

REFERENCES

Ackoff, R. L. (1973). Science in the Systems Age: Beyond IE, OR, and MS. *Operations Research*, *21*(3), 661–671.

Archer, M. S. (2013). *Social Morphogenesis*. Dordrecht: Springer.

Boghossian, P. (2006). *Fear of Knowledge: Against Relativism and Constructivism*. Oxford: Clarendon Press.

Boulding, K. E. (1956). General systems theory—the skeleton of science. *Management Science*, *2*(3), 197–208.

Drack, M., & Schwarz, G. (2010). Recent Developments in General System Theory. *Systems Research and Behavioral Science*, *27*(6), 601–610. doi:10.1002/sres.1013

Flood, R. L., & Robinson, S. A. (1989). Whatever Happened to General Systems Theory? In R. L. Flood, M. C. Jackson, & P. Keys (Eds.), *Systems Prospects* (pp. 61–66). New York : Plenum.

Francois, C. (2007). Who Knows What General Systems Theory Is? Retrieved 31 January 2014, from http://isss.org/projects/who_knows_what_general_systems_theory_is

Hammond, D. (2003). *Science of Synthesis: Exploring the Social Implications of General Systems Theory*. Boulder Colorado: University Press of Colorado.

Hofkirchner, W., & Schafranek, M. (2011). General System Theory. In C. A. Hooker (Ed.), *Vol. 10: Philosophy of Complex Systems* (1st ed., pp. 177–194). Amsterdam: Elsevier BV.

Kamarýt, J. (1973). From Science to Metascience and Philosophy. In W. Gray & N. D. Rizzo (Eds.), *Unity Through Diversity* (pp. 75–100). New York: Gordon & Breach.

Pouvreau, D. (2014). On the history of Ludwig von Bertalanffy’s ‘general systemology’, and on its relationship to cybernetics - Part II: Contexts and developments of the systemological hermeneutics instigated by von Bertalanffy. *International Journal of General Systems*, *43*(2), 172–245.

Pouvreau, D., & Drack, M. (2007). On the history of Ludwig von Bertalanffy’s ‘General Systemology’, and on its relationship to cybernetics, Part 1. *International Journal of General Systems*, *36*(3),

281–337.
Psillos, S. (1999). *Scientific Realism: How Science Tracks Truth*. London: Routledge.
Rousseau, D. (2014). Foundations and a Framework for Future Waves of Systemic Inquiry. Presented at the 22nd European Meeting on Cybernetics and Systems Research (EMCSR 2014), 2014, Vienna, Austria. In J. M. Wilby, S. Blachfellner, & W. Hofkirchner (Eds.), *EMCSR 2014: Civilisation at the Crossroads - Response and Responsibility of the Systems Sciences, Book of Abstracts* (pp. 428–434). Vienna: EMCSR.
Von Bertalanffy, L. (1955). An essay on the relativity of categories. *Philosophy of Science*, *22*(4), 243–263.
Von Bertalanffy, L. (1956). General System Theory. *General Systems [article Reprinted in Midgley, G. (Ed) (2003) 'Systems Thinking' (London: Sage) Vol 1 Pp 36- 51. Page Number References in the Text Refer to the Reprint.]*, *1*, 1–10.
Von Bertalanffy, L. (1967). *Robots, Men and Minds*. New York: Braziller.
Von Bertalanffy, L. (1968). *Organismic Psychology and Systems Theory*. Worcester, MA: Clark University Press.
Von Bertalanffy, L. (1972). The History and Status of General Systems Theory. *Academy of Management Journal*, *15*(4), 407–426.
Von Bertalanffy, L. (1975). *Perspectives on General System Theory*. New York: Braziller.
Von Bertalanffy, L. (1976). *General System Theory: Foundations, Development, Applications* (Revised Edition.). New York: Braziller.

Team 6: Systems Research

Team Leader: Mary Edson, USA
Team Members:
Louis Klein (Facilitator), DEU
Shankar Sankaran, AUS
Debora Hammond, USA
John Kineman, USA
Pam Buckle, USA
Will Varey, AUS

INTRODUCTION

The purpose of the Systems Research Team's (SRT) work at the 2014 IFSR Conversation focused on a compelling question, "What distinguishes Systems Research from other forms of research?" This question propelled the SRT's Conversation in multiple directions; however, two threads predominated (given the diverse backgrounds of team participants) – those that were divergent and those that were convergent. As a result, the SRT's Conversation began to scope out the breadth and depth of this subject.

The SRT began meeting monthly via WebEx in November, 2013, in preparation for the Conversation in April, 2014. In the months leading up to the Conversation, the SRT focused on gathering resources and conducting a survey of existing Systems Research. At the Conversation, the SRT consciously chose to focus on specific areas related to developing a shared framework (see Figure 19) and process for discussing Systems Research rather than attempting to comprehensively address the far-reaching scope of the field (see Figure 20; also see related perspective of Team 5: Figure 16).

The process the SRT used synthesized the Conversation into four (4) questions for further exploration:

- What can we do to promote good systems research as we understand it? (PLAN)
- What do we see as key elements of good systems research? (ACT)
- What would a good systems research output look like? (OBSERVE)
- How is good systems research organized? (REFLECT)

These four questions converged into a compelling question for the future work of the SRT and the entire Systems Community, "What can WE provide to enhance the quality and impact of Systems Research?"

Figure 19. Systems Research Framework

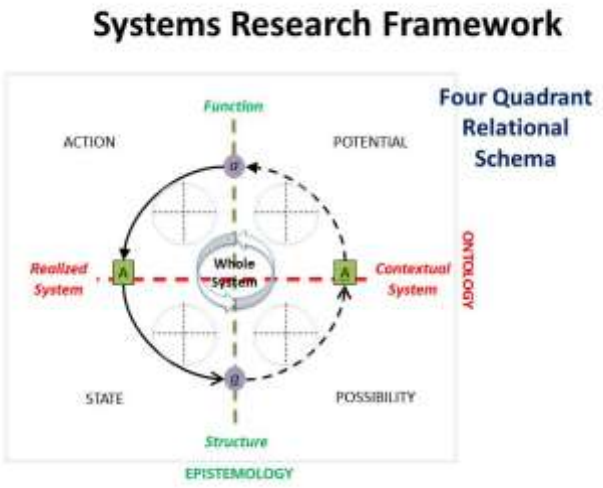
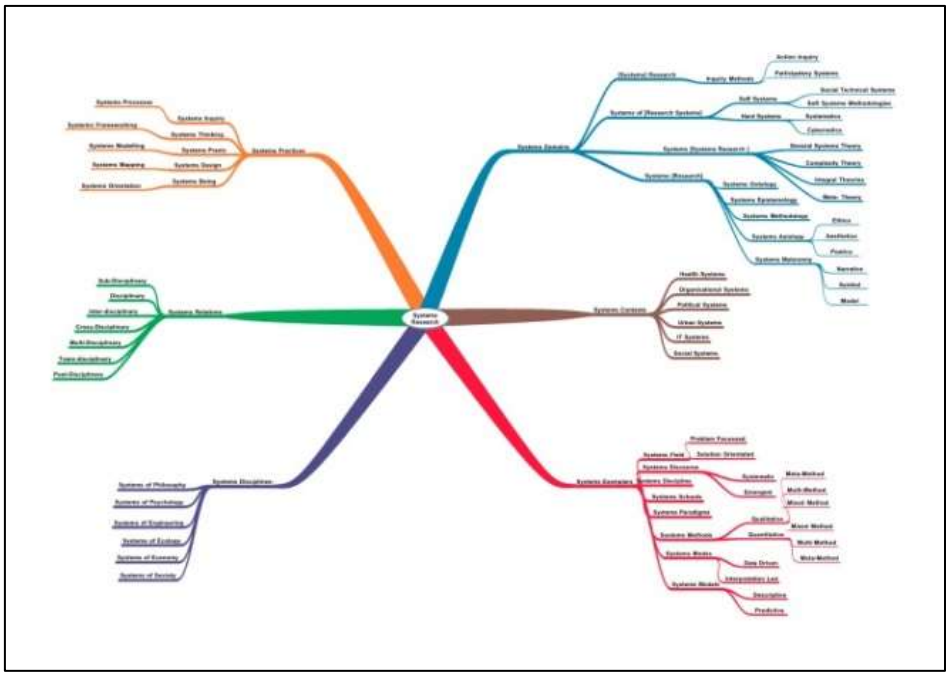


Figure 20. Scope of Systems Research



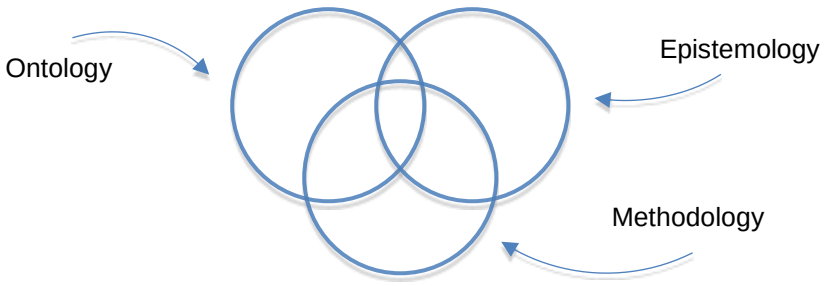
PROPOSED APPROACH

In general, the SRT agreed one of the essential factors distinguishing Systems Research from other forms of research is that the systems approach is intentionally undertaken (designed) using an integrative or systemic [what?] (i.e. “the whole is greater than the sum of its parts”), in addition to a systematic, perspective - theoretically, methodologically, and/or analytically. The SRT considered whether Systems Research discussions, recommendations, and conclusions needed to explore the integrative or systemic effects and consequences of the research.

Further, using the analogy of a duck (i.e. “Does it look like a duck? Quack like a duck? Waddle like a duck?”), the team explored questions of whether Systems Research benefits from situational utility, compositional adequacy, philosophical concordance, assertive plausibility, and procedural descriptives.

The SRT proposal noted that the relationship between ontology, epistemology and methodology (i.e. being, knowing and doing) in systems research required an inter-dependence reflecting the specifics of the research and the preferences of the researcher (see Figure 21).

Figure 21. Inter-dependence of Systems Research



SUMMARY

Future actions for the SRT include the following questions:

1. What currently qualifies as Systems Research for publication and are these standards reflective of the field and its future directions (ontologically, epistemologically, and scope)?
2. What Systems Research guidelines can be shared with graduate students and researchers who want to design, conduct, and publish their research in journals related to the Systems Sciences (e.g. *Systems Research and Behavioral Science*)?
3. What role does the Systems Community play in educating scholars, practitioners, and other educational outlets about the value of Systems Research?

These questions, as well as others will continue to be addressed, developed, and shared by the SRT with fellow members of the International Federation for Systems Research, as well as its member organizations. The following passages express the perspectives of individual team members' experience of the 2014 Conversation and Systems Research.

GARY METCALF, PRESIDENT, IFSR

My interest in systems research is first about making distinctions. Courses and full programs are offered regarding systems theories. If researchers are to study systems, is that, or should it be, any different than studying any other type of entity? Is there anything about *systems* which makes them unique, or anything different about conducting research from a systemic perspective, rather than more traditional approaches?

To be more concrete, if a student wishes to apply what she or he has learned about systems theories in a research study, are there methodologies or protocols for doing so? If an academic journal, such as *Systems Research and Behavioral Science*, purports to focus on systems-related topics, what articles should a reader expect to find there?

Answers to these questions seem to vary a great deal, even within what are considered the systems communities (e.g. systems organizations and programs.) Assumptions include ideas like the following:

1. Systems research uses systems models or methodologies, e.g. system dynamics, soft systems methodology, viable systems models, actions research etc.
2. Systems research is necessarily scientific and mathematical, building on the work of early theoretical biologists.
3. Systems research is any research that is non-reductionist, participatory, emancipatory, constructivist, etc.
4. Systems research studies properties of systems as entities, e.g. emergence, feedback, self-organization, etc.
5. Systems research searches for isomorphies, in order to create one overarching General System Theory encompassing all of science.

The idea of approaching research from a *systems perspective* has often been contrasted with a traditional scientific approach, which presumed that entities were best understood through isolating them from their environments in order to reduce extraneous influences. The properties of these entities could be understood by reducing them to their most essential components, e.g. their atomic structures.

A relatively accepted alternative view is that systems research studies *dynamic wholes*. Entities have (emergent) properties that cannot be explained by the properties of their elements or constituent parts. The only way to understand an entity is to study it at the level of its existence (and also in context, as will be explained.)

From early in the development of systems theories, Gestalt psychology had influence. What a researcher studies begins with a choice of phenomenon and related variables. From a Gestalt

perspective, this involves choosing the *foreground* (that which is deemed important) from the *background* (everything else.) The chosen phenomenon exhibits certain properties and characteristics as an entity, but always in relation to an environment.

A distinction credited to Ludwig von Bertalanffy is that between closed and open systems. Closed systems exist in isolation. Open systems exist through interactions with their environments.

In reality, closed systems are only human concepts. The universe is intimately connected and interdependent. The study and interpretation of the universe (i.e. science) is a human endeavor, filled with human behavioral issues. The entities that we designate as systems, then, should be studied *systemically*, meaning as patterns of dynamic interaction in relation to their environments.

As individual humans, for instance, we tend to think of ourselves as developing through childhood to reach a fixed and clear adult identity that remains stable thereafter. In reality, we are ongoing processes that are recreated each day, through both biological and social systems. Our bodies are constantly in interaction with our environments, which provide the necessary elements for metabolic processes, which change over time. Our psychological identities are reinforced or changed through social interactions. We are, in essence, being constantly reproduced.

Likewise, the organizations and other social systems (families, institutions, etc.) in which we participate are not static structures, but are processes being constantly reproduced through our interactions with each other in them. They exist because we create them through our participation. They, in turn, help to re-create us as social actors on societies.

A significant limitation in current research is the capacity to explain, model, or represent systems as dynamic (e.g. fluid) entities in relation to their environments. Isolating variables is only useful to the degree that variables act in isolation. In order to understand and anticipate the behavior, especially of large, complex systems, we need the ability to model them *as they are*, and *as they are evolving*.

SHANKAR SANKARAN

In the white paper I submitted prior to the IFSR conversations, I posed the following questions. So my reflections will focus on those questions. I think we made great progress in our conversations and expect that we will continue to extend our conversations to deliver outputs and outcomes we set ourselves to deliver.

1. *How do we guide students who are interested in carrying our postgraduate research to use systems approaches to design/justify their research to meet the academic requirements of their institutions?*

   One of the ideas we discussed prior to the conversations which we are continuing to discuss is to publish a book on guiding systems researcher to design and carry out their research. It was envisioned that we work together to publish a book similar to the very popular research book published by Creswell on qualitative research. Creswell, J. (2007) *Qualitative Inquiry and Research Design: Choosing among Five Approaches*, 2nd Edition, Sage; Thousand Oaks, CA. During our Webex meetings, prior to our meeting in Linz, some of the team members felt that while this is a good idea we also needed to recognise the value of various tools used by systems practitioners that can be useful in linking theory and practice in our research. This was a question I also raised in my white paper.

2. *What methods will they use in conducting their research? As a corollary: How will they incorporate systems practices (such as system dynamics, soft systems thinking etc.)in their research methods?*

   So we undertook to find the various practices that are commonly used in systems practice to see how they have been used. I summarised the various practices listed in Jackson, M. (2004) *Systems thinking: Creative Holism for Managers*, John Wiley: Chichester, UK. As a book that compiled various practices and Debra Hammond summarised the practices found in Williams, B.

& Hummelbrunner, R. (2010) *Systems Concepts in Action: A Practitioner's Toolkit*, Stanford University Press, Stanford.

We also listed a few other books that have published about a variety of systems practices that included:

Flood, R. (1999). *Rethinking the Fifth Discipline: Learning Within the Unknowable*, Routledge, London.
Reynolds, M & Holwell, S. (Eds.) (2010). *Systems Approaches to Managing Change: A Practical Guide*, Springer, Milton Keynes, UK.

This brought us to the conclusion that we could define a systems approach as having three essential steps as described by Reynolds & Holwell (2010 p. 17):

Step 1 - Making sense of, or simplifying (in understanding) relationship between entities associated with a complex situation. *Problem Structuring*
Step 2 - Surfacing and engaging (through practice) contrasting perspectives in a complex situation. *Model Building.*
Step 3 - Exploring and reconciling (with responsibility) power relations, boundary issues and potential conflict among different entities or perspectives. *Problem Solving*

However there was debate at the conversations whether academic research should really be solving problems or is it only applicable to systems practitioners who often intervene in situations to resolve issues. Although this has not been entirely resolved at this point in time it was suggested at the conversations that the final step for academic research could be *Theory Building* instead of *Problem Solving*.

3. *What epistemological and ontological stand will underpin their research?*

Prior to the conversations my readings led me to the valuable work of Bela Banathy who has tried to answer this question. In brief, Banathy & Jenlink (2003) propose that systems research could be characterised as having the following dimensions:

Ontology: The primacy of organizing relationship processes between entities from which emerge novel properties of the system
Epistemology: How a systems inquiry is conducted – focus on synthesis rather than analysis
Axiology: Moral/ethical dimension of the inquiry process
Methodology: Tools and approaches that best fit the nature of the identified problem situation and the context and content

They also clarified how systems inquiry differed from scientific inquiry. Scientific inquiry, often, uses rigidly methodologies of a discipline which are clearly defined. On the other hand, a systems researcher selects methods and methodological tools or approaches that best fit the nature of the identified problem situation, and the context, the content, and the type of system that is the domain of the investigation. The methodology is assembled from a wide range of systems methods that are available to them. From this it became clear that the systems inquiry is more pragmatic in nature.

The executive summary of our conversations that was presented on the last day encapsulated the process of system research succinctly with its philosophical underpinnings as an action research cycle.

4. *If they adopt mixed methods approaches to conduct systems research how will they work across research paradigms to ensure that their research is rigorous?*

While this question was not debated in depth it was pointed during the conversations that Mixed Methods has come a long way to being recognised by seminal books such as:

Creswell, J.W., Plano Clark, V.L (2011). Designing and Conducting Mixed Methods Research, 3rd edn., Sage: Thousand Oaks, CA.

Tashakkori, A., Teddlie, C., (eds.). 2003. *Handbook of Mixed Methods in Social and Behavioural Research*, Sage: Thousand Oakes, CA.

5. *How will they write up their research to have a systems flavour? .How will examiners accept such ways of writing which may not follow conventional practices?*

This was not explored at the conversations. There are papers written about various ways of presenting action research thesis. More investigation needs to be done for this question. Perhaps looking at some dissertations submitted using systems research might help in bringing out specific characteristics of writing by systems researchers.
Fisher, K & Phelps, R. (2006). Recipe or performing art?: Challenging conventions for writing action research theses. *Action Research*, *4*(2), 143-164.

6. *What are some ethical issues they have will have to take into account in applying for ethics approvals at their institutions as well as organisations where they will conduct such research?*

This will depend on the institution where this research is being carried out. This was also not discussed in depth systems researchers are responsible for exploring and reconciling (with responsibility) power relations, boundary issues and potential conflict among different entities or perspectives to bring an ethical dimension to their research.

DEBORA HAMMOND

My initial orientation as a participant in the 2014 IFSR Systems Research Conversation Team grew out of an interest in action research and a desire to explore the range of methodologies employed in the field of applied systems research, particularly in the facilitation of collaborative change in human systems. An underlying question informing my own inquiry was a growing curiosity about what it means to say one is using systems theory or a systems approach, as it is clear that scholar/practitioners from different schools of thought and communities of practice may have slightly different interpretations of what these terms imply.

In preparation for the Conversation, I reviewed the work of Bob Williams and Richard Hummelbrunner (Systems Concepts in Action: A Practitioner's Toolkit, 2010), whose opening suggestion that "thinking systemically is inherently collaborative" (p.vi) reflects my own commitment. Their work serves as a useful starting point for my own reflections and as a foundation for addressing the questions raised by the systems research team.
Echoing my own interest in the range of models and methodologies used in applied systems research, the book is organized in three sections - describing and analyzing situations; changing and managing situations; and learning about situations - each of which provides a comprehensive overview of specific approaches. What is most interesting about the survey is not so much the concrete descriptions, but the summary of the kinds of questions that each approach seeks to answer. While the IFSR systems research team decided to focus more broadly on the question of what qualifies as systems research, I believe these questions will be useful in the further development of our team's collaborative efforts.

As the team began to explore the dimensions of systems research, our initial discussion was oriented around an elaboration of a systemic ontology and epistemology (to which I would add a consideration of systemic ethics). In their introduction, Williams and Hummelbrunner (2010) begin with a discussion of three primary orientations that they believe characterize a systems approach (p.3):

• An understanding of interrelationships
• A commitment to multiple perspectives
• An awareness of boundaries

These characteristics provide a foundation for my own perspectives on the ontological, epistemological and ethical implications of a systems view. With regard to the ontology of systems, there were divergent perspectives, one focusing on the ontology of a system (i.e. what is a system?) and another focusing on a systems ontology (i.e. what is the nature of reality from a systems orientation?). The first question provided the impetus
for the development of our four-quadrant shared framework, with its evolutionary progression through the cycle of "plan, act, observe, reflect." The very nature of this framework is dynamic and highlights the ontology (being-ness) of a system as process, embedded in interactive patterns of relationship.

In my own work ("Philosophical and Ethical Foundations of Systems Thinking," 2005), I explore the second question, regarding a systems ontology, which I suggest emphasizes organization, interaction, interdependence and relationship; and reflects a shift from a mechanistic to an organic conception of nature, and from an atomistic and dualistic orientation to an appreciation of networks, patterns and processes of relationship.

Accordingly, echoing Williams and Hummerbrunner's (2010) emphasis on the collaborative nature of systemic thinking, I suggest that a systems epistemology recognizes the dynamic and dialectical nature of knowledge, as an active process of interacting with a system. Acknowledging the importance of integrating multiple perspectives, I underscore the pluralistic and participatory nature of systemic knowledge, acknowledging the observer as an active participant in the process of observation, and understanding knowledge as an evolutionary process of perception, interpretation and creation of meaning.

This process is reflected in the two lower quadrants of our shared framework - observe and reflect - which imply a further iteration of planning and action. The shared framework thus undermines the traditional separation between theory and practice, and supports the general orientation of action research, in its circular process of planning, action and reflection. As Kurt Lewin famously remarked, "the only way to understand a system is to try to change it." This raises the question of the purpose/function of research. Traditional research, in the spirit of Sir Francis Bacon, sought to understand the world in order to be better able to predict and control the external environment, assumed a posture of detachment in relation to the phenomena under observation, and presumed the existence - and aspired to the mastery - of a stable objective truth.

A fundamental shift in systems research is a consideration of purpose as an integral part of the research process. Thus I would suggest that system research is not something "done to" a system, but rather a "partnership with" a system. This orientation reveals another dimension, which I refer to as the qualitative dimension of relationship - addressing the issue of how we actually treat one another, and how our institutions often reinforce more destructive forms of human interaction. Engaging the question of purpose illuminates some key principles of a systemic ethic, nurturing a transition from control to collaboration, from competition to interdependence, from hierarchical to participatory decision-making processes, and from objectivity to reflexive self-awareness.
With this general orientation as background, I will explore the questions raised by the systems research team:

1) What can we do to promote good systems research as we understand it?
Perhaps the most critical direction would be to emphasize the role of systems research as one of synthesis and integration. Traditional discipline-based research is a critical piece of whole system understanding and effective action; what is missing is an adequate model for bringing the fragmented pieces into a coherent whole. A systemic understanding requires a multi-dimensional analysis of the existing situation, as well as an inclusive consideration of criteria for further planning and action, i.e. for determination of goals for the system, in turn informing the purpose of research.

2) What do we see as key elements of good systems research?
In consideration of boundaries, good systems research is broadly inclusive. It must be clear about the reasons for the boundaries it draws around the system under consideration, what is being left out, and possible consequences of those choices. Ultimately, good systems research supports the cultivation of whole-systems thinking, and seeks to serve the health and integrity of the systems it serves - to

manage the systems that structure our lives in ways that honor the needs and purposes of all participants in the system, as well as the larger environment within which that system functions.

3) What would a good systems research output look like?
Good systems research output provides a meaningful multidimensional synthesis of the situation or problem under consideration. Ideally, it acknowledges relevant political, economic, cultural, psychological, ethical, and environmental considerations. To the extent possible, it integrates perspectives from all aspects of the system, and is clear about the personal orientation and interests of the researcher(s). In proposing any intervention, it provides clear guidelines and criteria for assessment and on-going reflection.

4) How is good systems research organized?
Ideally good systems research is a collaborative process, whether among a team of researchers with different areas of expertise or drawing on analysis and interpretation from members of the system under investigation - or some combination of both. And, in the spirit of our shared framework, it should embody an on-going cycle of action and reflection.

In closing, the final three questions that the system research team proposed for future study are an elaboration of the overarching focus of our task: What can WE provide to enhance the quality and impact of systems research? In conjunction with existing texts outlining the wide range of systems approaches to understanding and intervening in systems, the collaborative efforts of the systems research team can serve to articulate guidelines for future researchers. Perhaps more importantly, in clarifying the nature and purpose of systems research our work can serve to educate the larger community about the value and potential contributions of a systems approach, some of which I have identified as:

- overcoming the fragmentation of knowledge,
- strengthening the connections between human, technological and natural systems,
- nurturing inclusive approaches to decision making, and
- supporting integrated education and the cultivation of skills in dialogue and
- communication.

JOHN J. KINEMAN

Preamble

I will refrain from attempting a comprehensive view of our meeting because I think the final compilation of these perspectives will accomplish that, combining perhaps more salient comments according to each member's expertise.

My subjectivity/bias is itself a form of 'mixed methods' thinking, or perhaps just 'mixed up' thinking which I am attempting to sort out. As such, I have searched for a way of organizing research and informatics, initially about the natural world, but quickly finding that it must also be about the observer of the natural world. Thus we have subject and object as a basic starting point. Nothing new there.

But then I found that there are other-than-human (not ET) observers of nature and also *within* nature. Now we are observing the observer observing nature. It gets complex, not just 'complicated' in the terms I came to adopt from the work of Robert Rosen.

To have a clear, tangible, reliable, and testable perspective, classical science decided to overlook subjective agents that, in the pre-science of this era, were thought to be ubiquitous from an omnipotent God to animistic and vital forces. But that was apparently not the case. We found that we could abstract stable patterns and material systems that have no significant subject-dependencies; and these largely correspond with our sensory perceptions. Thus, the classical world.

Then we made a mistake. We thought, therefore, that reality must itself be composed of these sensory objects. After hundreds of years of describing nature that way we now find that it is composed of quasi-subjective and quasi-sensory objects that come into agreement with entangled observers. Then

a counter-classical culture that developed among soft system thinkers made another mistake. They thought: "We were right all along; nature is constructed from observation; it's all human construction."

Systems research (SR) vacillates between these perspectives and presents methods in each camp, including integrative methods that try to bridge the camps. But in my opinion we have not yet succeeded in forming the third alternative – the view that contains both subject and object. That's where we are today. The root cause of this confusion, I believe, is that we consider objects to be natural and subjects not.

The quadrant cycle diagram (Figure 22) we adopted as a framework for SR may provide the third, truly integrative alternative; a new phase of systems research and research in general. Or perhaps we will not know due to multiple perspectives that will persist. Perhaps this framework will be one of the perspectives that persists. I learned from our team that the basic level of this model corresponds well

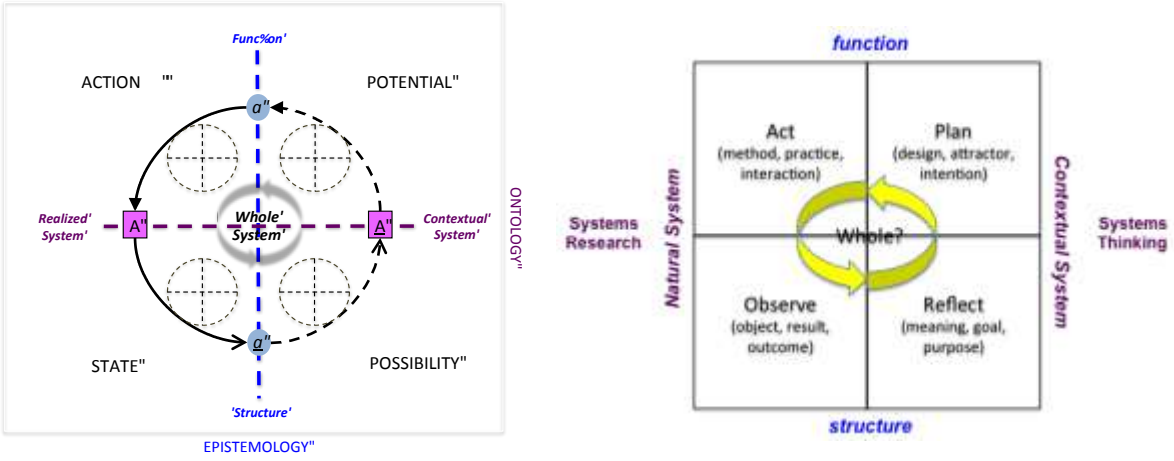


Figure 22. Relational Framework: General Theory (left); SR Analysis (right)

with "Action Research", along with many other four-level analytical frameworks; perhaps that explains why it was not too unfamiliar to our team and the larger group. But perhaps it is too familiar. If among systems thinkers a 2X2 matrix, or four quadrant analysis, plus $4, will get you a cappuccino – when they're normally $3.50 – I think we have to show that it is much more than just a 2x2 matrix; that it is really a deep causal analysis of whole system identities. If followed out, the exercise is anything but trivial; it will lead to greater insights, discovery of missing components, elimination of redundant components, hierarchical linkages, and a much clearer sense of the organization of the system.

It goes much farther theoretically than I see in the Action Research literature (so far – I'm just starting to review it). The R-theory model has a precise mathematical structure that I think in some way characterizes a natural 'whole' system. If so, it may explain why so many empirically developed or even intuitively developed frameworks have come to a similar view. Also, note in the left diagram that there are algebraic symbols between the quadrants. The quadrants represent causality, but these algebraic symbols represent what is being caused and what is causing. A much more rigorous analysis is implied based on these elements. The Action Research cycle is just the starting point after which, using this framework, we can enter into a mathematical (category theory) analysis of relations in the system. If you will excuse the pedantry, I will give a brief discussion of its application to our own questions (clearly, we should demonstrate what we preach).

Our Questions

We framed four top-level questions (listed in the sub-headings following this section) about a system that we identified as "Systems Research" (Figure 22, right). Initially we applied the relational framework (left) so the questions roughly correspond to the quadrants: Plan, Act, Observe, Reflect (right). Then we asked three more questions but did not put them into the framework. If we do, it suggests a different level of whole system analysis, and a missing fourth question. The four top questions are anticipatory, asking about a prescription for "good" SR. The three sub-questions appear

to be descriptive, asking about the current norms of SR. If we do apply our own framework to these sub-questions, then we can create a new diagram that is about current SR. The 'sub-whole' in this case is missing the "Reflect" quadrant, logically about the direction of current research, perhaps as in q4 below.

The secondary questions, re-labeling with their implied quadrants and re-organized to match the framework, are:

q1 (Plan). (formerly #2). What Systems Research guidelines can be shared with graduate students and researchers who want to design, conduct, and publish their research in journals related to the Systems Sciences (e.g., Systems Research and Behavioral Science)?

q2 (Act). (formerly #3) What role does the Systems Community play in educating scholars, practitioners and other educational outlets about the value of Systems Research?

q3 (Observe). (formerly #1) What currently qualifies as Systems Research for publication and are these standards reflective of the field and its future directions (ontologically, epistemologically, and [in reference to] scope)?

q4 (Reflect). (formerly missing) Where is current Systems Research headed?

The analysis has already given us a useful 4th question needed to make the study, in some sense, 'whole' and thus truly systemic.

Now, note that the general framework (Figure 22, right) indicates that each quadrant is decomposable into self-similar four quadrant wholes, and implicitly the whole diagram can also be a quadrant in a higher level analysis. That is where the analysis really unfolds. We can nest the two sets of four questions. Either set could fit into a quadrant of the other, because the mathematics of these relations is holoarchical (hierarchies can be inverted). The choice is of perspective; the 'identity' of the system we are inquiring about. The first set of questions is about a prescriptive system. The second set of questions is about present SR. Thus we can recognize that the SR Team represents the dynamics of change in the first cycle, anticipating and visioning as part of present SR; and that visioning is influenced by each of the four aspects of present SR. Therefore, we can link between existing and recommended systems in each of the four quadrants in each of the systems. By mapping this out, we can easily see additional questions, inputs, and outputs of our analysis.

Figure 23 shows the two sets of questions shown as two whole systems that are 'closed' with each other in the action quadrant. That quadrant corresponds with Aristotle's "efficient" cause. In relational theory this kind of relation is called "efficient closure". In other words, we are showing how the two systems, existing SR, which spawned our working group, and anticipated SR, consisting of our analysis and recommendations, establish each other through mutual interaction. Having two different models makes a system complex and inherently unpredictable, requiring the active iteration of

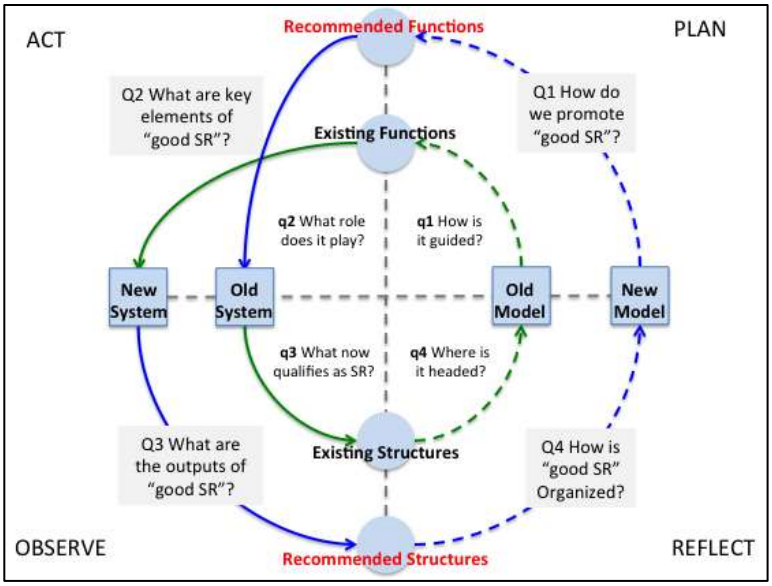


Figure 23. Action Cycle of Our Questions

alternatives (the true sense, I believe, in which SR must be participatory). There is no theoretical way to predict the outcome of systems that are related in this way without stepping through possible cycles. By analogy, one cycle alone, either the status-quo cycle or the visionary cycle, has a simple system model that merely reinforces its existing elements.

It is equally possible to have closure in any of the other quadrants; that is, material, final, and formal closure. Thus, there are four ways to relate our visionary cycle to the present system of SR to bring about desired change. This raises the possibility of creating closure in all four quadrants, which makes present and future thinking into a fully entailed whole system. This appears to be the requirement for an inherently evolutionary system; which certainly SR already is, with many such re-design loops, however the SRT may be designing a specific loop with more general aims than might develop otherwise . At yet another level we can consider if this is a purely analytical exercise, in which case it would occupy a 4th quadrant in a larger system not shown here, that is doing the analysis; or if it is operational, in which case it would correspond to the 2nd quadrant of a larger implementation cycle.

Note also that one outcome of this exercise could be to identify the final epistemology (vertical axis): the knowable components of change from old to new SR in terms of "recommended functions" and "recommended structures". We cannot possibly get all the relations involved and certainly our initial set of questions is limited. We used experience and intuition to select an initial set of questions that we thought would led us in the desired direction. But by iterating this cycle, it can converge on something like what was wanted, subject to the natural and cultural forces inherent in the system. Along the way we will discover many questions we hadn't thought of and perhaps we will be able to eliminate some that might not make a difference – we can do sensitivity analysis and scenario building.

I went through this exercise to demonstrate how the framework works, and its value in framing out a more complete study. We need not present all this detail, however, as it might be overwhelming. But we should indicate that the framework is extensible in a rigorous way. It objectifies Rosen's modeling relation.

One more point. This demonstration also points out a very important part of the framework, which is that there is a 5th aspect: the whole or unity of the four quadrant aspects (which are causalities). That 5th aspect is the whole "Identity" of the system we are discussing. It is essential to know that aspect too, otherwise the semantics get mixed and relations are lost. We would lose sight of what we are talking about. Here I assumed that the two systems were (a) anticipating the future of SR, and (b) existing SR. There are many other system definitions we could adopt for various purposes.

There is much more that can be pointed out about this organization. For one thing, notice that it relates two 'wholes' with implicitly different models of SR. In fact we designed it that way to consider a new model of SR. The key to the exercise, therefore, is to envision the new system, based on elements of the old, and then to close its causalities with the old system so as to bring about just that change. The method is thus also open to conceptual testing before trying to implement it.

I will now do my actual homework and answer the questions.

Q1 PLAN: What can we do to promote good Systems Research as we understand it?

A handbook on SR including some hints toward this general framework might help. It might also be contested, since some will see it as another straightjacket. But we should try it. More generally, I think we would need to apply the framework somewhat rigorously, in part to demonstrate its rigor. That may mean challenging some common beliefs.

For example, I would like to clarify a point about reduction***ism*** that seems to come up in the current systems view, particular in descriptions of AR & PAR. I think such descriptions in the social sciences may be too limiting (and yet are absent in the hard sciences). I understand the wish to distinguish what SR does from how 'normal research' goes about its thinking in a more reductive, classical way; which is essentially a mechanistic analysis leaving out the contextual and subjective (participatory) elements that are otherwise constraining or formative in complex systems. That is a given.

However, I don't entirely agree that SR should distinguish itself from *reduction* itself. The reason is that "good" SR, in my opinion, should be whole and inclusive, which means inclusive of reductions. The idea is that SR should be a larger system with more in it than physical causality (called objective) or contextual causality (called subjective) alone. We may be comfortable with 'subjective modes' such as ethical perspectives and cultural cosmologies with regard to human systems, but we are generally more reluctant to add the same causal type to 'new physics', even though it is needed to represent the higher causes that classical science expunged and that now assert their necessity in the failure of purely mechanistic approaches. However, considering higher causes does not then remove the physical causes. Thus, in adding the higher causes involved with contextual formation of a system, we must relate that to the material realizations, not keep them separate as the reductionists did, choosing one side or the other. In fact there is an argument that all describable knowledge is a reduction of some kind. The question is what we are reducing to. The obvious reductions are (a) to material things and their dynamics, (b) to subjective qualities, impressions, spirits and other psychological experiences, or (c) to whole systems and whole sub-systems inclusive of both (a) and (b) plus their relations. So, what SR "should" do in my opinion is tell us how to relate the two sides. It turns out, I believe, that the relational framework not only does that for research, it works as a description of nature too, "all the way down with the turtles". It describes the cosmos and quantum behavior, along with life, ecology, and social systems. I think it is what Von Bertalanffy was looking for.

My other thought is about Action Research being inherently collaborative and interventionist (Williams & Hummelbrunner, 2010). I think this idea came mainly from dealing with social systems in the context of social design. It seems (others may know better) to apply to 'problems' in the sense of something that must be acted upon and in which we, the observer, are of the same type as the observed - people. Thus it has a collective goal and it is possible to see with many equivalent eyes. It was not as true of primate research, which was turned upside down by participatory methods introduced by Louis B. Leakey.

In that case there was no collective goal of the combined system of apes and researchers (certainly some mutual curiosity, but not likely about the same things). The observer was a different species, but still, immersion in the system was required. I therefore agree that SR is 'collaborative' in the sense that we must be immersed in order to gain multiple perspectives, but it may not involve collective agreements between individuals; it can be done by one individual. If we are microcosms of the universe in a functional sense, which I think *we* are, there shouldn't be anything fundamentally unavailable to the individual except external diversity. If SR practitioners are concerned with what individual skills are needed to think systemically, and the appropriate psychology for doing system research, we can't then say those qualities don't exist in the individual and must be obtained collectively. That would imply that individual views must be simple reductions, thus requiring a community of them to gain the complexity; but that is the particle view of reality: It is more likely the other way around.

I think that construction does not build, and perhaps can't discover, complexity; it reduces it, which is why it is a useful way to make social decisions. I think it is something more organic that transfers complexity to larger system organization and prevents them from being reduced – keeps them creative and adaptive. These are the methods of organizational design like Senge's 5th discipline and others. A community is certainly complex, but no more so than a person. Left to random interactions I think it reduces its complexity, which is why leadership is needed at the individual level where full complexity remains. Organization, as in life itself, preserves natural complexity in larger systems by preventing its reduction until a reduction (a decision) is needed.

Similarly, I think it may be the case that we are born thinking systemically and through interaction with others we learn to think in reductive ways; to make collective decisions about reality. If that is the case, then we should not insist that SR can only be done in groups. I would argue, for example, that people like Margaret Mead, Diane Fossey, and Jane Goodall were doing good Systems Research as individuals interacting with the system of study. The degree of cross-construction (mutually induced changes in behavior) between ape and human was of concern, because we wanted to know ape behavior itself; but the big discovery was that mutual effects (other than a sense of familiarity or, at least for the humans, affection) diminished as the apes habituated to non-interfering human presence and went on about their business. Thus researchers gained an 'inside' view into the ape world by

using immersion as a way to minimize impact, while not really becoming a causal part of the system. Perhaps this case violates the premise of Action Research where people are concerned, but perhaps AR then needs to be broadened.

Q2 ACT: What do we see as key elements of good Systems research?

I gave some answers to this above. Some of the things we think are key elements are too narrow and may limit SR and prevent it from really integrating with other academic fields. I think the key to good SR will turn out to be the same as the key to understanding what makes a system 'whole'. My tentative answer is the framework. I don't think we need to specify anything else, except in examples, which can be more specific because they do not claim to be prescriptive of the field. If our framework is good, then good SR is applying that framework. The question will arise if the framework is meant to be an ontological norm, in which case many people may rightfully object. I think, despite what any person may believe about the 'true reality' (e.g., what I may believe, for our purposes in defining SR it must not be that, but rather a common and perhaps tentative epistemology or worldview. In other words we should introduce it as a systems analysis tool with natural referents. Much of SR may be about testing if the epistemology gets at something real. So I would say the key to good SR is exploration of this systemic, holarchical worldview in which nothing a system is capable of is a priori excluded.

Q3 Observe: What would a good Systems Research output look like?

We naturally need to begin with the example of what SR presently is. Based on what SR presently is, we can think about what it should be. Except for the remarks here, however, I will not single out the secondary questions about present SR because I don't feel that familiar with its diversity.

I think it does and should include all standard research output forms in academia. I sense that in asking this question we may be too sensitive to the look and feel of science. But SR does not need to be science. It includes science. As such a good SR output might be a documentary film, a musical composition, a painting or poetry. It might be a playground or a garden, or a biodynamic farm. Or it could be a new policy, a Bill introduced to Congress, a peace agreement between two countries. It might be a religious service or spiritual ceremony. Who says SR has to output words on paper? But if by "research" we mean only words, I think we are already falling into the kind of reductionism we set out to avoid.

On the other hand, we also need to speak the language of academia and conform with its norms of publication. If the question is what good SR publication should look like, then I would say there is no difference with traditional academia. If there were, it would further contribute to the marginalization of the field.

Q4 Reflect: How is good Systems research organized?

I'm becoming quite redundant. Again, my contribution would be that it is the framework. The Action Research cycle is apparently an example of it, but it does not always have to be about intervention, and participation can be minimal as in the case of ape research mentioned above. It is expanding the PAR model and expanding the reductionist paradigm until the two meet; the organization of SR is integrative.

Again, as one of the four types of closure (represented by each question above), this is final closure where present and recommended SR organize each other at the level of visionary change. It is where we bring old structures into the new context to envision re-design, and where we introduce new structures into the old context to stimulate new functions that will help evolve the system.

PAMELA BUCKLE HENNING

I'm taking this opportunity to reflect on my own views about systems research coming out of the week I spent with the IFSR Systems Research Team in Linz, and on actions I feel personally committed to take, given that experience.

What I Can Do to Promote Good Systems Research, As I Understand It
My abiding interest is systems thinking – clarifying what it means, how it's done, and how it can be developed in people. I believe that good systems research is not possible if the researcher is not an effective systems thinker, and better understanding the mechanisms of systems thinking will support the goals of the Systems Research team, and every other team assembled at IFSR this year. Accordingly, I wish to undertake a research program that would incorporate both secondary and primary sources to study the "psychological type" factors used by recognized systems thinkers, via the Singer-Loomis Type Deployment Inventory®. This can assist in developing a set of testable hypotheses on cognitive and affective skills used (perhaps required) for systems thinking. This research program would seek to identify enabling conditions (intrapersonal and interpersonal) that facilitate the capacity to do systems thinking, as well as identifying competing values and other conditions that can act to impede systems thinking. A further aspect of the research would seek to identify quality markers for systems thinking.

Overall, given my interests in education and in human development, I am looking to develop capacity-building strategies to develop systems thinkers. Together, these approaches can assist us in developing a systems thinking curriculum to pilot test. As we implement it, we can make refinements through action-research-informed reflection to develop an empirically-sound, effective educational experience that makes systems thinking skills understandable and attainable to people entering the systems community.

What I See as Key Elements of Good Systems Research
Informed by my experiences in qualitative research, clinical work in psychology, and the group dynamics I experienced in Linz, I am convinced of the importance of a researcher explicitly communicating his/her subjectivities. Doing so enables the audience to locate the researcher's truth claims within his/her stated context and facilitates more informative, effective discourse. On the researcher's part, this requires capacities for reflexivity. On the reader/audience's part, this requires capacities for *multiperspectivalism* (consciousness of multiple perspectives; specifically, normative, situational, and existential) (Frame, 2007). Given my view that good systems research should provoke good systems discourse, I consider both capacities essential.

How a Good Systems Research Output Looks
To me, good systems research should look much like research of any type. It should refer to extant systems literature – historical and current – that is published in reputable books and journals. It should present the research to a clearly-defined academic audience. And whenever possible, it should be presented in practitioner outlets as well (e.g. journals, magazines, or newsletters). However, guided by the quest of von Bertalanffy and others to find a general systems theory, I believe good systems research should take a further step: articulating how the research method and findings could be pertinent in disciplines outside the intended audience; that is, how the research furthers our understanding of systems beyond the one(s) addressed by that particular study. Thus, good systems research output should be presented in the most reputable academic outlets possible in the systems community, and also in respected journals in other disciplines as well.

How Good Systems Research is Organized
Systems research belongs to the body of intellectual work designed to further our understanding of the world in which we live. In many respects, high-calibre systems research is no different from any contribution to that lofty goal. Systems research ought to follow academically recognized processes for sound research design – qualitative and/or quantitative. If a choice is made to depart from currently-accepted research processes, the researcher should articulate the carefully-considered and well-justified arguments for doing so.

What Currently Qualifies as Systems Research for Publication; Are These Standards Reflective of the Field and Its Future Directions?
In my reading of published systems work, I would characterize the systems community as an assembly of enthusiastic researchers and practitioners seeking to demonstrate how the use of different systems methodologies or technologies can help us understand complexly interconnected phenomena. I compare this to medical diagnosis – systems thinking can often help us understand the complexities of what is happening better than reductionist thinking can. However, if the systems community is to convincingly demonstrate the power of systems approaches, we need published accounts of the successes and difficulties of systems interventions: accurately diagnosing a problem does not mean its solution is straightforward to implement. In my view, systems research publications must go beyond extolling the merits of particular systems techniques and address also the shortcomings of those techniques when brought to bear on intervening in real-world phenomena. Understanding the conditions wherein systems analysis and intervention work and where they don't provides clear direction for future research, and eventually, a strengthening of the claim that systems research can be a reliable method for both understanding and action.

Systems Research Guidelines That Can be Shared with Graduate Students and Researchers Wanting to Publish in Systems Science Journals
I come to systems research with great interests in systems thinking, as I have stated above. To me, the greatest unaddressed area of sound advice for those wishing to create publication-worthy research is the as-yet not-understood matter of how to become a good systems thinker. With research such as that I have indicated, we can begin to identify specific cognitive and other mechanisms that characterize one capable of being a systems thinker and thus capable of performing high-quality systems research that will warrant publication in respected journals. With a better understanding of systems thinking, we should be able to help graduate students and researchers understand their specific systems thinking difficulties, and how they can be addressed.

The Role of the Systems Community in Educating Scholars, Practitioners, and Educational Outlets about the Value of Systems Research
The question of what the system community can do to promote the value of systems research is, I think, a good way to summarize ideas I've sought to communicate in this brief paper. The systems community must improve the currently-loose way that terms like "systems thinking" and "systems research" are used. As a community, we must guard against groundless evangelism and work to clarify exactly what systems approaches can and cannot do, and how they perform in comparison with non-systems approaches currently being used. The systems community needs to educate itself in how to communicate the value of systems research to various audiences using multiple channels, including high-calibre publication citing the extensive contemporary research being published in SRBS and other systems journals. Succeeding in this communication effort will require, in part, targeting specific scholars, practitioners, and educational institutions that would benefit and be open to conversation about systems approaches to research. Succeeding in communication efforts also requires studying the political structures that support current non-systemic research, and how the systems community can skilfully engage with those structures.

Parting Thoughts
The Systems Research Team that met at the IFSR Conversation this year agreed that sound research involves cycles of planning, acting, observing, and reflecting. So too it is with good systems research. I see a research program on systems thinking as the plan I am adopting. Putting this plan into action in good research, for me, includes disciplined attention to subjectivities on the researcher's part throughout the course of the study. For audiences to observe and evaluate the quality of the research output, the research will need to be situated among current systems researches and must also be positioned to audiences beyond the academic systems community. Careful reflection to methodological choices, and choices left unmade, must be justified and can provoke discourse about innovative new approaches to systems research and beyond.

I am looking forward to working alongside my Systems Research Team colleagues to continue our work to define systems research, propose standards for it, develop ever-better ways to teach it in our universities, and more ways to articulate its value to a broader academic and practitioner public.

WILL VAREY

A Poem
There are many animals,
In the Zoo,
All are beautiful,
And some,
Are useful, too.

The Systems Research Team (SRT) for the 2014 IFSR Conversation had as one of its unique strengths a representative mix of disciplines. The SRT 2014 members brought together their experience in applications of systems principles and practices to different disciplines and research domains (e.g. ecology, sustainability, business management, project management, psychology, engineering, etc.). From our conversation we believe systems thinking provides a distinctive contribution to other disciplines in coping with complexity. The result is a plethora of possibilities and potentialities to discuss and pursue. My personal interest is, however, more towards the relative contribution of these domain-specific applications to a wider systemic discourse. This concerns the generative potentials of complex thought in humanity level systems. It is to this topic my personal reflections are primarily addressed.

Context and Entry Question

The SRT entry question for IFSR 2014 was phrased as: *What distinguishes systems research from other forms of research?*
We decided that there was a distinctive quality to systems research, yet there are also many blurred distinctions in the discussion of its distinct elements. In the SRT conversation we briefly explored the role of a 'taxonomy for systems research' (i.e. identifying over 110 categories and over 40 modalities). This approach would allow for the distinctive elements that operate as components of 'good' systems research to be discussed without confusion. This also distinguishes already established 'systems approaches' from other forms of scientific research. Finding the many beautiful animals in the zoo and distinguishing their distinctive features of merit was, however, for us only a preliminary activity. The additional inquiry we did not complete was determining for the systems research field its real contribution, its relevance and its potential utility. The critical question that arises for me is the appreciation of how, outside of their zoo-like enclosures, systems research paradigms operate in a complexity of environmental contexts (e.g. health systems, political systems, ecological systems, urban systems, linguistic systems, virtual systems, etc.). It is these contexts that govern the formation of systems conceptions and their paradigms of praxis. The analysis of the formation of these forms involves a systems approach to the thought ecology of systems of conceptions. This removes the zoo walls and looks instead at the ecology of systems thinking as a system of thought. The discipline for doing this is called apithology systems inquiry. Its primary application in systems research is to the enablement of the generative potentials of humanity-scale health and wellbeing.

In these reflections, I look at each of the four concluding action-research questions proposed by the SRT in our 2014 Executive Summary. Rather than re-interpreting the SRT framing questions personally, I have referenced the (four quadrant) framework adopted by the SRT as our organizing convention. In doing so I discuss the problem identified, the premise of its assumption and the proposal for its resolution. This is done from an apithology systems theory perspective. I also reflect on what might distinguish 'apithology systems research' from other forms of systems research, to move beyond personal opinion and towards praxis generation.

Primary IFSR Questions

Q1. What can we do to promote good systems research as we understand it? (PLAN)
This question concerns the potential of systems research as a function in a context (UR - Potential). A perennial problem faced by the systems research community is that the contribution it primarily offers cannot easily be seen by the domains it hopes to influence. The system to be assisted cannot see itself systemically. The contribution of a wider systemic perspective offered by a systems approach is therefore valuable.

For example, while transport planning would benefit from a systemic analysis of congestion logistics, hospital systems from integrated approaches to health care, and managed aquiculture from projections of a sustainable yield – the strength of focus of each primary discipline often excludes the appreciation of the extended systems principles that would most benefit it. This tension of the 'significance of the excluded' is natural, primary and (in terms of systems of conceptions) is to be expected.

One premise in promoting good systems research is that it provides utility by this wider perspective. The argument put is that systems research can solve the problems that other domains find unsolvable. The benefit of systems research is then not simply in its own self-assessed beauty (or elegance), but rather in its contribution to the enablement of better systemic outcomes for other domains of research. The difficulty with an argument based on this premise is that systems research provides an additional perspective that the primary research domain does not itself have from within its own field of expertise. This premise is (of course) unacceptable to the domain itself, and is a reason why a call for 'transdisciplinary practice' is often proposed as the solution to the non-functional limitations of narrow domain-specific contributions.

In apithological systems theory, systems research is seen not only as being useful for solving problems unsolvable by domain specific inquiries, but also as essential for enabling future capacities. In an apithology approach four different orientations are spoken to equally. These four primary orientations are usually identified as: i) to isolate dysfunction as pathology (p.), ii) restore function by anti-pathology (p+), iii) to allow for functionality in apathology (a_), and iv) to enable generativity in apithology (a^). This framing provides the opportunity for a four-fold expansion of the potential for systems research to contribute effectively. Instead of narrow problems to remediate, apithological systems research examines the possibility for the enactment of generative potentials in all the fields of human endeavour. What is spoken to is not the present problem, but the promotion of potentials. The apithology system research approach is different in not requiring a 'problem' for its originating question. It does more than solve problems; it reduces the potential for their creation.

Q2. What do we see as key elements of good systems research? (ACT)
This second question concerns the dynamics of the function realized in systems research (UL – Action). The problem noted is that what constitutes 'good' in this context is a function of the conception held which attributes value to the systems research being conducted. For example, the emphasis of a well realized action might be on; the 'systems' indicia, the 'research' quality, the fact that research was done in a 'systems field' specifically, or that a systematic approach to the 'research praxis' was adopted generally. Each conception of 'systems research', by having a different composition, has a different emphasis as to what constitutes adequacy from it its own viewpoint.
The premise held is that there is homogeneity in how the systems-science field conceives of a valid approach to systems research. In reality, a brief inquiry discloses the vast heterogeneity; in discipline biases, preferences for models, privileging of different theories or theorists, and the permissiveness of cross-disciplinary applications of theories into domains never initially envisaged by their originators. In considering the multiple research forms an extended systems research taxonomy discloses, rather than finding 'good' we found there were many forms of 'good-ness'.

Our 'zoo' included all the animals - whether terrestrial, aquatic, amphibious or aerial.
However, as a group we avoided the question of whether 'systems research within the discipline of systems-science' might be the sole and exclusive domain in which 'good' systems-research might be conducted.

In apithology systems research, the attainment of 'good' is clearer. This form of research initially involves the avoidance of three conflation errors. These are: i) the conflation of structuations; ii) the confusion of inclusions; and iii) the collapse of assumptions. The standard for apithology systems research is higher than in ordinary research, as the avoidance of the unconscious replication of dysfunctions of thought is necessary. Yet the further aim of this approach is to actively ask: 'What would a beautiful one look like?' - where beauty is not solely in the purvue of the beholder-enactor. Instead of only the avoidance of error, this involves the explicit presence of three key elements, relating to capacity, coherency, and cogency. Rather than the minimum elements necessary, these

are the requirements enabling an apithological 'dynamic sufficiency'. The action is directed towards doing good, well.

Q3. What would a good systems research output look like? (OBSERVE)
This question concerns the state of the realized structure in systems research (i.e. LR – State). The difficulty of assessment in systems research outputs is often reflected in the statement: 'we know a 'good' one when we see one' (i.e. it has 'systemicity', or "duckness"). However, in the planning and enacting of systems research systematically, post-fact assessments provide insufficient guidance for the willing (but novice) researcher. As a result, a common default position is that the exemplars of specific approaches are adjudged to be 'good outputs' merely by their adherence to a familiar form for each paradigm of practice.

The premise that causes difficulty here is that systems researchers often have a primary preference for the model or modality they are most familiar with, adjudging others as necessarily deficient. The preference for (or the 'incommensurability of') a different paradigm to that adopted by another researcher means the outputs acceptable to one school of practice will be assessed as inadequate (or unfamiliar) by a group with a different paradigmatic bias. The effect is that different schools or paradigms then re-argue for their originating premises as preferential criteria for adequate outputs.

In apithology systems research, there is instead a premise of the co-contribution and conjunctive validity of multiple paradigms by a meta-paradigmatic analysis. This involves tests for 'appropriateness' in the selection of paradigms best suited to the question and the context. Again, different standards apply. The 'five veracity tests' specifically applicable to the outputs of apithological systems research require that the findings are: i) useful (not impractical); ii) credible (not implausible); iii) conceivable (not inadequate); iv) consistent (not incomplete); and v) coherent (not irrational), within the specific meanings of those terms as attributed by this praxis. The difference is that rather than research outputs being assessed post-fact as to their deficiencies, they are instead proactively designed for as 'realized adequacies'. The output is one of states of continual formation as a conjunction of generative tensions.

Q4. How is good systems research organized? (REFLECT)
This question concerns the possibilities given the structure in a context (i.e. LR – Possibility). A problem systems researchers uniquely face is that in undertaking a systems inquiry they are usually exploring newly generated content at a level of abstraction that is unfamiliar to the participants in the system considered. Often when conscious agents or natural phenomena are involved, the system is not completely cooperative with the research as planned. It is for this reason that appreciative systems inquiry, action inquiry, participatory inquiry, co-operative inquiry and other grounded theory and abductive theory approaches to systems development are becoming increasingly significant. The boundary between observer and observed, or actor and enactor, has become less defined.

The premise that systems research can be organized in a standard or systematized way involves the assumption that specific systems can be approached generally. While general systems theory unified many common assumptions applicable to all systems analysis, the specific contexts of different systems applications (i.e. social sciences, natural sciences, political sciences, cognitive sciences, virtual sciences, non-normal sciences, etc.) means that flexibility and novelty in systems approaches is the convention, rather than the exception. The method of organization in research is then usually domain-specified (i.e. the research standards for qualitative, quantitative and mixed-method approaches). The systems research field presently lacks similar levels of standardization.

In an apithological approach to systems research, the premise is different. Rather than the system being ontologically existent and its description being a function of set observations using a method, there is the recognition that the system itself enacts the appropriate systems research modality. The novelty of the system specifies its abductive depiction. This also involves the ethical recognition that the systems researcher co-enacts the system's future condition by the act of its observation. In an extension of cyberneticist and constructivist principles, apithological inquiry additionally involves the development of the systems researcher systemically by the praxis of the inquiry. Instead of 'action research' conducted towards a satisfactory solution, this is 'developmental inquiry' directed to development of the researcher.

This approach requires much more than action and reflection, or even action and self-reflective inquiry (i.e. triple loop learning), being a form of apithological inquiry where the context for the inquiry is actively enhanced by the enhancement of the researcher. The metaphor for this is where 'the garden gardens the gardener'. This is evidenced particularly when the systems research practice changes the researcher systemically. The person is changed, not as to their actions, their model, or their behavior, but as the active constitutor of the system's parameters and the capacity for its future self-generation. The possibilities from such research are therefore organized, not with an end in mind, but with the outcome of the 'unending development of mind'. The research possibilities then increase enduringly.

Summary

My reflection from the IFSR 2014 Conversation is that systems research makes a useful contribution when three cognitive errors are avoided. These are:

Simplification: Where the systems description, as driven by the modality, method, or model of the systems research approach adopted, is too simplistic to adequately describe the complexity of the situation being investigated.

Conflation: Where the form of depiction is not adequate to the field it is applied to, such that distinctions used within that field and which are significant, are blurred or merged. Characterizations made are then satisfying to the researcher, but impractical when applied to the context of the research.

Projection: When the systems research paradigm adopted is the default methodology of the researcher (or their adjudicators) and is applied mainly due to its familiarity, even though inappropriate to the content, context or conventions of the situation to which it is to be eventually used.

If systems research involves the relations of parts, as a whole, in a context – these errors relate to; reduction of the whole, loss of distinction in the parts, and disregard of the context. Rather than research that is good (let alone beautiful, or true) the result of these three errors is the overlay of a poor systems analysis on situations of complexity, which may result in unattractive depictions, from false representations. However, the risk of these errors is easily averted by self-reflective inquiry at each stage of the systems research investigation. These are the 'choice points' that guide good systems inquiry. They represent the research itself as a developmental system of inquiry. This is the emphasis of apithology systems theory. The distinction between desired and undesirable research outcomes is then simply a function of praxis efficacy (which may be unavailable unless specifically trained for and practiced specifically). The personal conclusion reached is that, in the design of apithological systems research, more emphasis is placed on the choices in formation, than the justification of the forms chosen.

Conclusion

The opportunity for participation in the IFSR Conversation confirmed for me the diversity and beauty of all system inquiry forms. There are also many 'zoological' questions to answer. All are motivated by the desire for realization of potentially significant contributions from the systems research community. A discussion of the problems, their premise, and different propositions for resolution provide many pathways forward. For the field of systems science to not have an endangered future, my own emphasis will be on the preservation of its habitats of wild ecology and on ways for nurturance of its generative capacities.

MARY EDSON

The purpose of this paper is to review my perspectives of the inquiries posed by the Systems Research Team (Team 6) at the 2014 IFSR Conversation in Linz, Austria. The purpose of the Systems Research Team (SRT) is to explore questions related to the question, "What is Systems Research?" Specifically, SRT focused on the main question, "What distinguishes Systems Research from other types of Research?" This question impelled the SRT's Conversation in multiple directions; however, two threads predominated (given the diverse backgrounds of team participants) – those that were divergent and those that were convergent. As a result, the SRT's Conversation began to scope out the breadth and depth of this subject.

During the Conversation, the SRT chose to focus on specific areas related to developing a shared framework (see Figures 19 and 22) and created a process for discussing Systems Research rather than attempting to comprehensively address the far-reaching scope of the field. Four compelling questions were developed; these questions will be the focus of my discussion:

* What can we do to promote good Systems Research as we understand it? (PLAN)
* What do we see as key elements of good Systems Research? (ACT)
* What would a good Systems Research output look like? (OBSERVE)
* How is good Systems Research organized? (REFLECT)

These four questions converged into a singular question for the future work of the SRT and the entire Systems Community, "What can WE provide to enhance the quality and impact of Systems Research?" The following questions advance this inquiry:

1. What currently qualifies as Systems Research for publication and are these standards reflective of the field and its future directions (ontologically, epistemologically, and scope)?
2. What Systems Research guidelines can be shared with graduate students and researchers who want to design, conduct, and publish their research in journals related to the Systems Sciences (e.g. *Systems Research and Behavioral Science*)?
3. What role does the Systems Community play in educating scholars, practitioners, and other educational outlets about the value of Systems Research?

What is Systems Research?

First, "What can we do to promote good Systems Research as we understand it?" One of the roles of the IFSR is to promote understanding of complexity and assist in solving "wicked" problems through the application of methods of systems sciences, systems thinking, and Systems Research. When confronted with the magnitude of this role, the question naturally arises, "What is Systems Research?" There are several scholarly publications that disseminate research related to systems, yet this question persists. Should research that explores systems, specifically using positivistic research methods to investigate systems, be considered "Systems Research?" In my personal opinion, it should not because it conflates positivistic interpretations of systems with integrative and systemic distinctions. Dissecting a system and examining its parts alone does not invoke the fundamental principle of systems thinking often attributed to Aristotle – "the whole is greater than the sum of its parts." Sole reliance on positivistic approaches erodes the rigor of Systems Research. This distinction leads to the next question and addresses the "PLAN" portion of the SRT's holistic model.

Second, "What do we see as key elements of good Systems Research?" Systems Research should be undertaken consciously. In other words, the researcher's decision to conduct a Systems Research study needs to include intent from conceptualization of the investigation. This includes using systems thinking approaches at every step in the design, conduct, analysis, and results-reporting of the research. While the researcher's own sensibilities and competencies factor significantly in determining the quality of the research, others will address this topic more thoroughly and it is beyond the scope of this paper. My focus is on the design, conduct, and reporting of Systems Research. Specifically, at *minimum* the research design needs to include:

1. Clear statement of purpose, research questions, and relation to the Systems Sciences (documented through scope of citations and literature review)
2. Definition of the system(s) under study, its context, boundaries, stakeholders, and modes of relational feedback
3. Definition of the problem and discussion of causality in the subject system

And, at least one or more of the following elements:

- Theoretical pluralism (compare and contrast two or more models or theories)
- Methodological pluralism (e.g. mixed methods)
- Multi-level analysis (use of a baseline with recursive analysis)
- Integrative, systemic, and/or strategic analysis with consideration of context and stakeholders
- Recommendations and discussion of feedback as well as consequences of interventions and decisions

These elements impact the conduct of the study, which addresses the "ACT" portion of the SRT's model.

Third, "What would a good Systems Research output look like?" If the key elements of good Systems Research are in effect during the conduct of the study, it naturally follows that the outcome will demonstrate evidence of systems thinking in its output. In this statement, I am proposing that the SRT consider pragmatic dimensions of these questions, which are based upon philosophies of C.S. Peirce and others (e.g. Dewey, Fish, Habermas, Hegel, Hume, James, and Kant). Systems thinking and approaches will be evident to readers and reviews of research conducted using one or more of the key elements, which addresses the "OBSERVE" portion of the SRT's holistic model.

Fourth, "How is good Systems Research organized?" In agreement with my fellow teammates, I believe Systems Research must be conducted with discipline and rigor. Like its positivistic counterpart, Systems Research must demonstrate veracity, validity, and reliability. However, the way positivistic research is reported is constraining to Systems Researchers in that Systems Research is not well communicated in two-dimensional forums, linearly, incrementally, or phasically because it is inherently dynamic. Formerly, communication was limited to two-dimensional space because paper was the medium of transfer; however, technology has changed and reduced this constraint. Still, academia clings to two-dimensional communication because it is cybernetically reliable (predictable, controllable, and verifiable). This is one forum in which the Systems Community and the IFSR needs to challenge the staid modes of communicating research results, so our work can be more fully understood and embraced. By communicating results via dynamic presentations, Systems Research addresses the "REFLECT" portion of the SRT's model.

Through the PLAN-ACT-OBSERVE-REFLECT approach posed in this discussion, the remaining three questions can be answered as follows:

1. What currently qualifies as Systems Research for publication and are these standards reflective of the field and its future directions (ontologically, epistemologically, and scope – structure and function)?
   The SRT has begun to survey the field of Systems Research to determine its scope (breadth and depth/divergence and convergence) with the intention of developing an understanding of the current criteria used to evaluate it. As the SRT has found, this is a painstaking process without clear standards. With refinements, the SRT could use the Systems Research Framework developed during the 2014 IFSR Conversation. We could also use other methods such as problem structuring, modeling the current system, or a strategic approach. In my opinion, the approach chosen needs to reflect the nature of the subject; hence, analysis of the field of Systems Research necessitates a systems approach accounting for context, boundaries, and content.

2. What Systems Research guidelines can be shared with graduate students and researchers who want to design, conduct, and publish their research in journals related to the Systems Sciences (e.g. *Systems Research and Behavioral Science*)?

The SRT has developed many questions related to establishment of guidelines to assist researchers interested in Systems Research. Some of these factors include situational utility, compositional adequacy, philosophical concordance, assertive plausibility, and procedural descriptions. In addition there are philosophical, psychological, scientific, and pragmatic dimensions needing attention to fully develop sound guidelines. This effort will require expertise beyond the SRT, which means involvement of the Systems Community and other SMEs – the next question.

3. What role does the Systems Community play in educating scholars, practitioners, and other educational outlets about the value of Systems Research?
   The IFSR is the locus of many organizations and streams of the Systems Sciences and Cybernetics. In this role, the IFSR has the opportunity to be the nexus of Systems Research in determining its scope, evaluating its quality, disseminating knowledge, sharing expertise, and educating audiences keen to address complex problems. While the Systems Community may be well aware of its intrinsic value, this value needs to be aptly articulated into a broader audience. Through its website, the IFSR could create a hub of activity related to these projects actively. In my opinion, this endeavor requires going beyond passivity to planned outreach with clear messages about the value of systems approaches.

RECOMMENDATIONS - FUTURE PROJECTS AND POTENTIAL ALLIANCES

Future Projects

During the Conversation, the SRT discussed several projects and opportunities for further development. The discussion and subsequent reflection post Conversation led to several initiatives to which I am committed:

1. Collaborative articles and books for publication with the SRT
2. Developing a collaborative relationship with the Systems Philosophy Team through team co-leaders, Jennifer Wilby and David Rousseau
3. Co-creation of value with IFSR members through collaboration on an IFSR Systems Research Council (see following description)

Potential Alliances - IFSR Systems Research Council

One of the possible value propositions for the IFSR is the creation of a Systems Research Council with the help of the SRT. Here are some details to contemplate, should the IFSR Executive Committee (EC) choose to explore this proposition:

1. Purpose: To create participative value for our constituents, the IFSR creates an "IFSR Research Council."
2. Each IFSR Member has the option to designate one of their members to participate in the IFSR Research Council.
3. The role/purpose of the Research Council (RC) is to act as an advisory committee to the Systems Research Team (SRT).
4. In conjunction with the SRT, the RC consults about SR issues, helping to determine the scope and nature of SR as well as how it is communicated and shared with the public and institutions of Higher Ed.
5. In conjunction with the SRT, the RC consults about IFSR educational SS programs (creation, communication, distribution, etc.)
6. The RC works with the SRT to develop a "Special Issue" of SRBS biennially (perhaps linked to the biennial Conversation)
7. The RC works with the SRT to develop other media outlets and vehicles to create SS awareness in Higher Ed and the public, perhaps through development of webinars, online course modules, and an app (iPhone and Android)

8. The RC works with the SRT to identify key sources for SR and assists in mentoring, guiding, and facilitating the conducting, reporting, and publication of SR in SRBS and other publications (IFSR's own content or others with whom we have articulation agreements)
9. The RC reports progress to the IFSR EC throughout the year and to the IFSR Board at the biennial EMCSR meetings.
10. The IFSR President advises the SRT and RC, making the final decision, negotiating all contracts and agreements with affiliates, members, vendors, and stakeholders (i.e. final authority over both the SRT and RC according to By-Laws and Board designation).

Many of the details need to be worked out, especially those related to publications like *Systems Research and Behavioral Science*. This project will require significant work and commitment, which will take time and will not happen overnight.

CONCLUSION

Ultimately, all these questions converge into a compelling question for the future work of the SRT and the entire Systems Community, “What can WE provide to enhance the quality and impact of Systems Research?” Through active collaboration, networking, education, and outreach, I believe we can not only enhance the value of organizational membership in the IFSR but also as individual contributors to our discipline too. That is “being [resilient] systems.”

REFERENCES

Creswell, J. W. (2012). *Qualitative inquiry and research design: Choosing among five approaches*. Thousand Oaks, CA: Sage.

Frame, J. M. (2012). *A Primer on Perspectivalism*. Retrieved from http://www.frame-poythress.org/a-primer-on-perspectivalism/

Williams, B., & Hummelbrunner, R. (2010). *Systems concepts in action: a practitioner's toolkit*. Palo Alto,CA: Stanford University Press.

APPENDIX A: LINZ AND SANKT MAGDALENA
Venue of the IFSR Conversation 2014

Linz is the third largest city in Austria and the capital of the province of Upper Austria. It is approximately 200 km west oft Vienna, about 138 km east of Salzburg and is one of the main stations on the rail connection between Vienna, Munich, and Innsbruck.

The population counts approximately 191,000. The city is situated on both banks of the Danube, which is favorable for transportation and tourist industry.

Linz (Lentia) was founded by the Romans as a 'castellum' in the 2nd century AD. In 799 AD the name 'Linze' is mentioned with respect to a church and a castle. It was a provincial and local government center of the Holy Roman Empire, as it connected several trade routes on either sides of the river Danube from East to West, including Poland and Bohemia in the north and the Balkans and Italy in the south.

During the reign of the House of Babenberg (976 to 1246) Linz became a town and was thus the center of Austria to the west of the river Enns.

The House of Babenberg was followed by the House of Habsburg (1270 – 1918). The House of Habsburg (also spelled Hapsburg) was one of the most important royal houses in Europe. The Habsburgs began to take possession of countries surrounding their territory, herewith gaining land and influence for what was to become in 1867 the Austrian-Hungarian Monarchy with an area of approximately 676.000 km^2 and 52.8 million inhabitants.

From 1438 onward the throne of the Holy Roman Empire was continuously occupied by the Habsburgs until its dissolution in 1806. Friedrich III even chose Linz as his residential town and thus Linz became the center of the Holy Roman Empire between 1489 and 1493. After the death of the Emperor in 1493 it was only secondary to Vienna and Prague. When the end of the Holy Roman Empire came in 1806 the title of 'Emperor' became nonexistent, but in 1804 the sovereigns of Austria were given the title "Emperor of Austria ('Kaiser von Österreich').

In March 1497 Linz was granted permission to build a bridge over the Danube. It was the third bridge over the Danube in Austria, following Vienna and Krems. It also proved to be an excellent source of income.

Johannes Kepler (1571-1630) was a notable resident who spent many years teaching mathematics in Linz. In 1618 Kepler discovered the Third Law of planetary motion. The local public university, the Johannes Kepler University is named in his honor. Anton Bruckner (1824-1896), a famous composer, organ player and music teacher also resided in Linz between 1855 and 1868. The festival hall of Linz is named after him.
From the second half of the 19th century traffic on the Danube was dealt with by steam ships. The first railway on the continent, drawn by horses, started to run between Linz and Budweis, Czech Republic, in 1832. The railway going up the Pöstling mountain, the steepest adhesion railway in the world, began operating in 1898.

From the middle of the 19th century on industrialization reached Linz. The shipyard of Linz was the first large industrial complex in the field of metal processing. Textile industry also played a significant part. In March 1938 German troops marched into Austria, making Austria part of the German Reich, which lasted until 1945. Hitler turned Linz into a major industrial center both for metallurgical and also chemical industries, mostly for military purposes. Linz was heavily bombed between July 1944 and April 1945.

During the occupation by the Allied Forces (May1945 till October 1955) the province of Upper Austria and as a consequence Linz was split up along the Danube. The north (Urfahr including St. Magdalena) was occupied by the Soviets, the South was American.

At the end of the seventies Linz tried to free itself from the “steel-town”-image of a grey and dirty industrial town. Modern industries, especially ICT came to Linz. Environmental measures and regulations for industrial companies improved the quality of air and have resulted in Linz becoming one of the cleanest cities in Austria.

New cultural centers have also been opened, the Ars Electronica Center, an opera, and an art museum. In 1966 a university planning project was launched resulting in 1975 in the foundation of the Johannes Kepler University Linz.

The IFSR Conversation took place at the Seminar Hotel. Sankt Magdalena located on the northern outskirts of Linz. It is located in the district of Sankt Magdalena.
The Seminar Hotel is designated as a center of communication, discussion and interaction. It offers excellent seminar rooms, plus full pension for participants. It was opened in 1976 and carries the name of Dr. Erwin Wenzl, a former head of the provincial government of Upper Austria.

Gerhard Chroust

APPENDIX B: WHAT IS THE IFSR? WHAT IS THE IFSR CONVERSATION?

What is the IFSR?

THE INTERNATIONAL FEDERATION FOR SYSTEMS RESEARCH (IFSR), founded 1981, is a non-profit, scientific and educational organization comprising 42 member organizations (status May 2013) from all continents. The overall purpose of the Federation is to advance cybernetic and systems research and systems applications in order to serve the international systems community (see also its constitution).

The Federation is guided by a Board of Directors, composed of two individuals from each member organization. The Board elects a President, one to three Vice Presidents, and the Secretary General. These officers form the Executive Committee (EC). The EC acts for the Board pursuant to the authorization of the Board. The Board meets bi-annually in even years, the EC annually.

The IFSR has the following major means of publication:

The Journal of Systems Research and Behavioural Science

The IFSR Book Series on Systems Science and Engineering

The IFSR Newsletter

Proceedings of IFSR (Fuschl) Conversations

IFSR W. Ashby Memorial Lectures (held at EMCSR Conferences)

HOME PAGE: http://www.ifsr.org

CURRENT OFFICERS (2014-16):

PRESIDENT
Dr. Gary S. Metcalf
InterConnections LLC, USA
1408 1/2 Central Avenue
Ashland
Kentucky, KY 41101, USA
E-mail:gmetcalf@interconnectionsllc.com

VICE PRESIDENTS
Stefan Blachfellner, Austria
E-mail: stefan.blachfellner@bcsss.org

Dr. Mary C. Edson, USA
E-mail: maredson.s3@gmail.com

Dr. Nam Nguyen, Australia
E-mail: nam.nguyen@adelaide.edu.au

SECRETARY GENERAL and contact
Prof. Gerhard CHROUST
IFSR c/o OSGK (Austrian Society for Cybernetic Studies)
Freyung 6/6, A-1010 Vienna, Austria
Tel: +43 664 28 29 978, fax: +43 1 5336112-77
E-mail:Gerhard.Chroust@jku.at

The Founding of the IFSR
Global conflicts like World War I and World War II, the related economic and social crises, social unrest, global interaction of powers, and the fragmentation of science made far –thinking scientists aware that a new paradigm for analyzing, understanding and hopefully ameliorating world problems. Scientists such as Ludwig von Bertalanffy, Norbert Wiener, and their colleagues found a response to these problems: holistic rather than fragmented, linear thinking, decision-making, and acting. They established two sciences to support humankind in the effort of meeting this end as a promising alternative to local and worldwide crises. These sciences were Systems Theory and Cybernetics. System was and is the word characterizing this new paradigm: Considering the whole and avoiding one-sidedness in order to survive.

From this combination most modern approaches, most modern knowledge in all spheres of human activity, solutions to environmental problems, etc., most of the existing problems can be ascribed to a lack of systemic thinking this combination, and there are many around that can hardly be solved without systems thinking and creative co-operation of diverse specialists. Our responsibility for the future obliges us to try to improve the current situation and not to leave an excessive burden to future generation.

In the early 50's of the past century few scientists and societies were explicitly working in the field of Systems Sciences and Cybernetics. It was decided to interlink these societies and all groups of system thinkers around the world in order to try to find answers to some of the pressing problems of the world.

On March 12, 1980 during the 5th EMCSR-Congress in Vienna the then three important societies in the area of Systems Research, the Österreichische Studiengesellschaft für Kybernetik, the Systemgroup Nederland, and the Society for General System Research founded the International Federation for Systems Research. The key persons were: Robert Trappl, George J. Klir, Gerard de Zeeuw. They became the first officers of the IFSR (see IFSR Newsletter vol. 24, no. 1 (nov. 2006), [http://www.ifsr.org/newsletters]).

Strong support came from the then Austrian Ministry of Science and Research in the person of Norbert Rozsenich who gave strong encouragement and provided financial support. F. de P. Hanika accepted the responsibility of Editor-in-Chief of the Newsletter of the IFSR.

Aims and Goals of the IFSR
The constitution of the Federation states:
The aims of the Federation are to stimulate all activities associated with the scientific study of systems and to co-ordinate such activities at the international level by:

- co-coordinating systems research activities of private persons and/or organizations;
- organizing international meetings, courses, workshops, and the like;
- promoting international publications in the area of systems research; 16th IFSR Conversation 2012 109
- promoting systems education;
- maintaining standards and competence in systems research and education; and
- any other means … [to] serve the aims of the members.

The first Board Meeting in June 1980 defined the Federation's goals:

- Social Learning Goal: Strengthen the programs of member societies by their involvement in the program and network of IFSR.
- Membership Development Goal: Facilitate (encourage) the development of Systems science in countries in which such programs do not yet exist or are now developing.
- Synergetic Goal: Develop – implement – evaluate IFSR-level programs to meet the purposes of IFSR to advance systems science.

- Resource Development Goal: Identify an inventory of system science relevant resources, acquire those and make them accessible to member societies.
- Global Mission: Make contribution to the larger (global) scientific community, be of service to improve the (global) human condition, and enrich the quality of life of all.

IFSR Activities
The IFSR pursues successfully numerous activities:

- The International Academy of Systems and Cybernetics, founded in 2010 by the IFSR, with Robert Trappl as its current president provides a forum for persons professionally excelling in research and teaching of Systems Sciences and Cybernetics (http://www.iascys.org/).
- Systems Research and Behavioural Science (ISSN 1092-7026), the official scientific journal of the IFSR, edited by Michael C. Jackson, published since 1984 (http://eu.wiley.com/WileyCDA/WileyTitle/productCd-SRBS.html).
- International Series on Systems Science and Engineering, IFSR's book series, established in 1985, edited by George J. Klir, now published by Springer, New York (http://www.springer.com/series/6104).
- The yearly IFSR Newsletter, the informal newsletter of the IFSR (hard copy: ISSN 1818-0809, online: ISSN 1818-0817), published once or twice a year since 1981, edited by Paul F de. P. Hanika (1981-1985), Robert Trappl (1985), Steven Sokoloff (1986 – 1994), and Gerhard Chroust (since 1993), see http://www.ifsr.org/newsletters.
- The IFSR web-site (http://www.ifsr.org) informing the world about the Federation's activities
- The IFSR Conversations, taking place every other year since 1982 (initially held in Fuschl near Salzburg, Austria) convene 30 systems scientist from around the world to discuss systemic issues relevant for the mankind, society and the environment, http://ifsr.org/node/33.
- Support for other events (e.g. the EMCSR-conference in Vienna every second year)
- Sponsoring a bi-annual Ashby-lecture at the European Meeting on Cybernetics and Systems Research (EMCSR)

Future Plans
More than ever Systems Sciences are seen as a basis for balancing the divergent needs and interests between individuals and society worldwide, between ecology and economy, between nations of various levels of development and between differing worldviews. The IFSR commits itself to increase its contributions answering the needs as expressed in its original aims and goals. Some new activities, in line with the needs and the challenges, have already been started:

- The Bertalanffy Library: In cooperation with the Bertalanffy Center for the Study of Systems Science (led by W. Hofkirchner) the IFSR will both help to preserve, revive and disseminate systems concepts and knowledge in general and L. v. Bertalanffy's ideas and work on General Systems Theory in particular.
- The International Encyclopaedia of Systems and Cybernetics based on Charles Francois' seminal International Encyclopedia of Systems and Cybernetics. This work will be continued, supplemented electronically as an attempt to clarify and reduce 16th IFSR Conversation 2012 111 inconsistent terminology and semantics in the field.
- Systems. connecting matter, life, culture and technology: In cooperation with the Bertalanffy Center for the Study of Systems Science the IFSR supports the establishment of an international peer reviewed open access journal as a vital node to foster the sytems movement, accessible for free to all members and everyone interested in systems research. Many member organizations are involved in this project as associate editors, for more details visit http://www.systemsjournal. eu/about/editorialTeam (work in progress)
- Supporting our member societies in organizing conferences and workshops.
- Fostering the outreach of the IFSR and our member organizations with the relaunch of our website, a new digital newsletter and several social media activties.
- Fostering the decision processes of our members and jointly working for the establishment and maintenance of a collaborative e-democracy tool to meet the Social Learning and Synergetic Goal.

- Developing new services for our members to meet the Resource Development Goal, to identify an inventory of system science relevant resources, acquire those and make them accessible to member societies.
- Developing an enhanced business model aligned to the IFSR services.
- Promote the IFSR as the global umbrella organization of the systems movement and attract new members to the Federation to meet the Membership Development Goal.
- Develop and support the global dissemination of the systems conversations to curate the conditions that will support the Global Mission of the IFSR.

Past Officers of the IFSR

Many prominent system scientists have been officers of the IFSR since 1980

Year	President	Vice-President(s)	Secretary/Treasurer
1980	George J. Klir	Robert Trappl	Gerard de Zeeuw
1984	Robert Trappl	Bela H. Banathy	Gerard de Zeeuw
1988	Gerrit Broekstra	Franz Pichler	Bela Banathy
1992	Gerard de Zeeuw	J.D.R. De Raadt	Gerhard Chroust
1994	Bela Banathy	Michael C. Jackson	Gerhard Chroust
1998	Michael C. Jackson	Yong Pil Rhee	Gerhard Chroust
2000	Yong Pil Rhee	Michael C. Jackson	Gerhard Chroust
2002	Jifa Gu	Matjaz Mulej, Gary S. Metcalf	Gerhard Chroust
2006	Matjaz Mulej	Jifa Gu, Gary S. Metcalf	Gerhard Chroust
2008	Matjaz Mulej	Yoshiteru Nakamori, Gary S. Metcalf	Gerhard Chroust
2010	Gary S. Metcalf	Kyoichi Jim Kijima, Amanda Gregory, Leonie Solomons	Gerhard Chroust
2012	Gary S. Metcalf	Yoshihide Horiuchi, Stefan Blachfellner	Gerhard Chroust
2014	Gary S. Metcalf	Stefan Blachfellner, Mary Edson, Nam Nguyen	Gerhard Chroust

Member societies of the IFSR

The IFSR has shown a healthy growth with respect to the number of members. Currently it has 43 member societies, representing scientists from 25 countries on most continents [in brackets the membership number]. For the most recent list see:

http://www.ifsr.org/index.php/member-societies/

ASC: American Society for Cybernetics [no. 7]
GESI: Asociacion Argentina de Teoria General de Sistemas y Cibernetica [no. 5]
ALAS: Asociacion Latinoamericana de Sistemas [no. 38]
AMCS: Asociacion Mexicana de la Ciencia de Sistemas [no. 37]
AMSC:. Asociacion Mexicana de Sistemas y Cibernetica [no. 19]
AFSCET: Association Francaise des Sciences et Technologies de l'information et des Systemes [no. 11]
ANZSYS: Australian and New Zealand Systems Group [no. 33]
BCSSS: Bertalanffy Center for the Study of Systems Science [no. 41]
BSSR: Bulgarian Society for Systems Reseach [no. 30]
BS-LAB: Business Systems Laboratory [no. 48]
CHAOS: Centre for Hyperincursion and Anticipation in Ordered Systems [no. 28]
HID: Croatian Interdisciplinary Society [no. 44]
GfK: Deutsche Gesellschaft fuer Kybernetik [no. 34]
GWS: Gesellschaft für Wirtschafts- und Sozialkybernetik [no. 12]
GIFT: Global Institute of Flexible Systems Management [no. 32]
Greek Systems Society [no. 14]
GIROS. Groupe d'Intervention et de Recherche en Organisation des Systèmes[no. 50]
HPSSS: Hai Phong Systems Science Society [no. 53]
Heinz von Förster Gesellschaft [no. 42]
HSSS: Ελληνική Εταρεία Συστημικών Μελετών (Hellenic Society f. Systemic Studies) [no. 36]
ISCE: Institute for the Study of Coherence and Emergence [no. 51]
IAS: Instituto Andino de Sistemas [no. 26]
INCOSE: International Council on Systems Engineering [no. 46]
IIGG: International Institute Galileo Galilei [no. 45]
IIIS: International Institute of Informatics and Systemics: IIIS [no. 39]
ISSS: International Society for the Systems Sciences [no. 3]
ISKSS: International Society of Knowledge and Systems Science [no. 35]
RC51: International Sociological Association , ISA-RC51 on Sociocybernetics [no. 40]
ISI: International Systems Institute [no. 4]
JASESS: Japan Association for Social and Economic Systems Studies [no. 31]
MSSI: Management Science Society of Ireland [no. 29]
META PHORUM: Metaphorum Group [no. 47]
OSGK: Oesterreichische Studiengesellschaft für Kybernetik [no. 1]
Pentagram Research Centre Private Limited [no. 43]
SDSR: Slovenian Society for Systems Research [no. 25]
SESGE: Sociedad Espanola de Sistemas Generales [no. 13]
S&O: Systèmes & Organisations ASBL
SGN: Systeemgroep Nederland [no. 2]
SESC: Systems Engineering Society of China [no. 21]
CYBSOC: The Cybernetics Society [no. 9]
KSSSR: The Korean Society for Systems Science Research [no. 22]
The Learned Society of Praxiology [no. 16]
WCSA: World Complexity Science Academy [no. 49]

The aim of the Seventeenth IFSR Conversation in 2014, held in St. Magdalena, Linz, Austria in April 2014, was to continue the tradition of Conversation that had been established in 1980, stressing face-to-face discussions on the chosen topics. The overarching theme for the conversation was how to reposition systems thinking in a changing world both with respect to scientific research and practical applications, in view of historical roots and the precarious situation of our environment.

The dialogue of the six teams focused primarily on the future directions of the systems sciences and the capacity for systems approaches from different perspectives (philosophy, research, engineering, cybernetics, communication, as well as the physical and social sciences) can address complex problems.

- 'Quality Control' of Model Development for Successful Systems Intervention
- Thrivable Systems - from Vision to Reality
- New Directions in Cybernetics
- Future Directions of the Banathy Conversation Methodology
- Philosophical Foundations for the Modern Systems Movement
- Systems Research

The Conversation was able to build on previous and ongoing work within the member organizations of the IFSR. The outcome of this Conversation, while at a high conceptual level, also supports and encourages further practical applications through individual member activities.

The Conversations essentially followed the successful scheme used in earlier Fuschl Conversations as devised by Bela H. Banathy in 1981. In 2014, 40 renowned systems scientists and systems practitioners from twelve countries took part in this five-day cooperative effort. The outcome of the conversation is summarized in six team reports plus other contributed papers. A short description of the IFSR's activities completes the proceedings.

Johannes Kepler University Linz, Austria
gerhard.chroust@jku.at

ISBN 978-3-902457-41-7