

Strategic Foresight and Innovation

Toward the integration of visual languages for systemic design

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Toward the Integration of Visual Languages for Systemic Design

Peter Jones, PhD OCAD University, Toronto Jeremy Bowes OCADU Systemic thinking is better expressed in design languages than system formalisms.

Understanding of complex systems is enhanced for a wider variety of stakeholders.

Visual design languages offer significant potential for social & service systems design.

Generative bias as opposed to descriptive science



design is changing ...

Design thinking is extending beyond design outcomes, but is falling short of systems methods & toolkits. Design approaches differ from systems in many respects:

- Successive approximations toward emerging goals
- Continuous interpretation by multiple perspectives
- Action-oriented, making artifacts & prototypes
- Visual representations, from sketching to blueprints

However we still lack good theory & practices of systemic design.

... an opportunity for COMPLEXITY NAVIGATION

Design thinking also deals with complexity.

Design must become more systemic - as we are confronted with wicked problems.

Highly complex domains need new methods

Design 1.0 Craft design, Advertisin

Design 2.0 Industrial, Products, Web

Design 3.0 Organizational systems

Design 4.0 Social systems Mixed stakeholders





don't we have good visual models in systems?

- Warfield Influence maps / directed graphs
- Gharajedaghi Context diagrams
- Checkland Soft Systems / Rich Pictures
- Boardman Systemigrams
- System Dynamics Causal loop diagrams
- Robt Horn Infographics

Recently?

To understand *actual* systemic phenomena in complex systems?

To better communicate knowledge of systemic patterns affecting social & ecological outcomes?

To better organize sociotechnical systems?

Why not *innovation*, or to design significantly better systems for complex ?

Systems & Cybernetics grew from scientific disciplines. Creative fields were not taken seriously.

Systems theorists *redefined design* in *Design Science* terms.

Simon	Design Science (Sciences of Artificial) Comprehensive Design Science		
Fuller			
Warfield	Generic Design Science	(ISM)	
Christakis	Dialogic Design Science	(SDD)	

By reframing design, cybernetics assumed it captured relevant processes.

Times change. Design has caught up to systems thinking.

WHICH FIT WHERE IN SYSTEMS LINEAGE?



Based on R. Horn, 2004, Adapted with permission.

"Though a handful design thinkers have made some substantial contributions to systems thinking in general, hardly anybody has developed a **systems practice from within design**, specially informed by design thinking and design practice. This is remarkable when we compare us with other fields where proprietary adaptations of systems perspectives are normal."

> Birger Sevaldson, Oslo School Of Architecture & Design Giga-Mapping: Visualisation For Complexity & Systems Thinking In Design Nordic Design Research Conference 2011

.. the new approach to SOCIAL SYSTEMS DESIGN

Service systems *are* social systems, as are:

Social innovations Sustainable business models Network organizations Communities of practice New learning institutions Transparent markets New (sustainable) economies Emerging political structures

EXAMPLES

Design Thinking in HEALTHCARE SERVICES

..as services become MORE COMPLEX

ACUTE

CARDIO

NEURO

GIM

HOSPITAL

ED

Atrial Fibrillation Care (visualized)

Many health services treat chronic & complex illness as exceptions. Patients fall between the cracks & are shuttled around, getting fragmented care. By not adapting to the changing reality of the chronic demographic, costs rise as hospitals increase their exception cases.

DISCONNECTED

COMMUNITY

PHARMA

CCAC

OTHER SPECIALIST CLINICS THROM

CLINIC

E CUNI

HOME/

HOM

OTHER

INSTITUTIONS

Morra, et al (2010). Reconnecting the pieces to optimize care in Atrial Fibrillation in Ontario.

HUMAN-CENTERED SERVICE DESIGN is insufficient



DESIGN ATTEMPTS at VISUALIZATION are insufficient



Morra, et al (2010). Reconnecting the pieces to optimize care in Atrial Fibrillation in Ontario.

DESCRIPTIVE SYSTEMS METHODS And DESIGNERLY PRACTICES

the use of Interactive Sketching



unpacking the problem aspects



highlighting connections for visualization





Visualization of **PATTERNS** and **timelines**



making sense through visualization & critiques



Visual Language of Flow & Feedback

medicine.



exploring Causal Loops as a Visual Language



Diagram of Practicing Physicians in Ontario

Josina Vink, Jessica Mills, Phouphet Sihavong Social Systems project, Strategic Foresight & Innovation, OCAD U

The average age of family physicians in Ontario is 52 years old. 9.8% of family physicians in Ontario practice in rural communities, where as 13% of Ontarians live in rural communities. One third of physicians in Canada practice family medicine, but to meet the need, it should be closer to one half of all physicians.

Uncovering root causes and Influence Mapping



Healthy Healthcare

Oksana Kachur, Jonathan Resnick, Karl Schroeder, Social Systems project, Strategic Foresight & Innovation, OCAD U

What are the most significant issues affecting the quality of healthcare in Ontario? The outcome of this Interpretive Structural Modelling session was the influence map shown.

Influence Mapping and points of intervention



the **GIGAMAP** as a visual synthesis



Mitigating the Spread of Infectious Disease in Toronto

Slavica Ceperkovic, Kirk Clyne, Peg Lahn, Heidi McCulloch



PLONES: SPIN 6804 - 2012 - PROJECT 2: KOMORE + KEAD + SHEWCHUK



Design Languages for Systems Methods

Democratic Looper of

Implications for **PEDAGOGY**

Learning systems principles in a design context

Course in OCADU Strategic Foresight & Innovation MDes:

Understanding Systems & Systemic Design

Originally 2 courses: 6 modules, 2 projects

- Systems concepts
- Natural systems
- Social systems & service systems
- Social systems & design methods
- Structured dialogic design

Rheinfrank, J. and Evenson, S. From Winograd, Terry. 1996. *Bringing design to software*. New York: Addison-Wesley.

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- Structured dialogic design
- Social / service system design project
- Gharajedaghi & Meadows texts Iterative system mapping Small team map & analysis Gigamapping Global problematique
- + Depth readings Ostrom, Hollings Rittel, Buchanan Beer, Spohrer, Warfield Christakis, Ozbekhan

Build on a base of design thinking.

Visual language integrated throughout, required with every project. Builds base for systemic design for foresight-led innovation.





Thanks.

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