An introduction to systems thinking and tools for systems thinking

- it’s a way of collaboratively talking about and designing real-world solutions

Will Allen & Margaret Kilvington
Content guide

1. Introduction: Why decision-makers are moving towards a systems thinking approach to better deal with complex situations in health, environment, education, etc.
2. Basics of systems thinking
3. Systemic design – linking systems thinking and design
4. Introduction to range of tools/methods that support systems thinking and systemic design in practice
5. Nurturing & supporting systems thinking in your practice

1. Why the growing interest in a systems thinking approach
We are all systems thinkers

• We all grew up exploring our natural and social worlds and asking questions born of curiosity. We can look at problems, see beyond the obvious, and explore otherwise hard to see connections.

• But in many school and workplace settings today knowing the “right answers” is often rewarded over systems-based inquiry and creativity.

• Yet in today’s more crowded, and rapidly changing, world there are fewer instances where all that is needed is a “right answer” – rather there are more perspectives, interconnections and interdependencies to consider!

Hence the growing interest in learning to strengthen systems thinking practices, and manage organisational cultures that encourage its use in both problem structuring and solution design.
Systems thinking enables us to:

- **Change our thinking** to match the interconnected, dynamic complexity of our communities and their environments
- **Communicate with others** to create new ways of thinking and seeing - and develop shared understanding
- **Change our behaviour** to work with the complex forces in the system (instead of against them) to realize our vision
- **Identify and test** a wider variety of **possible actions and solution pathways**
- **Become more aware** of the potential for unintended consequences of our actions
- Harness **social learning** processes to help us develop a shared understanding and take action collectively
- **Expand the choices available to us** and identify those choices where we can **develop significant leverage**
Of course - not all systems are the same!

There are different kinds of systems
- Simple / complicated
- Complex and adaptive

We need to understand them, and use different management styles for each
A typology of problem situations

- Simple problems
  - Close to Agreement
  - Close to Certainty

- Complicated “difficult” problems
  - Far from Agreement
  - Close to Certainty

- Complex “wicked” problems
  - Far from Agreement
  - Far from Certainty

Modified from work by Ralph D. Stacey and Dave Snowden
Difficult problems are characteristically smaller-scale and well-defined.
Wicked (or complex) problems are characteristically bigger and poorly-defined.
International agencies and public sector organisations are moving towards systems thinking .....
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... to deal with complex or ‘wicked’ problems which

• go beyond range of any one organization to manage them

• are often characterised by disagreement about causes, and how to tackle them

• recognise the need to change behaviour or practice at multiple levels and scales (individuals to organizations)

• require innovative solutions that can be adapted in the light of experience and feedback
Different systems require different management

Managing a complicated system

- Develop explicit plans
- Plan then act
- Look for agreement & clear outcome
- Limit types of approaches & actions
- Set targets
- Drive implementation

Managing a complex adaptive system

- Look for divergence
- Act, learn, and plan at the same time
- Use minimum specifications
- Work on multiple leverage points
- Be creative with opportunities at the boundaries
- Build on what emerges and grows

From: Complicated or complex – knowing the difference is important
2. Basics of systems thinking
Key systems thinking components

- World views
- Multiple Perspectives
- Knowledge systems

- Interconnections
- Relationships
- Patterns
- Feedback

- Communities
- Boundaries
- Systems within systems
- Scope
- Issues

- Blocks
- Influences
- Leverage points
- Drivers
Multiple Perspectives

• Who or what are the key stakeholders in this situation?
• What stakes (individual values and motivations) do they have?
• What are the different ways in which the situation can be framed or understood – by whom?
• How do these different framings affect the way in which stakeholders act – when things go their way/when things don’t go their way?
Interconnections

• How do the elements within the situation (components, stakeholders, knowledge, etc.) interconnect?
• What is the nature of the relationships between them (e.g. strong/weak, fast/slow, collaborative, direct, indirect, etc.)?
• What patterns emerge from these relationships in action - with what consequences, and for whom?
Boundaries

• Define scope and scale (and from what/whose perspective is this developed.)
• Are other boundaries possible – and feasible?
• Agree on how to structure the problem situation
• Discuss what constitutes an improvement – and how this might be different for different stakeholders?
Influences

• What drives the systems in question in particular directions
• Identify .... drivers, trends, enablers, blocks, leverage points
• Leverage points are seen as key points with which to intervene in complex systems
The iceberg model is a systems thinking tool designed to help an individual or group discover the patterns of behaviour, supporting structures, and mental models that underlie a particular event.

Some questions to help unpack the system

- What is the fastest way to react to this event NOW?
- What trends and/or patterns are occurring?
- What mental/organizational structures create the patterns?
- What are the stated/unstated visions that generate this structure?
Donella Meadows’ 12 leverage points: places to intervene in a system

- Numbers
- Buffers
- Stock and flow structures
- Delays
- Balancing feedback loops
- Reinforcing feedback loops
- Information flows
- Rules
- Self-organization
- Goals
- Paradigms
- Transcending Paradigms

From: Leverage points – places to intervene in a system by Donella Meadows
3. Systemic design – linking systems thinking and design
Linking systems thinking and design

Systemic design - integrating the mindsets and toolsets of systems thinking and design thinking to encourage learning and innovative systems change

For more information: Systemic design
Systemic design

These frameworks link together to support collaborative decision-making. For example key functions in a typical adaptive management/policy setting process may include:

• [Systems thinking] Involving participants in understanding issue and wider context (recognizing different perspectives/problem structuring, potential leverage points)

• [Design thinking] Jointly develop action plans (identify activities, outcomes, and assumptions) and M&E plans

• [Reflective thinking] Learn and refine (adaptive management)
Tools/methods for systems thinking and systemic design can be grouped by function

- Understanding the system
- Co-designing solutions
- Monitor, reflect and adapt
- Dialogue and collaboration

The first three functions essentially can be seen as linked elements in an iterative and experiential learning cycle – in a systems approach each is best carried out using tools that support dialogue and collaboration among the stakeholder groups involved.
Tools/methods for systemic design
- supporting an experiential learning cycle

Understanding the system
- Influences
- Boundaries
- Interrelationship

Dialogue & collaboration
- Managing conflict
- Multiple perspectives
- Recognising different knowledge systems and cultures

Co-design solutions
- Leverage points
- Action plans
- Short term and long term goals

Implementation by organizations, other key stakeholders

Assess and adapt
- Choose indicators
- Monitor
- Assess progress
- Refine
4. Tools and methods for systems thinking and systems design

There are so many!
“All tools are wrong. Some tools are useful.”

“Over the years, I’ve found that starting with methods, whether causal loop diagrams or Soft Systems Methodology or Social Network Analysis, often confuses or exasperates novices ….

… furthermore, no single method will equip them with the power of the systems field.”

~ Bob Williams

https://thesystemsthinker.com/%EF%BB%BFall-methods-are-wrong-some-methods-are-useful/
Important to see how sets of tools/methods fit in the bigger process in which they are used.
1. Tools for understanding the system

- Understanding the system
  - Influences
  - Boundaries
  - Interrelationship

- Dialogue & collaboration
  - Managing conflict
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  - Recognising different knowledge systems and cultures

- Co-design solutions
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- Implementation by organizations, other key stakeholders

- Assess and adapt
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  - Refine
  - Assess progress
1. Understanding the system - tools for seeing things

- Timelines
- Trend analysis
- System archetypes
- Rich pictures
- Cynefin framework/Stacey diagram
- Concept mapping
- Social network analysis
- Causal loop diagrams
- Bayesian belief networks
- Computer models
- etc

For more information: Systems methods and tools
Understanding the system - tools for thinking strategically

- CATWOE
- Iceberg model
- System archetypes
- Soft Systems Methodology (SSM)
- Scenarios and visioning
- Problem structuring methods
- SWOT/TOWS analysis
- STEEP (PEST, PESTLE, STEP, etc.)
- etc

For more information: Strategy tools and approaches
2. Tools for dialogue and collaboration

Understanding the system
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- Boundaries
- Interrelationship

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Implementation by organizations, other key stakeholders

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Assess and adapt
Dialogue & collaboration – tools for involving the right people include:

- Stakeholder analysis
- Engagement planning
- Networking
- Relationship building & management

Not just who you could get to come at the time
Source: http://weird-vintage.com

For more information: Stakeholder mapping and analysis
Dialogue & collaboration – tools for working together

Use multiple methods and always have a plan. Tools include:

• Facilitation
• Kitchen workshops and meetings
• Informal conversations
• Networks
• Social media
• Active listening, appreciative inquiry ...

Don’t travel the same road every time

Source: www.pexels.com
3. Tools for co-designing solutions

- Understanding the system
  - Influences
  - Boundaries
  - Interrelationship

- Dialogue & collaboration
  - Managing conflict
  - Multiple perspectives
  - Recognising different knowledge systems and cultures

- Co-design solutions
  - Short term and long term goals
  - Leverage points
  - Action plans

- Implementation by organizations, other key stakeholders

- Assess and adapt
  - Choose indicators
  - Assess progress
  - Monitor

- Refine

3
Tools for co-design – finding desirable solutions

Usually both a product and a process. Approaches include:

• Agile planning (scrum & sprints) .... as opposed to waterfalls

• The five stages of Design Thinking (Empathise, Define – the problem, Ideate, Prototype, and Test)

• Along with a whole host of methods .... problem structuring methods (PSMs), conceptual models, scenario development, (participatory) system dynamic modelling and simulation, etc.
Tools for co-design – outcomes modelling
[Theory of Change (ToC) and logic models]

Situation analysis → Inputs, activities & outputs → Outcomes

Vision

For more information: Theory of Change and logic models
... can account for acknowledgement that people and organisations need to change first.
... and helps develop monitoring and evaluation plans along with activity plans

For more information: Planning, monitoring & evaluation – closing the loop
4. Tools/methods for assessing progress

Understanding the system
- Influences
- Boundaries
- Interrelationship

Dialogue & collaboration
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- Multiple perspectives
- Recognising different knowledge systems and cultures

Co-design solutions
- Leverage points
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Assess and adapt
- Assess progress
- Choose indicators
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Implementation by organizations, other key stakeholders
Tools for assessing and adapting include:

• Theory of change and accompanying logic models

• Complexity-aware monitoring (outcomes mapping, MSC, etc.)

• Using rubrics to assess complex tasks and behaviours (intermediate outcomes)

• Facilitating reflective practice (After Action Reviews – AARs and Strategic Learning Debriefs)

For more information: Planning, monitoring & evaluation – closing the loop
5. Embedding systems thinking in practice
It is important to create a learning organisation where:

• people continually expand their capacity to create the results they truly desire

• new and expansive patterns of thinking are nurtured

• collective aspiration is set free … and

• people are continually learning to see the whole together.

~ Peter Senge 1990 – The Fifth Discipline
Common challenges that often have to be faced include

• The perception that learning (collaboration and dialog) takes too long
• Too few people with the skillsets and resources required to follow through
• Exploring one’s personality and goals in a group can sometimes seem threatening and daunting
• A lack of safe spaces for groups to work in this different way
• A lack of formal commitment to the process from organisational leadership
Senge: the five core disciplines required for a successful learning organization

- Systems Thinking
- Personal Mastery
- Mental Models
- Building Shared Vision
- Team Learning

Image source: Peter Senge Systems Thinking
Learning for Sustainability

The Learning for Sustainability (Lfs) site began in 1998, and has been operating under its current name since 2006! It provides a reference guide to on-line resources for those working to support social learning and constructive action. The material referenced here can be used, or adapted for use, in any number of fields.

It operates as a portal – highlighting the wide range of social skills and processes that are needed to support constructive learning-based collaboration. The site has just been redeveloped to improve both content and structure. Occasional updates are sent out to the more than 1700 site subscribers as new resources and pages are added. If you are not already on the list feel free to join up here.

Subscribe to Lfs update

... recently updated topics

- **Systems thinking**. A set of annotated links that provide an introduction to systems thinking and how to manage and facilitate it.
- **Systemic design**. Links systems and design thinking to bring social-centred design to complex, multi-stakeholder service systems.
- **Systems thinking tools**. Links to sites providing toolkits and tools to support systems thinking.
- **Complexity-aware PM&E**. Links to approaches that can aid in tracking a fuller range of outcomes, causal factors, and pathways.

The site brings a wide range of annotated on-line resources from different sectors and geographic areas together in one easy to access place. It is largely sourced through material developed in the sustainable development, natural resource management, public health and agricultural sectors. The textboxes below highlight other recently updated posts and topics.

For more information visit: http://learningforsustainability.net
For more information

- Dr Margaret Kilvington – margaret.kilvington@gmail.com
  - Independent Social Research, Evaluation & Facilitation

- Dr Will Allen – willallennz@gmail.com
  - Will Allen & Associates / Learning for Sustainability

- Annotated links to a wide range of related on-line material can be found via the Learning for Sustainability clearinghouse - https://learningforsustainability.net/