Applied Systems Thinking in Practice (ASTiP) Group
The Open University

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Requisite literacy for systems thinking in practice

Systems Thinking Practitioners' Conference 2025

4 September

Martin Reynolds
(Visiting Honorary Fellow)
Systems Thinking in Practice (STiP) Programme
Applied Systems Thinking in Practice (ASTiP) Group
School of Engineering and Innovation, STEM Faculty

The Open University

ASTiP backdrop …

1. 16 years exclusive Postgraduate systems thinking education at OU
   - building on prior Undergraduate Diploma Systems Practice
   - (2009- present) Postgraduate Qualifications in Systems thinking in practice (STiP)

2. Professionalisation of systems thinking in practice
   - (2013-2020) x3 action research (eSTEeM) projects with alumni from systems thinking in practice programme at OU
   - Working with SCiO in contributing to (2020) approval of systems thinking practitioner apprenticeship (STPA)

3. Developing PG OU STPA
   - (2023-2025) portfolio module Evidencing STiP (TBXY874) Model of reasoning for developing STiP capabilities …based on structural coupling between systemic sensibilities and systems thinking literacy Martin and Ray
   - (2024-2025) work-based module Co-designing interventions with STiP (TBXY873)… Rupesh and Magnus

4. (2025-2027) Commissioned editing on *Guide to Key Theories for Systems Thinking* (Edward Elgar Publishers)… Martin, Rupesh, Houda and Samuel

Presentation overview …

Towards a requisite systems literacy for supporting systems thinking in practice

1. **Tensions** in actioning systems literacy
2. Capability matters…
3. Reasoning matters…
4. Robustness matters…
5. Activity model of requisite systems literacy

Tensions & traps in actioning systems literacy

Capabilities

1. Enchantment of *measurable* outcomes: extrinsically-ascribed attributes ('competency frameworks' and Standards)
2. …or (less measurable) experiential intrinsically-driven aptitudes (risk of 'unprofessional')

Reasoning

3. Methodological (commodity) *fetishism*: excessive interest with established theoretical constructs, and constitutive rules of systems approaches
4. …and/or space for more flexible abductive storylines of reasoning (risk of 'relativism')

Robustness

5. Dependent on narrow (science informed) *rigour*: exclusive dependence on guarantors of reliability
6. …and/or space for having further co-guarantors of resonance (interdisciplinarity) and relevance (transdisciplinarity) (risk of using flaky concepts of interrelationships, perspectives, boundaries (IPB) outside of theoretical reasoning

Capability matters…

Capabilities (rather than ‘competencies’) are…

1. Personal *aptitudes* (rather than attributes) enhancing an individual’s intrinsic ability to make appropriate choices in specific circumstances.
2. Developing capability is an ongoing practice of enabling a purposeful practitioner the *freedom to choose* (emancipation) pathways of action that may be different from pre-determined (purposive) systems of action associated with the situation at hand.
3. Such expressions of capability may involve emancipation from others' (extrinsic) definitions of competence if they choose it to be the right thing to do under the circumstances.
4. Capabilities are, by definition, *less easy to frame* (and/or measure). They relate to personal learned experiences of applying tools in different circumstances and being able to adapt and adjust to the situation by nurturing a wider variety of choices available.

Capability matters…(towards reasoning)

How can a capable systems thinking practitioner (STP) **maintain 'discipline'** whilst performing interdisciplinarity and transdisciplinary support?

Clue (a definition of systems thinking):

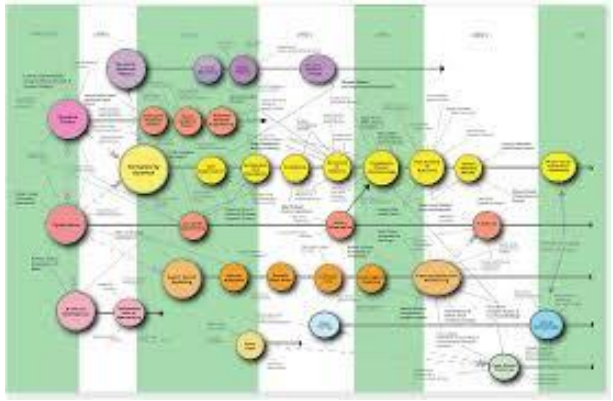
> "…ability **to reason** about […] phenomena in terms of systems characteristics* [systems literacy] to create a coherent understanding of […] phenomena" (Gilissen et al., 2020)

Amartya Sen: "development should enhance people's ability to lead the lives they value and have *reason* to value" (capabilities approach)

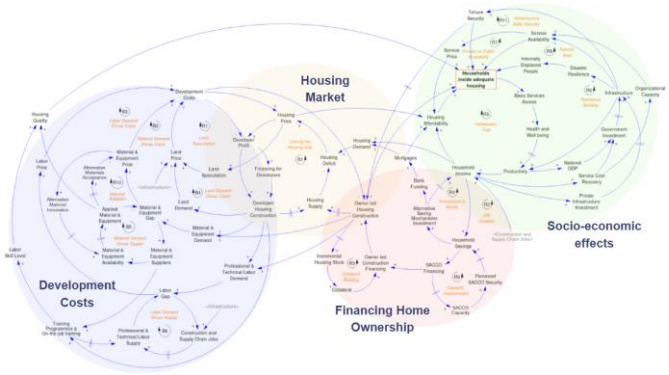
*Possible 'flaky' seven characteristics listed: - boundary/ components/ interactions/ input-output/ feedback/ dynamics/ hierarchy

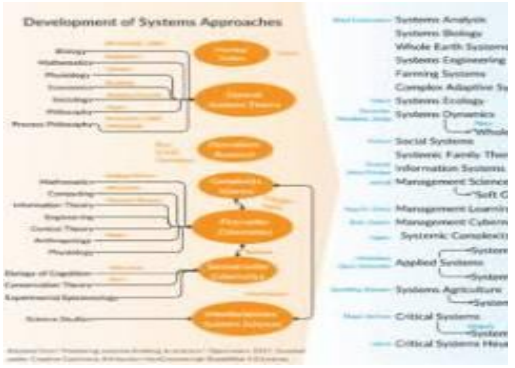
Reasoning matters…

What are the disciplinary foundations of systems thinking – **the theoretical lineages** – that might enhance 'trust' in provision of interdisciplinary and transdisciplinary support?



Theoretical Lineages?

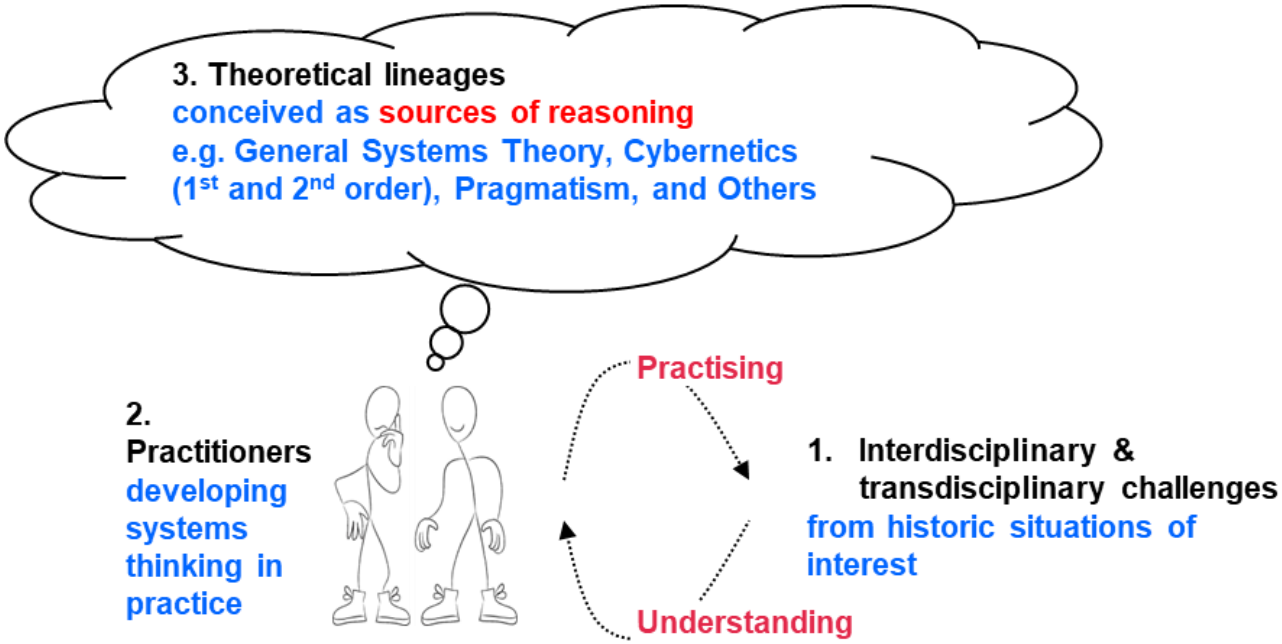




Theoretical lineages provide repository for a ***systems literacy*** – the basis of systems reasoning

Reasoning matters…

1. Draws on the lingua franca and theoretical lineages of a discipline/ profession



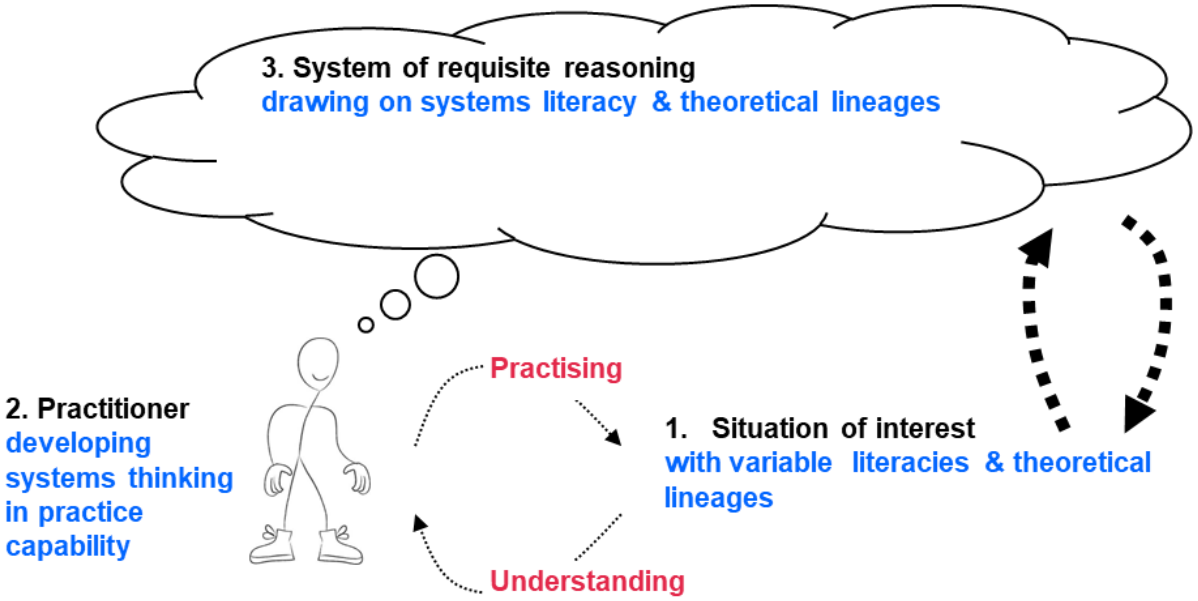
Derivation of theoretical lineages (mental model -1)

2. …providing a repository for a ***systems literacy*** – the basis of systems reasoning

Reasoning matters…

Requisite *reasoning* provides the means of coupling the complex externalities of a situation of interest with a system of interest to improve the situation

1. Requisite variety (Ashby, 1958; cybernetics tradition) A system needs enough internal variety to handle the variety it encounters in its environment.



Situated requisite reasoning for developing STiP capability (mental model -2)

2. Appropriate **structural coupling** between *system* of reasoning and *situation* of interest being 'reasoned' (…in order to create value)

Reasoning matters…towards robustness

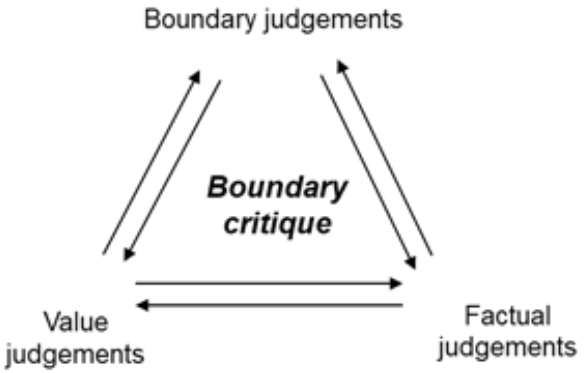
Requisite *reasoning* provides the means of coupling the complex externalities of a situation of interest with a system of interest to improve the situation

Internal variety secured by **threshold concepts**:

(i) understanding inter-relationships (uIR)
(ii) engaging multiple perspectives (emP)
(iii) reflecting on boundary judgements (rBJ)

Based on theoretical tradition of **boundary critique** involving the systemic interplay between factual judgements and value judgements, through boundary judgements (Ulrich, 1996; Reynolds, 2011; Ulrich and Reynolds, 2020).

Founded on theoretical pragmatism (Peirce, James, Dewey, Chuchman) and critical social theory (Habermas, Foucault)



Robustness matters…

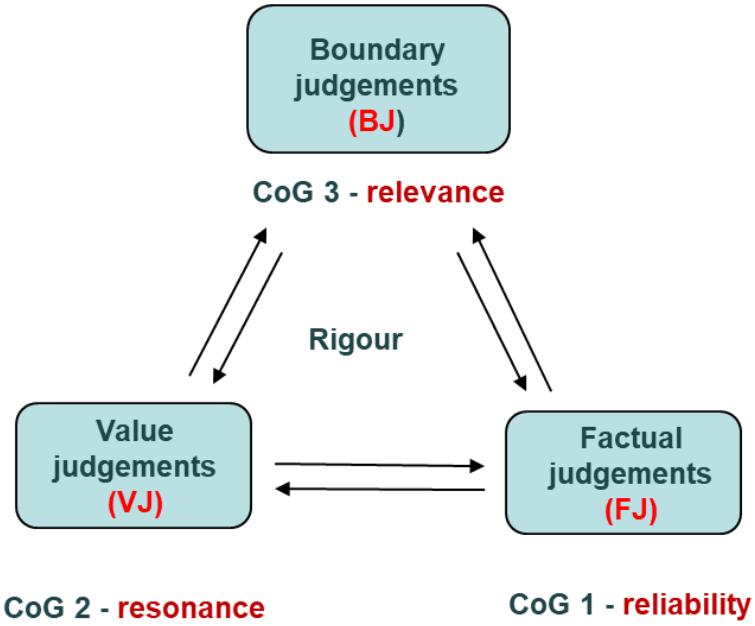
Threshold concepts – understanding inter-relationships (uIR), engaging multiple perspectives (eMP), and reflecting on boundary judgments (rBJ) provide a means for **abductive reasoning** based on pragmatism of boundary critique

Practising **systemic *rigour***:* triangulating between co-guarantors of:

1. reliability (based on disciplinary science-based judgements of reality/fact), with further co-guarantors of

2. resonance (interdisciplinary value judgements) and

3. relevance (transdisciplinary boundary judgements)

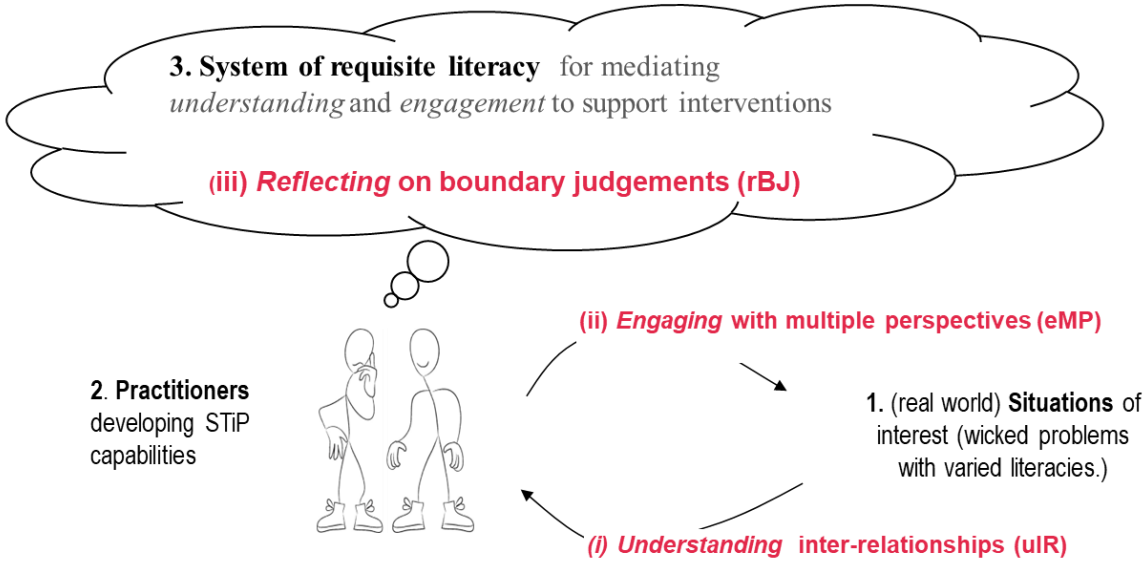


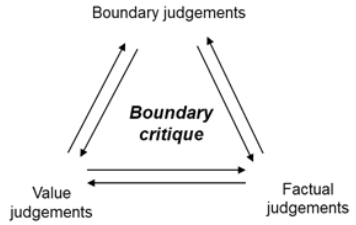
Co-guarantor attributes (CoGs) of rigour

*Reynolds, M (2015). Rigour (-mortis) in evaluation

Robustness matters…

Internal variety secured by threshold concepts – uIR, eMP, rBJ - working through levels of **conversation**





Situated reasoning with bricolage and 3 threshold concepts of 'conversation'

Reynolds, M. (2014). Triple-loop learning and conversing with reality. *Kybernetes*, 43(9/10) pp. 1381–1391

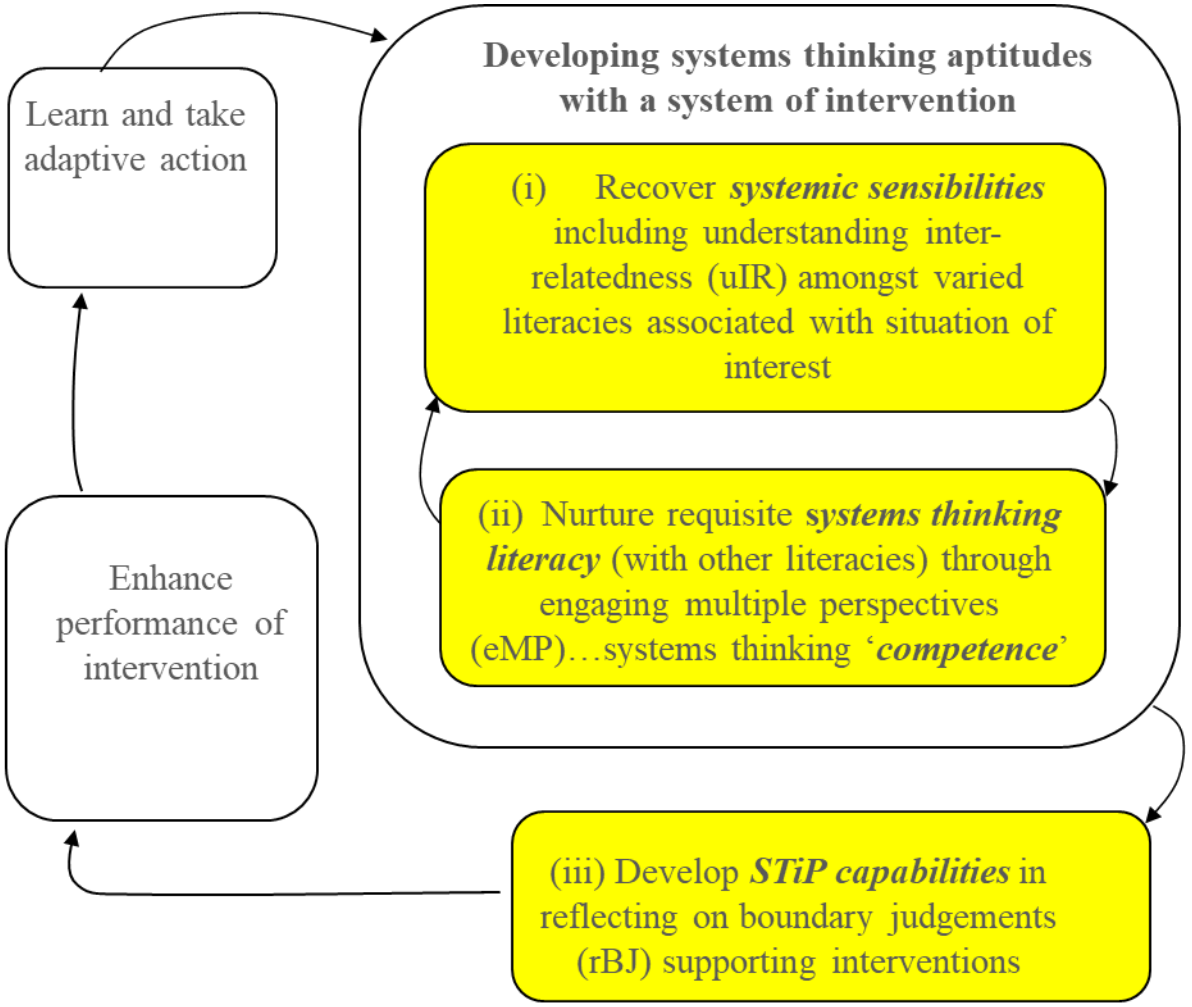
x3 levels of conversation for demonstrating response-ability through **bricolage**

(i) Conversing with intervention (understanding inter-relationships)
(ii) Conversing with practitioners amongst and about the intervention (engaging perspectives)
(iii) Conversing with and iterating on interventions (reflecting on boundary judgements)

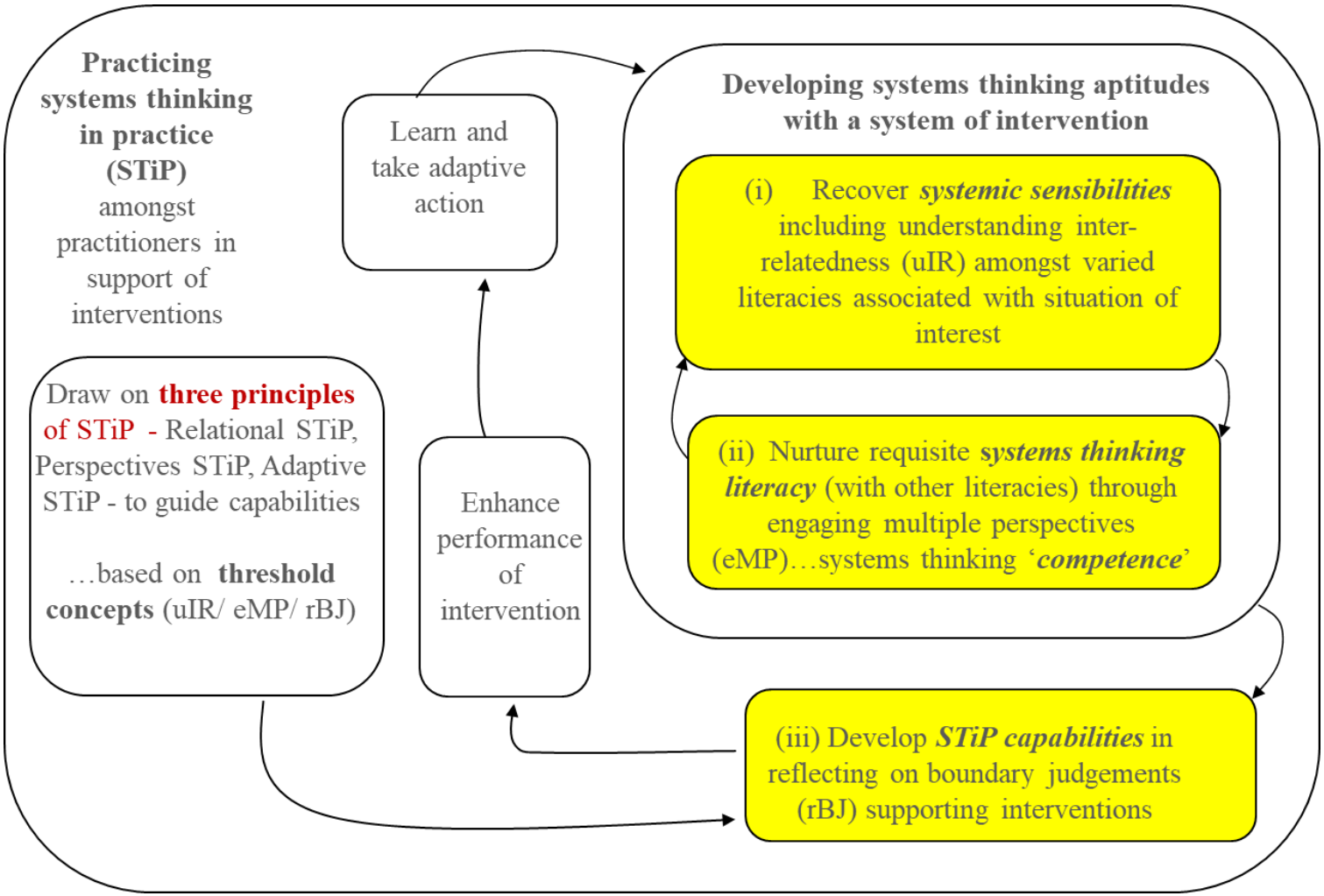
Actioning requisite systems literacy…

Activity model as a 'theory of change' for enabling requisite reasoning with requisite systems literacy

…through **Bricolage**



Actioning requisite systems literacy…



…with **Three principles** of systems thinking in practice informing methodological approach of **bricolage**

Principles

(Generic) Methodical principle: systems thinking involves structural coupling between being systematic and being systemic

(Generic) Operating principle: systems thinking in practice invites two *complementary* devices for thinking about systems

Two operating *devices* for thinking about 'systems'

1. **'Existential systems' - Ontological** device: *systems* as **1st order** real world entities	2. **'Constructivist systems' - Epistemological** device: *systems* as **2nd order** learning device
'the' health system 'the' legal system 'the' education system	an evaluation an intervention a theory of change
e.g. purposive analysis of 'the' social system	*e.g. purposeful social systems design*

Reynolds, M (2024). **Systems Thinking Principles for Making Change.** *Systems*, 12(10), article no. 437.

Three principles of (applied) STiP
(philosophical pragmatism tradition)

…based on three threshold concepts each with two operating principles

i. **Relational STiP**: (disciplinary) conversation between practitioner and real-world situations of interest through collating and making 'factual' judgements (reflective 1st order inquiry on interrelationships, and reflexive 2nd order inquiry on own role within relationships ;

ii. **Perspective STiP**: (interdisciplinary) conversation amongst practitioners about reality using and cultivating value judgements (knowing – systematically - how the 1st order world works, and knowing – systemically - how to work the world with 2nd order inquiry) ;

iii. **Adaptive STiP**: (transdisciplinary) conversation about changing nature of 1st order reality and need for 2nd order requisite change in systems through curating changing boundary judgements.

Summary…

1. Greatest challenge in developing **STiP capabilities** is not so much recovering systemic sensibilities (systemic endeavours) but **nurturing a requisite systems thinking literacy** that can 'speak to' systemic sensibilities of different professional domains (systematic endeavours) as part of interdisciplinary/ transdisciplinary support
2. Requisite systems literacy is based on **abductive reasoning** (cf. philosophical pragmatism) - an explanation being 'good enough' to secure improvement for situated context – drawing on threshold concepts mediated through an intervention approach of **bricolage** involving metaphors of conversation and storylines, supported with appropriate robustness provided by **co-guarantor attributes** (CoGs) of rigour

3. Professionalisation of STiP is a significant achievement, though requiring alertness to systems thinking practitioner as '**trustful companion**' rather than 'honest broker'
4. Three principles of ASTiP each with two operating principles

   i. **Relational STiP**: ((disciplinary) conversation (reflective 1st order inquiry, and reflexive 2nd order inquiry;
   ii. **Perspective STiP**: (interdisciplinary) conversation about knowing – systematically - how the 1st order world works, and knowing – systemically - how to work the world with 2nd order inquiry;
   iii. **Adaptive STiP**: (transdisciplinary) conversation about changing 1st order reality and governance design for 2nd order requisite change in systems

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Relevant author publications…

- Reynolds, M. (2024). **Systems Thinking Principles for Making Change.** *Systems*, 12(10), article no. 437.
- Reynolds, M. (2024). **Navigating our 'zone of interest' in evaluative practice.** *Evaluative Practice (Members Journal of UK Evaluation Society)*, 02 pp. 11–15
- Reynolds, M. (2023). **Professionalising Systems Thinking in Practice: what's not to celebrate?** In: *Journal of the International Society for the Systems Sciences | 67th Meeting of the International Society for the Systems Sciences* (Wilby, J. M. ed.), 67
- . Schmidt-Abbey, Barbara; Reynolds, Martin and Ison, Ray (2020). **Towards Systemic Evaluation in Turbulent Times – Second-order practice shift.** *Evaluation*, 26(2) pp. 205–226
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- Reynolds, M and Shah, R. (2018). **Researching capability development: developing systems thinking in practice capabilities.** In: *Symposium on Governing Complexity: developing appropriate praxis with citizens and organisations*, 12 Jun 2018, Milton Keynes, The Open University.
- Reynolds, Martin; Sarriott, Eric; Swanson, Robert Chad and Rusoja, Evan (2018). **Navigating systems ideas for health practice: towards a common learning device.** *Journal of Evaluation in Clinical Practice*, 24(3) pp. 619–628.
- Reynolds, M. and Wilding, H. (2017). **Boundary critique: an approach for framing methodological design.** In: de Savigny, Don; Blanchet, Karl and Adam, Taghreed eds. *Applied Systems Thinking For Health Systems Research: A Methodological Handbook.* Maidenhead: Open University Press, pp. 38–56
- Shah, R & Reynlds, M (2017). ***Developing professional recognition of systems thinking in practice: an interim report.*** The Open University
- Reynolds, M. (2016). **Towards Praxis in Systems Thinking.** In: Frank, Moti; Shaked, Haim and Koral-Kordova, Sigal eds. *Systems Thinking: Foundation, Uses and Challenges.* New York: Nova Science Publishers, pp. 3–33.
- Reynolds, M. (2015). **Rigour (-mortis) in evaluation**. *Evaluation Connections: The European Evaluation Society Newsletter*, June 2015, Special Edition, pp.2-4.
- Reynolds, M. (2014).**Triple-loop learning and conversing with reality.** *Kybernetes*, 43(9/10) pp. 1381–1391

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