Teaching sustainability through systems thinking:
Connecting Planetary and Human Health

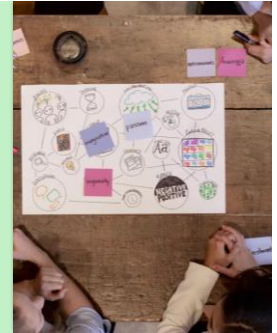Colin Sage

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GrACE
Green Europe:
Active Citizenship
and the Environment

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Structure

- Teaching sustainability: toward a critical pedagogy
- Collaborative learning
- Planetary stewardship
- SDGs as aid to systems thinking?
- Systems thinking: some conceptual tools
- Systems mapping: methods
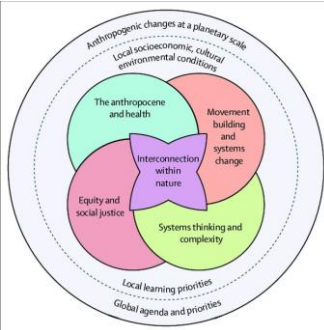- Breakout rooms: using Loopy

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Teaching sustainability

- Teaching *about* sustainability? Or teaching sustainability?
- A critical pedagogy for sustainability characterised by learning processes that are:
  - Relational, transdisciplinary, multi-perspectival, realistic & contextual, modest yet responsible, holistic & systemic; and which
  - Foster self-reflection, personal development, responsibility, enhance life skills, encourage societal critique & understanding of scales (from the local to the planetary)
- Head – Heart – Hands approach: integrating minds and bodies into learning design. Heart long disregarded; key to empathy with nature
- Moving from a Cartesian instrumental view of teaching *about* component parts ⇨ a relational, process-driven, co-evolutionary, dynamic & *systemic* approach

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Learning sustainability

- Learning is a social process: Collaborative & co-operative classrooms; a sense of conviviality; where teachers become facilitators creating a context for learning not a single point of intellectual authority
- Focus on problem-solving: It is particularly useful for complex problems because it helps learners develop the skills to navigate uncertainty and seek answers rather than a singular solution
- Learners are encouraged to create connections across different disciplines, sectors & concepts
- Unbounded and messy: learning embraces complexity, chaos, and creativity; a process of sense-making, without an obvious endpoint or a single correct answer.
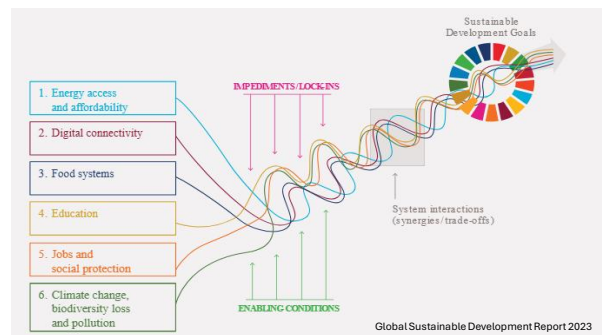- Kinaesthetic learning: interacting with the environment

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Environmental management to planetary stewardship

- Principles of environmental management: Precaution; Duty of Care, Subsidiarity, Transparency, Procedural equity, Polluter Pays
- Polycrisis: Pandemic, Putin, POTUS, Populist Politics, Planetary Perturbation
- Risk Society unknowns: micro-plastics, PFAS chemicals, air quality, obesity
- An era of uncertainty, volatility, unpredictability; vital importance of adaptation, resilience, diversification, redundancy, preparedness
- Embracing complexity; encouraging questions; willingness to accept ambiguity; limits to understanding; WWDKWDK
- Accepting a duty of planetary stewardship with humility rather than performing environmental managerialism with arrogance.
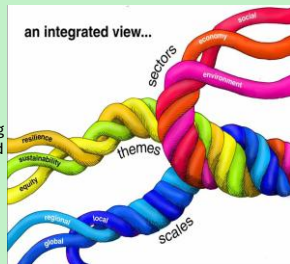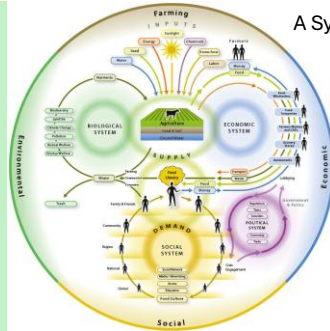
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Systems thinking

- A system is a set of components in dynamic interaction that deliver a set of functions
- Analyses complex systems across domains, scales & themes enabling holistic / integrative, & disentangled / individual examination
- Enables identification of cascading effects, feedback loops & other systemic features
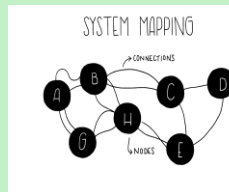- Resists reductionist & linear approaches (solutionism)

an integrated view...
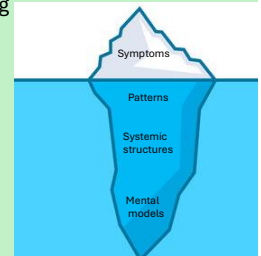
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A System of Systems

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Systems mapping

- To better understand how a system works it is 'mapped', enabling better visualization of connections in systems
- Helps people see their own role within the system; also enables a shared understanding of different perspectives
- Helps to identify possible points of intervention & actions that may change the way the system functions to produce better outcomes
- A systems approach reveals relationships with components in interrelated systems, like energy, water, health and the environment.
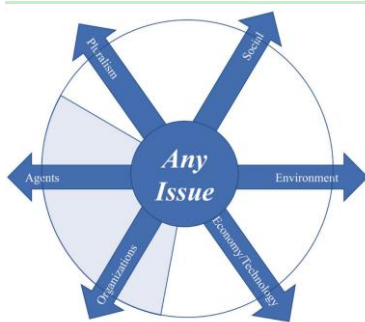

SYSTEM MAPPING

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Iceberg model for systems thinking

- Symptoms / Events: what's happening?
- Patterns & trends: what trends are there over time?
- Systems structures & drivers: how are the parts related? What influences the patterns?
- Mental models: what values, assumptions, beliefs shape the system?
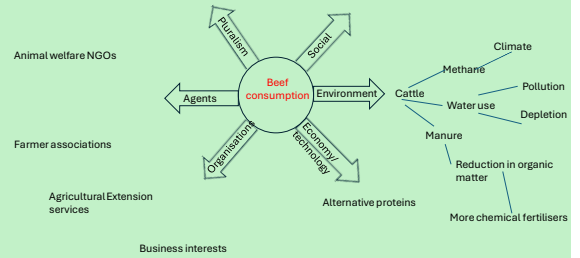

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Key concepts in systems thinking

- Parts working together for a purpose
- Interconnectedness: elements, actors
- Dynamic & evolving
- Definitional boundaries
- Analysis (of parts) ⇨ Synthesis (whole)
- Emergence: synergies of components
- Feedback loops: reinforcing, balancing
- Stakeholders & participatory methods
- Identifying points of intervention
- Redundancy: spare capacity in system

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Systems thinking: scalar issues

- **Meta** / global scale: climate, land use change, freshwater (stocks, flows), biogeochemical cycles, biodiversity
  - Economics & politics of global trade
- **Meso** scale: EU policies (rules, incentives); National governments: economic growth
  - Society: national characteristics, demographic & cultural change
- **Micro** scale: region, city, district: place-specific characteristics & issues
  - Schools: Creating opportunities to make a difference in classroom & wider networks

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EPOSEA template

Environment: ecological issues.

Pluralism: different perspectives.

Organisations: legal and political decision-making structures.

Social: social justice issues.

Economy/ technology: financial issues.

Agents: individuals / groups that are making decisions.

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A modest & thoroughly incomplete example

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