

Systems Thinking: teaching resources

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Overview

For many subject areas, systems thinking (holistically engaging students in exploring complex problems) is not a new topic and you can adapt and enhance existing methods and tools (life cycle assessment, supply chain analysis, for example) to develop students sustainability competencies by ensuring students can explore the interrelationships between social, economic, and environmental factors.

For subject areas new to systems thinking the following resources are a selection of tools and approaches that you can use in your learning and teaching.

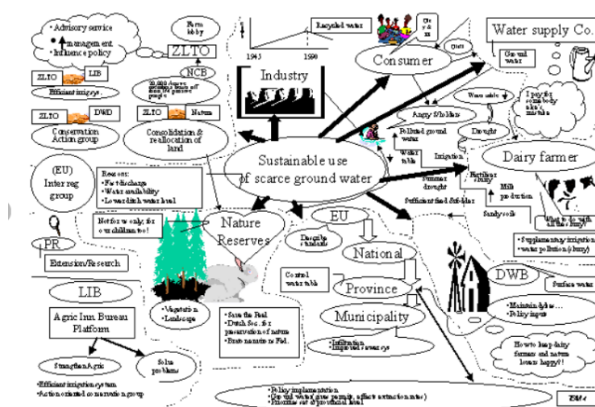
If you have any resources that you use in your teaching that you think will be support student system thinking competency development and will be accessible to other subject areas please contact cie@liverpool.ac.uk

Key systems thinking components

Learning activities and tools that enable students to explore:

- Multiple perspectives: world views, voices, knowledge systems.
- Interconnections: relationships, feedback, patterns.
- Influences: blocks, leverage points, drivers.
- Boundaries: communities, systems within systems, scope, issues.

Creative and experiential systems thinking tools



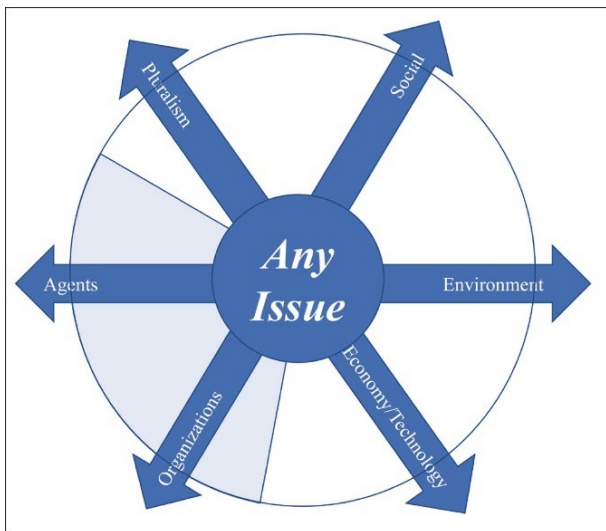
Taken from: [A conceptual map of land conflict management: Organizing the parts of two puzzles](#)

[Rich pictures](#) - purpose of rich pictures is to gather in one place, on one sheet of paper, all the data about a complex messy situation that you have collected. Using pictures or drawings is helpful in being able to collect it all together on one piece of paper, so that you can see everything together.



[Digital or other story telling](#) - storytelling is a powerful tool for learning: humans are hardwired to make sense of their lives and their surroundings through stories. In educational contexts, the storyteller engages more deeply with the subject.

Simple analytical systems thinking tools

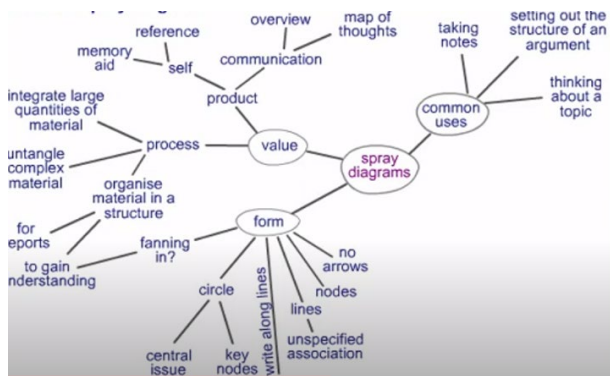


[EPOSA](#) (environmental, pluralism, organisation, social, economy/ technology, agents) is a simple paper-based graphic template designed to enable students to structure and explore their understanding of a complex issue.

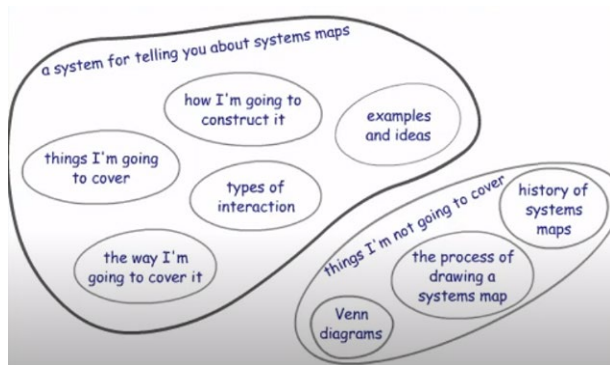
(See Appendix 1: template EPOSA diagram plus example that you can print off to use with your students)

Other analytical systems thinking tools

[Diagrams in systems thinking](#) - practical 'how to' resources from the OU on a range of systems thinking tools:

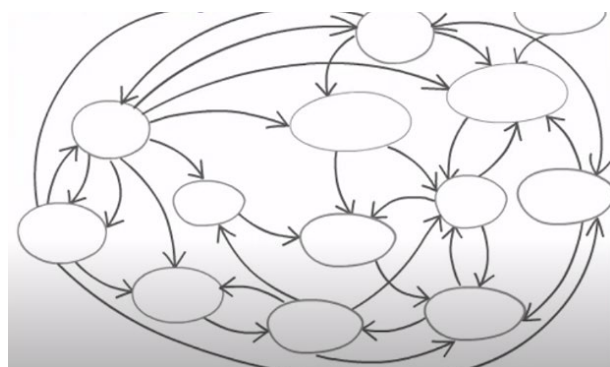


[Spray diagrams](#) - simple, fast technique for extracting the important ideas from a situation, conversation, presentation or written article and getting them down on paper in a way that is meaningful to you.



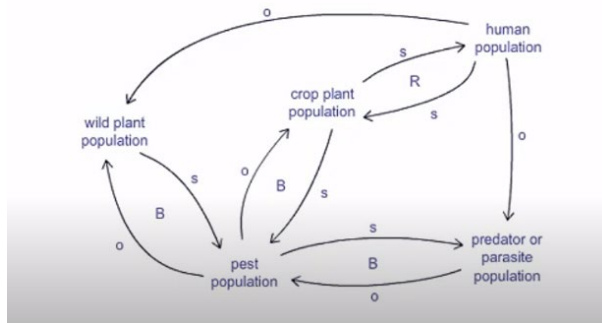
[Systems maps](#) - shows components of the system and environment from the perspective of the person drawing the map. It is possible to depict a different perspective of the same situation by placing the boundary at different points on the same systems map.

The main uses of systems maps are to help you to begin to decide how you are going to structure a situation and to communicate to others the system you have chosen to study.



[Influence diagrams](#) - is a straightforward development from a systems map that explores the influences between the components that you have included on the map. It therefore represents how the components both of the system and its environment interact, and

shows the important relationships that exist among them. It presents an overview of areas of activity, or organisational and other groupings, and their main interrelationships.



[Causal loop diagrams](#) - are used to graphically depict dynamic interrelationships among variables you may not have considered before. They allow you to see how parts of a system that are separated by location or time might nonetheless interact to generate problems.

Additional resources

[An introduction to systems thinking and systems design – concepts and tools](#) – includes examples of tools you can use for systems thinking not mentioned in this document (e.g. concept mapping, timelines, social network analysis etc.) plus other tools for strategic thinking, collaboration, co-designing solutions etc. (Learning for Sustainability).

[The Theory Underlying Concept Maps and How to Construct and Use Them](#)

[Concept Mapping: Benefits and Challenges in Higher Education](#)

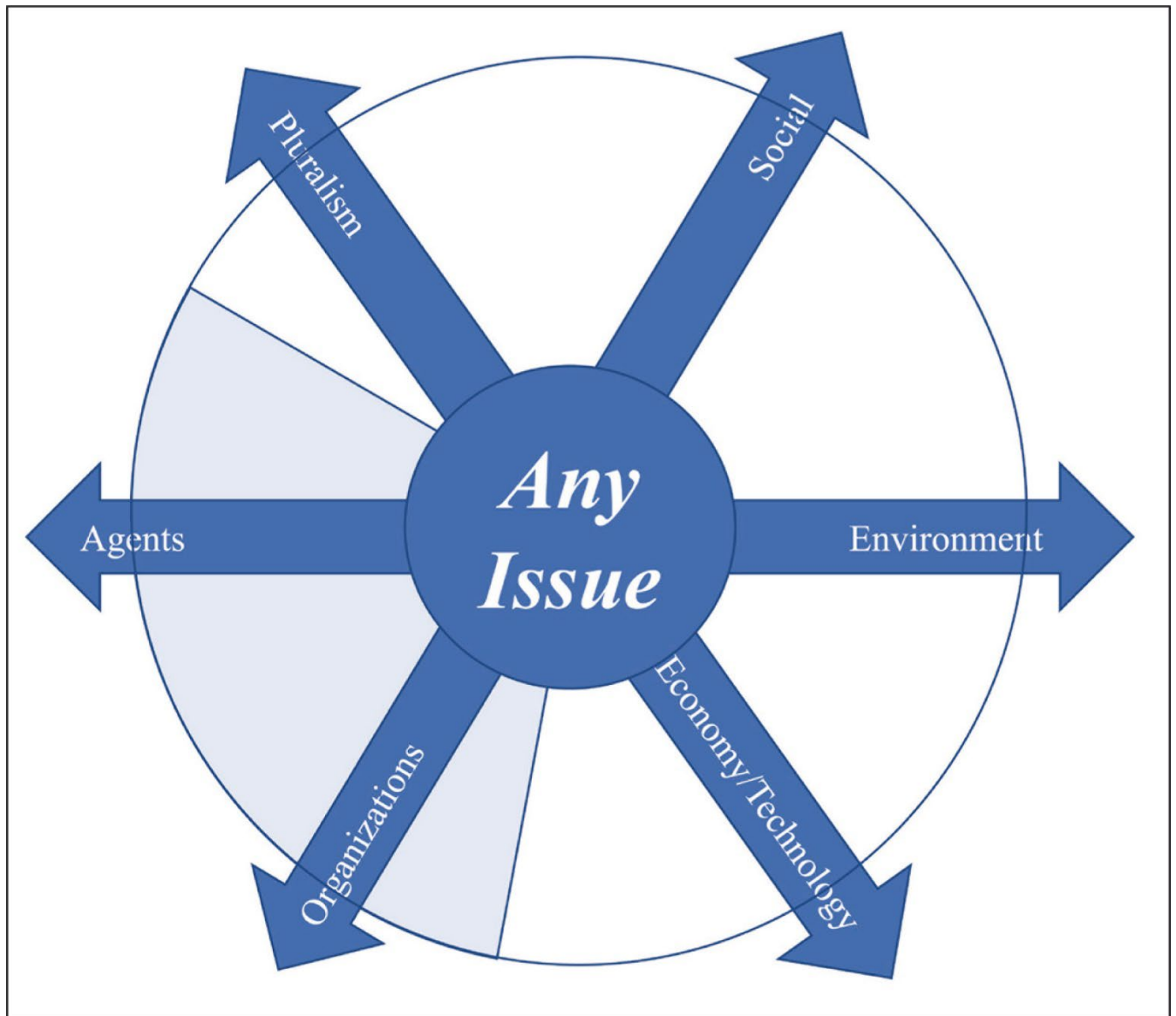


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Appendix 1:

EPOSEA template and instructions for students:



Key

Environment: ecological issues.

Pluralism: different perspectives.

Organisations: legal and political decision-making structures.

Social: social justice issues.

Economy/ technology: financial issues.

Agents: individuals (groups & you!) that are making decisions.

How to use this tool

1. Use the provided template or draw the six axes of the diagram on a large sheet of paper.
2. Select a sustainable development issue you want to work on.
3. 'Brainstorm' by adding key words to the six dimensions.
4. Make connections as you add key words.
5. Then, go back and think critically about your key words:
6. Identify any gaps in the map.
7. Make connecting lines between key words.
8. Add notes to capture any cause-effect between the different key words.
9. Check data you have on each area, and identify further learning that is needed.

An example of a completed EPOSA diagram

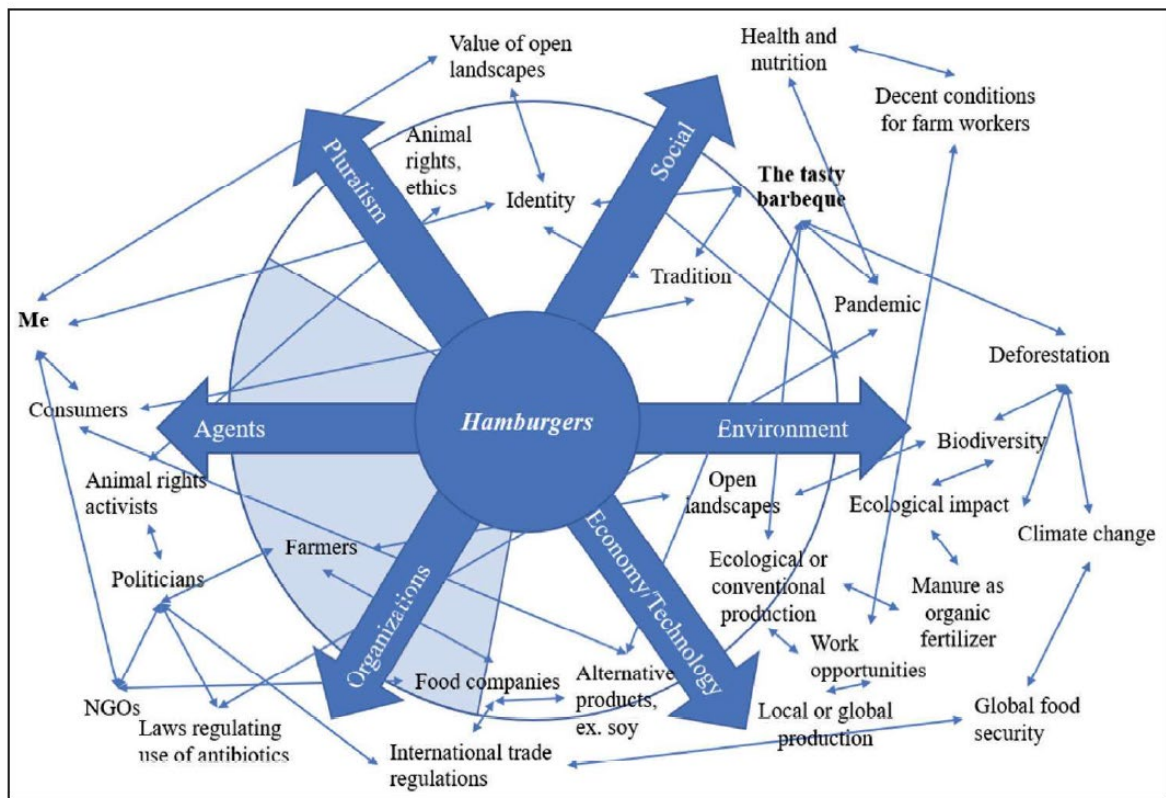


Figure 2 EPOSEA map for a Hamburger Sustainability Story, Far from Complete

Uhrqvist, O., Carlsson, L., Kall, A.-S., & Asplund, T. (2021). Sustainability Stories to Encounter Competences for Sustainability. *Journal of Education for Sustainable Development*, 15(1), 146–160. <https://doi.org/10.1177/09734082211005041>