

A close-up photograph of a mossy surface with several thin, upright stems bearing small, dark, pointed buds. The background is dark and out of focus. The text 'Misión ZERO' is overlaid in a white, stylized font.

Misión
ZERO

How Do (STEM) Students Navigate Uncertainty in Complex Living Wicked Problems?



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Tame vs. Wicked Problems

Tame problems

- **Definable**
- **Separable**
- **Findable solutions**

VS.

Wicked problems

- **Ill-defined**
- **Essentially unique**
- **No ultimate solution**

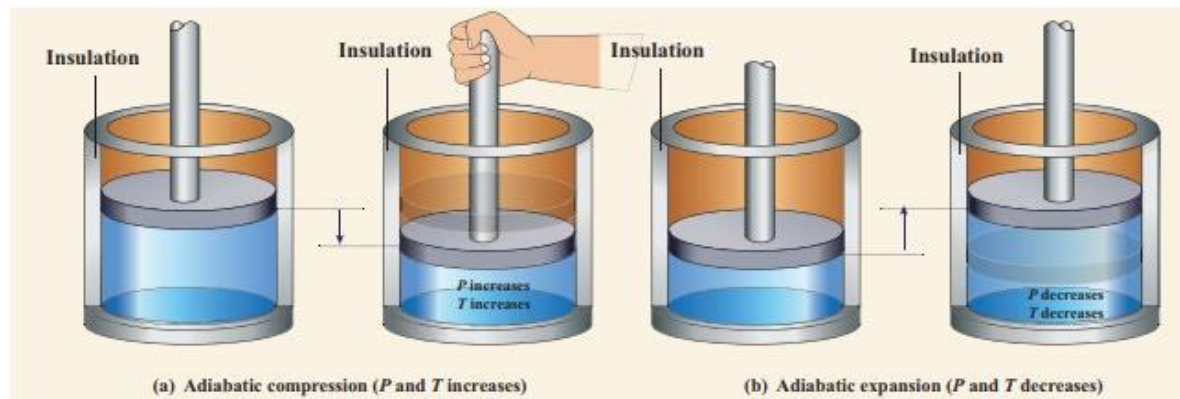


Figure 8.28 Adiabatic compression and expansion

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Tame vs. Wicked Problems

Tame problems

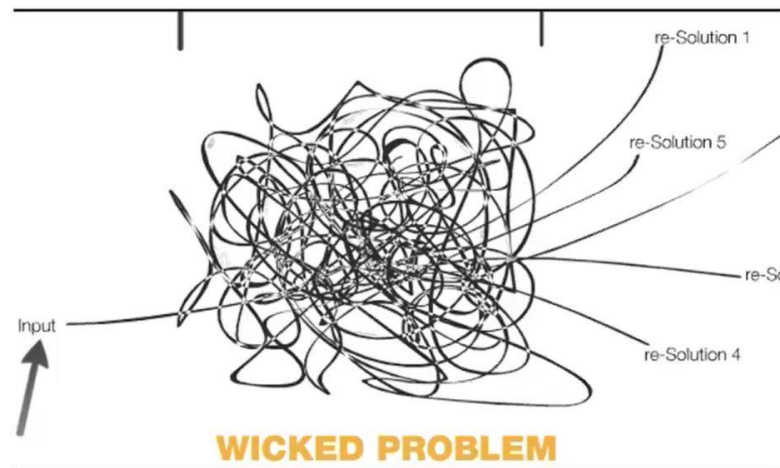
- **Definable**
- **Separable**
- **Findable solutions**



vs.

Wicked problems

- **Ill-defined**
- **No ultimate solution**
- **Complex and uncertain**



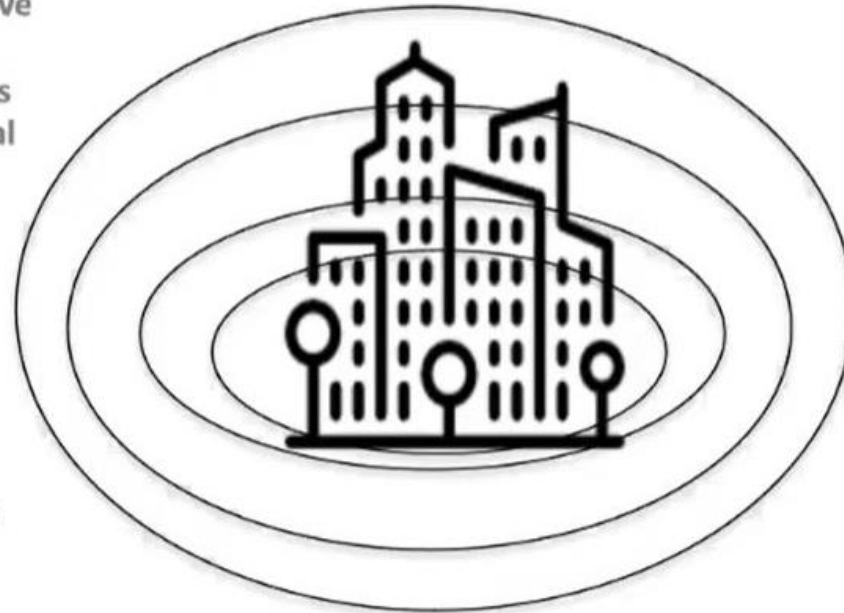
Complex Adaptive Systems

Multi-level interdependencies

- Administrative levels
- Spatial scales
- Technological systems

Multiple grand challenges

- Energy transition
- Climate change
 - Adaptation
 - Mitigation
- Digitization
- Population growth
- ...



Fragmented decision-making power

- Problem of 'many hands'
- Absence of central director
- Absence of implementation mechanisms
- Split incentives
- Tragedy of the commons

Technological uncertainty

- Alternative technologies
- Uncertain costs and benefits
- Path dependency and lock-ins
- Human and institutional behaviour influence technological opportunities and uncertainties

Attuning solutions to local challenges and opportunities

- Learning by doing
- Innovation, experimentation entrepreneurship

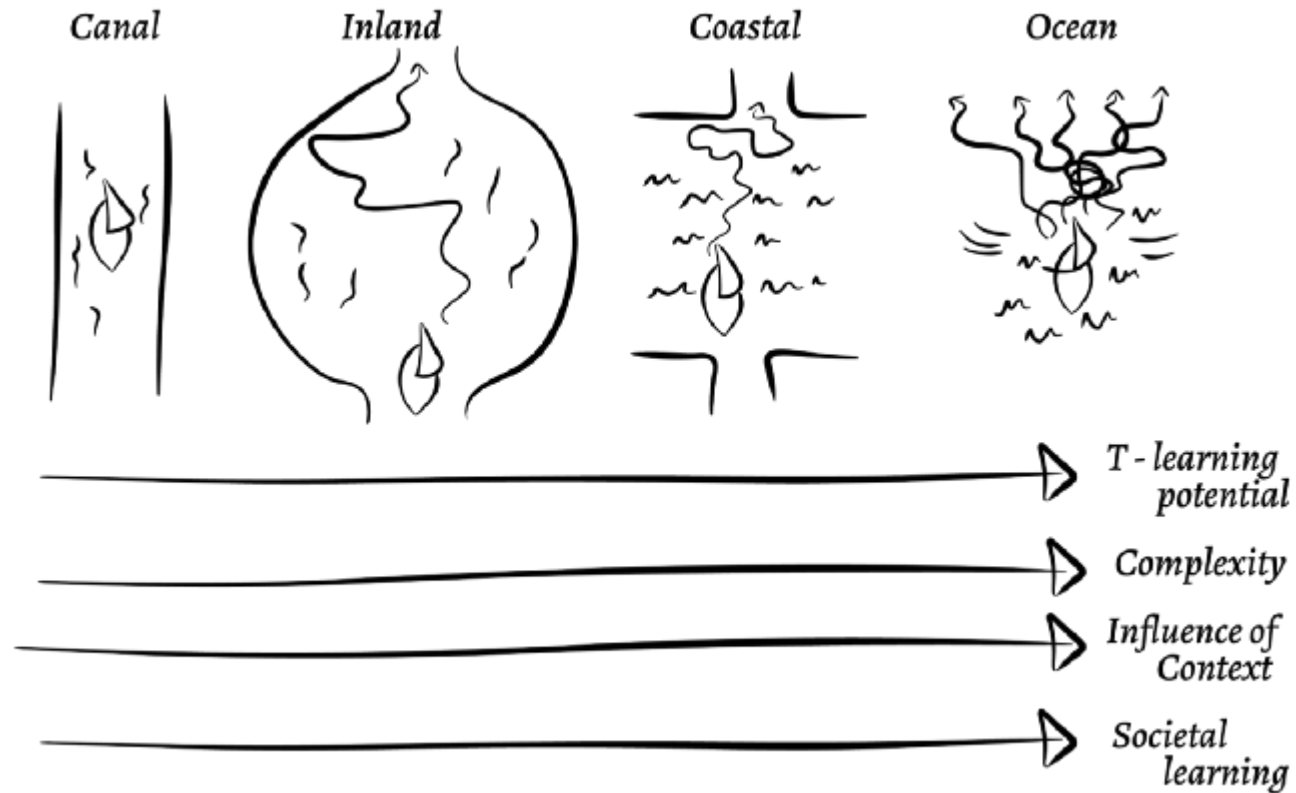
Higher Education as a Catalyst



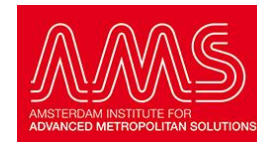
Integration of

- 1) external transitions
- 2) internal transformation

Sailing the Seas of Complexity



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21st-Century Skills

Foundational Literacies

How students apply core skills to everyday tasks



1. Literacy



2. Numeracy



3. Scientific literacy



4. ICT literacy



5. Financial literacy



6. Cultural and civic literacy

Competencies

How students approach complex challenges



7. Critical thinking/
problem-solving



8. Creativity



9. Communication



10. Collaboration

Character Qualities

How students approach their changing environment



11. Curiosity



12. Initiative



13. Persistence/
grit



14. Adaptability

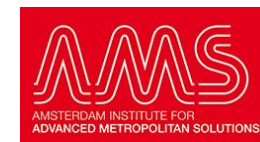


15. Leadership



16. Social and cultural
awareness

Lifelong Learning



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