Developing Systems Thinkers: Strategies for Effective Instructional Design

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VIRGINIA TECH

Learning Objectives

After engaging in this session, participants will be able to:

(1) describe approaches to instructional design for systems thinking

(2) identify strategies for supporting systems thinking effectively in their own instructional context

Grounded design

Simultaneous alignment of foundations of learning environment
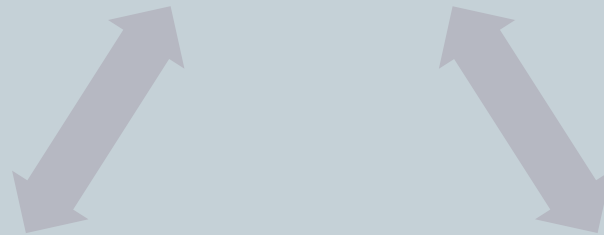
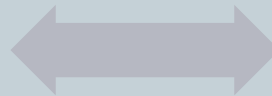Psychological | Pedagogical | Technological | Pragmatic | Cultural

Jonassen, D., & Land, S. (Eds.). (2012). *Theoretical Foundations of Learning Environments*. Routledge.

Backward Design

Identify Desired Results

Determine Acceptable Evidence

Plan Learning Experiences

Wiggins, G. P., & McTighe, J. (2005). *Understanding by design*. Alexandria, VA: Association for Supervision and Curriculum Development.

Facets of Learning Outcomes

Transfer
- What complex tasks will learners be able to independently use their learning to do?

Meaning
- What overarching conceptual understanding do I want learners to perceive?

Knowledge
- What factual knowledge will learners need to make meaning of this concept?

Skills
- What discrete skills will learners need to be able to accomplish the complex tasks?

Wiggins, G. P., & McTighe, J. (2011). *The Understanding by Design guide to creating high-quality units*. Association for Supervision and Curriculum Development.

What is a system?

An interconnected set of elements that is coherently organized in a way that achieves something.

- Donella Meadows

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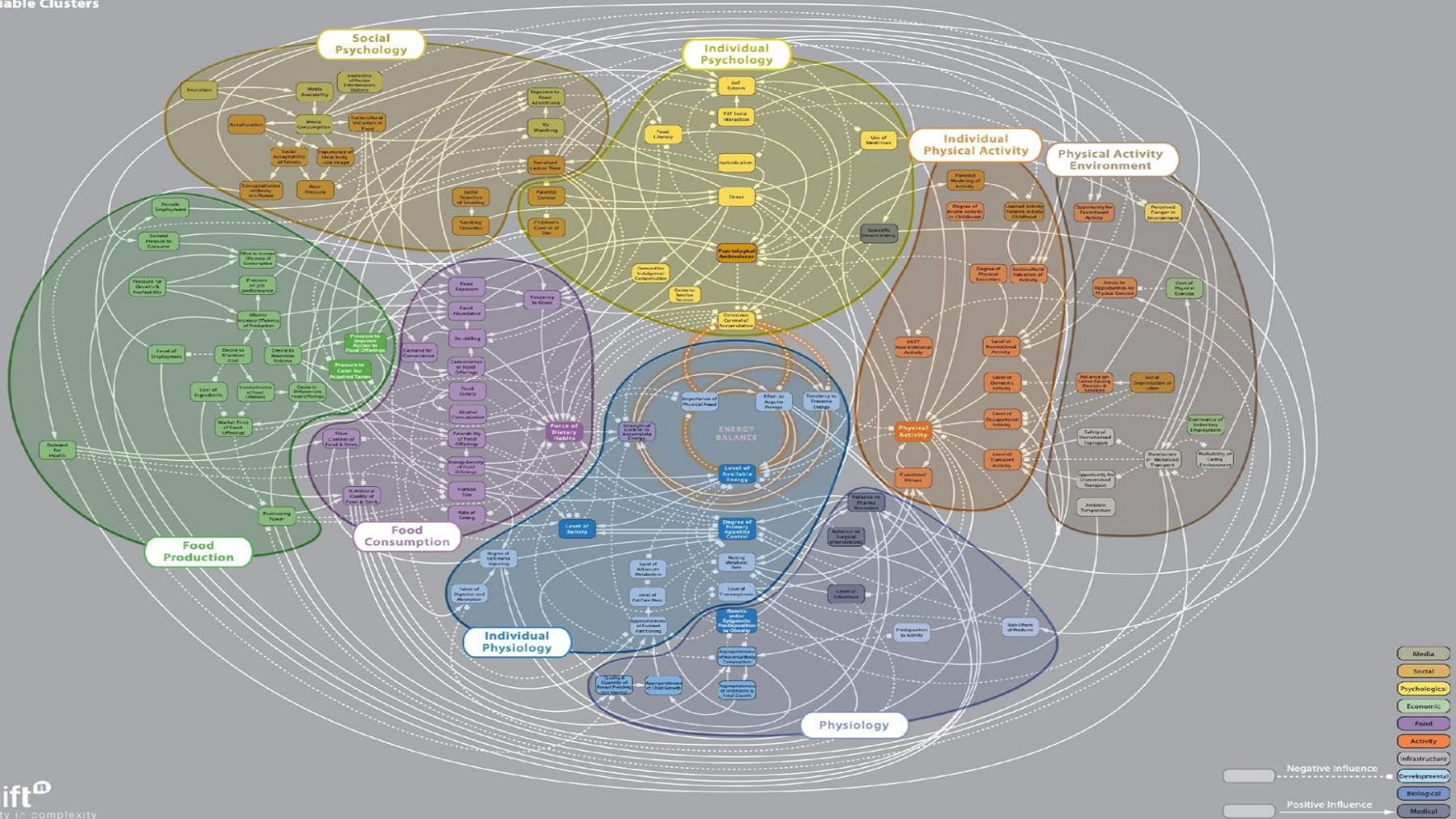
What is systems thinking?

*A set of **habits of mind** that can lead to mental models of complex systems that are closer to the "real" world*
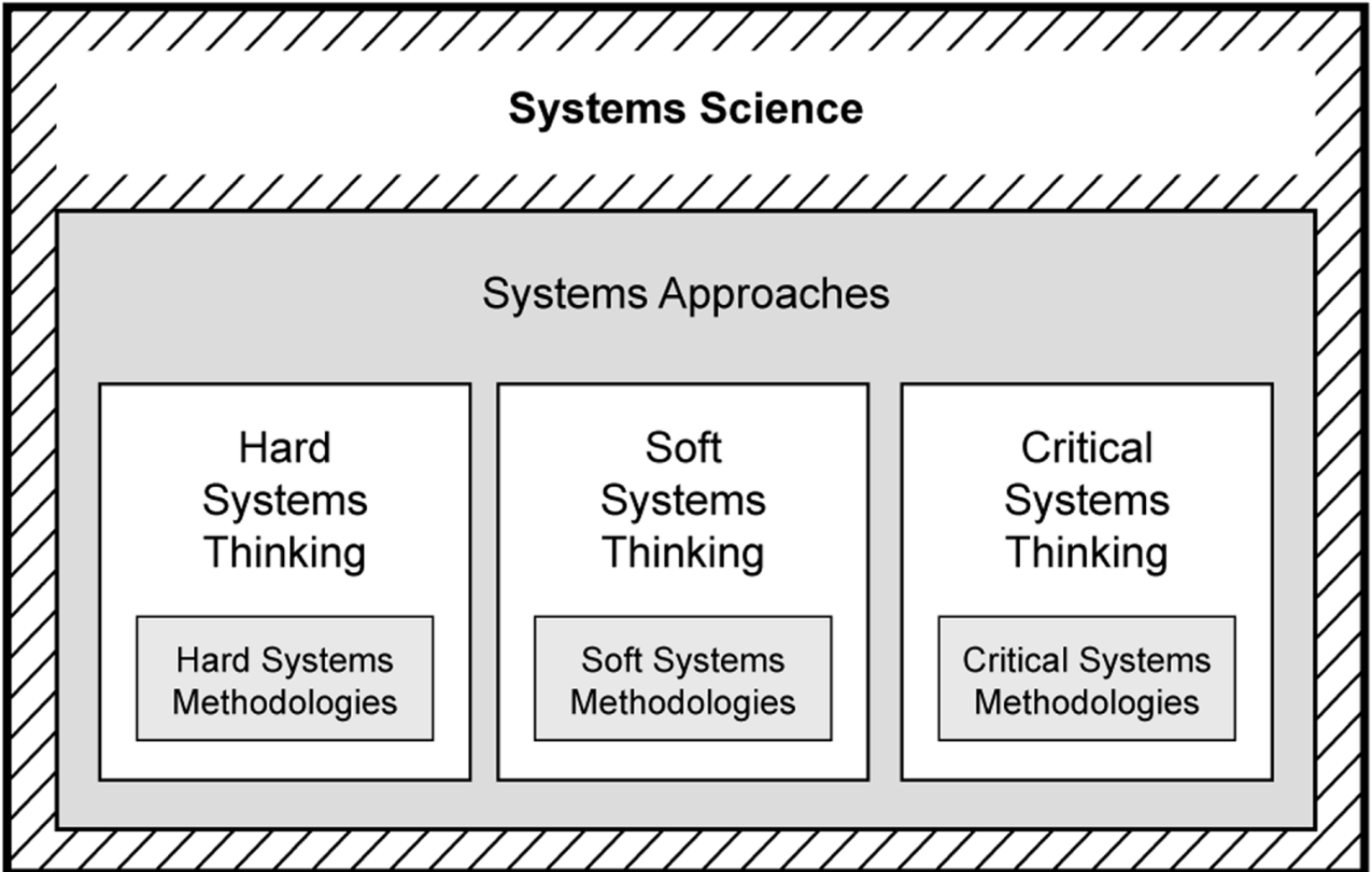
Systems thinking versus systems science

What kind of systems thinking?

Systems Science

Systems Approaches

Hard Systems Thinking	Soft Systems Thinking	Critical Systems Thinking
Hard Systems Methodologies	Soft Systems Methodologies	Critical Systems Methodologies

(da Costa Junior, Diehl, & Snelders, 2019)

Considerations for Instructional Design

Identify potential points of confusion and plan for how you will break them down

Consider how systems thinking is used in your (inter)disciplinary context

Scaffold systems thinking concepts along with other concepts

Define learning goals related to both content and process (systems thinking)

Activities, assessments, projects, courses

Incorporate use of systems language explicitly
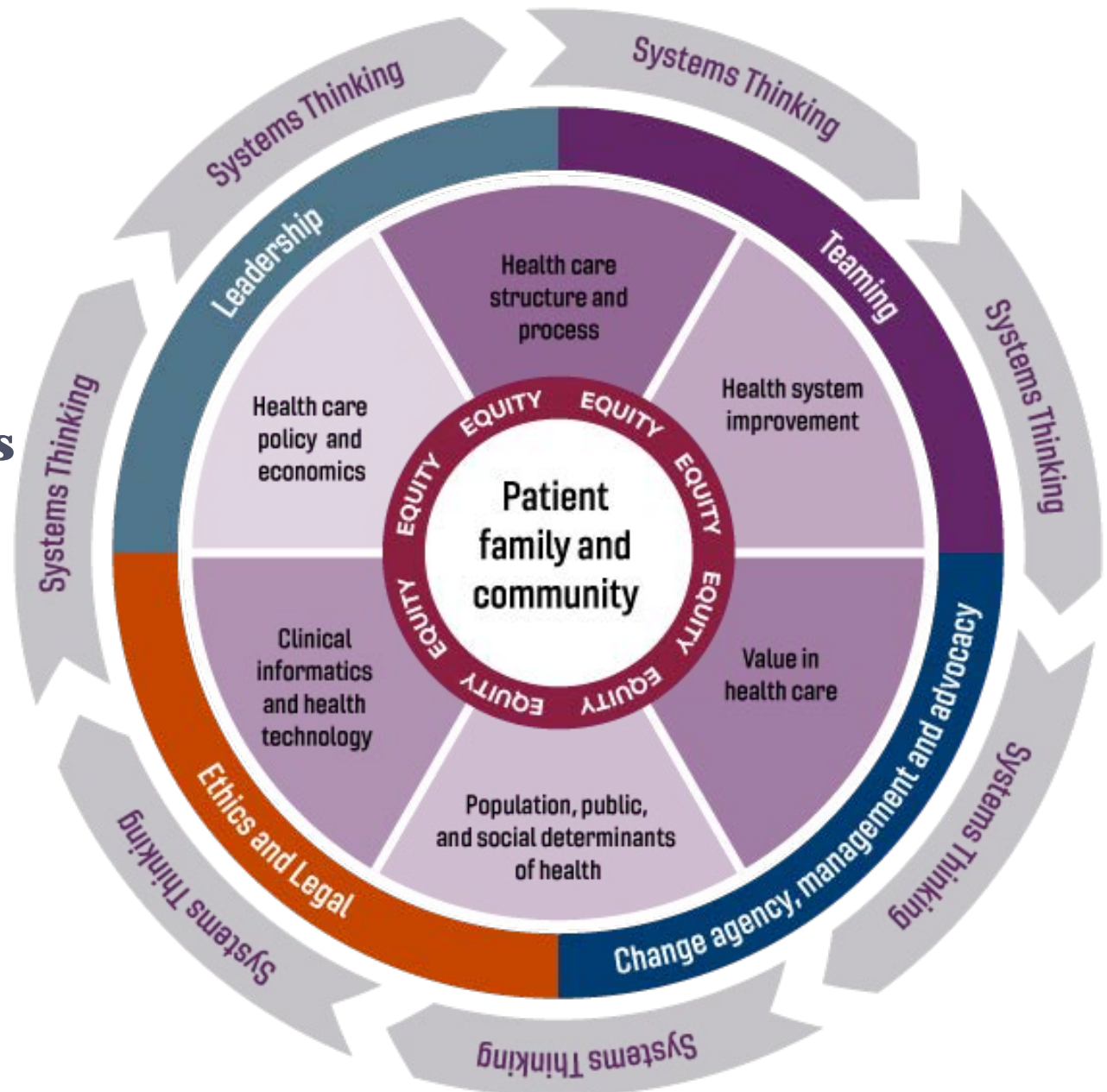
Health Systems Science

Systems concepts

- Scale
- Multiple interacting subsystems
- Multiple causal factors can influence one outcome
- Dynamic systems

World Health Organization definition of Systems Thinking

"An approach to problem solving that views 'problems' as part of a wider, dynamic system…It demands a deeper understanding of the linkages, relationships, interactions, and behaviors among the elements to characterize the entire system."

Savigny, D. de, Adam, T., & Alliance for Health Policy and Systems Research & World Health Organization. (2009). *Systems thinking for health systems strengthening /* edited by Don de Savigny and Taghreed Adam. World Health Organization. https://apps.who.int/iris/handle/10665/44204

Your turn! Facilitated breakout room discussion

Goal: Work with your colleagues to identify strategies for supporting systems thinking effectively in your own instructional context.
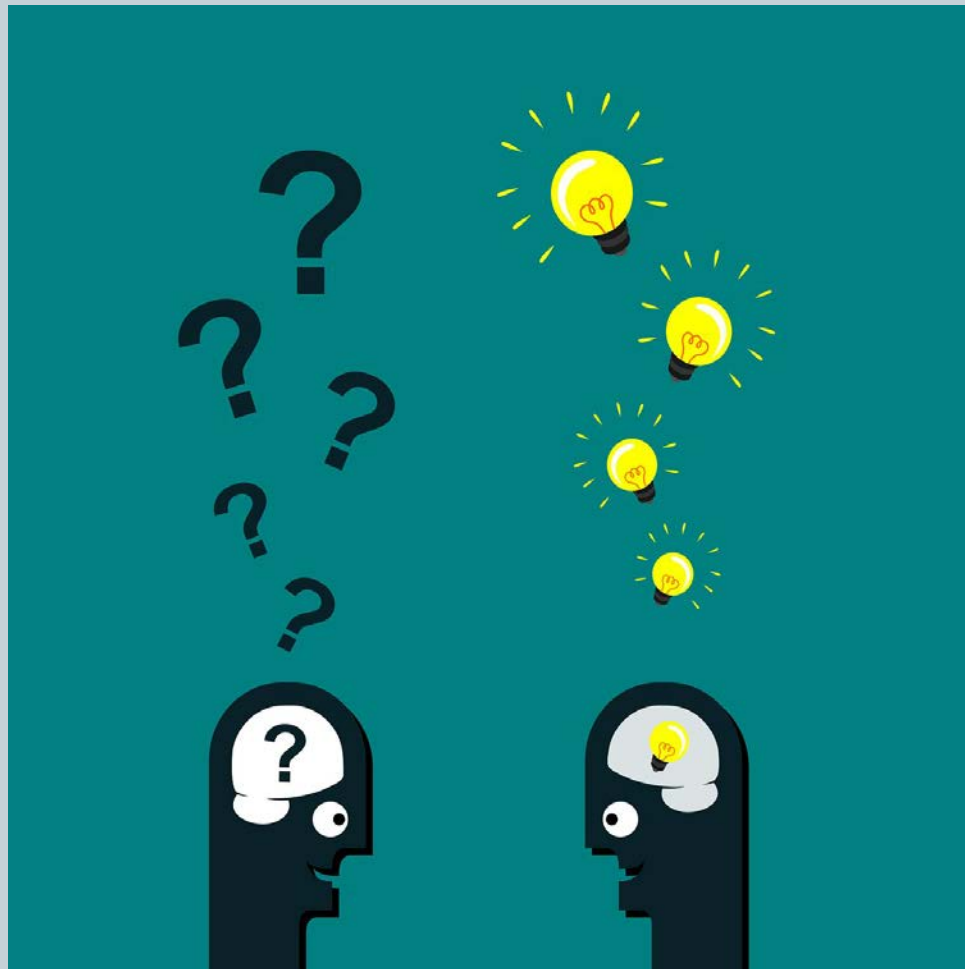
End at 12:45

Guidelines
- Facilitators will start things off
- Take the discussion in a direction that is generative for participants
- Make sure that everyone has a chance to share and get input
- Freedom to leave/join new group if needed

Key insights from small group discussions

Professional Identity Challenges

"being a systems-minded [practitioner/educator] requires the development of a new professional identity as much as knowledge acquisition…it also involves an expanded mindset that necessitates caring for and addressing insufficiencies in the system as obligatory aspects of the professional role." (p. 1429)

Gonzalo, J. D., & Ogrinc, G. (2019). Health Systems Science: The "broccoli" of Undergraduate Medical Education. *Academic Medicine, 94*(10), 1425-1432. https://doi.org/10.1097/ACM.0000000000002815

Emergent Strategy: Fractals

How we are at the small scale is how we are at the large scale. The patterns of the universe repeat at scale. There is a structural echo that suggests...what we practice at a small scale can reverberate to the largest scale.

- adrienne marie brown

brown, a. m. (2017). *Emergent Strategy: Shaping Change, Changing Worlds*. AK Press.

Resources: Starting Points

Cabrera, D., & Cabrera, L. (2015). *Systems thinking made simple: New hope for solving wicked problems.* Odyssean Press.

Checkland, P., & Poulter, J. (2006). *Learning for action : a short definitive account of soft systems methodology and its use for practitioner, teachers, and students.* Wiley.

da Costa Junior, J., Diehl, J. C., & Snelders, D. (2019). A framework for a systems design approach to complex societal problems. *Design Science, 5,* e2, Article e2. https://doi.org/10.1017/dsj.2018.16

Meadows, D. H. (2008). *Thinking in systems: A primer* (D. Wright, Ed.). Chelsea Green Publishing.