Learning to be sustainable (?)

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Introduction

Learning & Sustainability
Application of learning theory
Sustainability theory

Pipeline industry quants

Objective

What I **am** doing

- Expand on last presentation
- Show my thinking
- Test out the argumentation of my thesis

What I am **not** doing

- Dedicated paper presentation

Objective

What I **am** doing
- Expand on last presentation
- Show my thinking
- Test out the argumentation of my thesis

What I am **not** doing
- Dedicated paper presentation

- Mention Mark, Lee & Cam here
- Mention extensive reading sustainability lit

Invitation to conversation!

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Setup I

Maguire and Hardy (2009)–Fig. 1
vs.
Pipeline industry trend

Setup I
Maguire and Hardy (2009)–Fig. 1
vs.
Pipeline industry trend

Setup II–Maguire and Hardy (2009) story

- Existing model of a chemical.
  - What it is, what it does
  - Works well reg. prediction and control–it does exactly what it is supposed to
  - Understanding of DDT public, stable and shared, too!
- Disruption!
- New model emerges
  - Contradicts old model
  - Valid in prediction and control
  - Becomes public, stable and shared
- We have learned

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Setup III–Pipeline industry

Pipeline industry trajectories

Setup III–Pipeline industry
Pipeline industry trajectories

What's going on here?

- What happened here?
- What is the difference between the two phenomena?
- Why did we get control over DDT but not oil spills?

Pipeline industry

Examples

- After every oil spill–never again–e.g., arctic oil spill, Kalamazoo
- Dedicated organization–NTSB
- Industry promoting notion of pipelines as safe
- Oil spilling into specific rivers–repeatedly

So why did we take drastic action on DDT but not pipelines?
Add Kalamazoo or burning river image

Pipeline industry

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So why did we take drastic action on DDT but not pipelines?
Add Kalamazoo or burning river image

I am going to transition to learning now.

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Learning & Sustainability I

Prediction and control

Quantitative/mental models that inform in advance or lead to desirable states.

- Robust climate models (Manabe & Wetherald, 1967; Forster, 2017)

vs.

- Surprising, unpredicted arctic ice loss (Guarino et al., 2020)

Learning & Sustainability I
Prediction and control
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Robust climate models (Manabe & Wetherald, 1967; Forster, 2017)
vs.
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Purpose is to convince audience that reliability & validity are relevant to sustainability.

Learning & Sustainability II

Shared understanding

Developing a mental or formal model that is widely accepted.

- Collective learning process (Wright & Nyberg, 2017)
- Bridging epistemic communities (Aronczyk & Espinoza, 2019)

vs.

- Unintentional or deliberate rejection of learning (Hermwille & Sanderink, 2019; Koontz & Thomas, 2018)
- Persistent resistance or ignorance (Boudet et al., 2020)

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Learning & Sustainability III

Conflicts

- Biases (e.g., Makov & Newman, 2016)
- After building coalition, validity of knowledge in doubt (e.g., Aronczyk & Espinoza, 2019; Wright & Nyberg, 2017)
- Entrenched invalid learning (e.g., Boudet et al., 2020)
- Knowledge gap between layman and (relative) experts (e.g., Camilleri et al., 2019)

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- You can see how the concepts are useful?
- Useful concepts to describe phenomena in sustainability.
- The interaction of physical & social world makes them important here.

  Great insights into pollution and climate change

  Limited dissemination

Reliability & Validity

Oana would know those terms.

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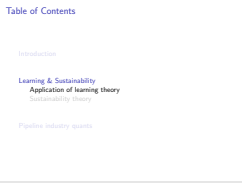


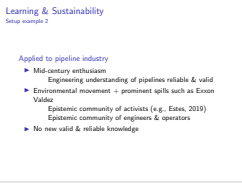
Applied to DDT (Maguire & Hardy, 2009)

- Starting point–DDT widely used, meets purpose
  ⇒ Reliable & valid
- Knowledge on toxicity arises in expert community
  ⇒ Valid but not reliable learning
- Knowledge is disseminated
  ⇒ Valid & reliable learning

Learning & Sustainability
Setup example 1
Applied to DDT (Maguire & Hardy, 2009)
Starting point–DDT widely used, meets purpose
⇒ Reliable & valid
Knowledge on toxicity arises in expert community
⇒ Valid but not reliable learning
Knowledge is disseminated
⇒ Valid & reliable learning

Applied to pipeline industry

- Mid-century enthusiasm
  - Engineering understanding of pipelines reliable & valid
- Environmental movement + prominent spills such as Exxon Valdez
  - Epistemic community of activists (e.g., Estes, 2019)
  - Epistemic community of engineers & operators
- No new valid & reliable knowledge



- Water warriors
- Are pipelines safe? No. But they are safer. It's complicated.

Purpose I

Document the insights so far. Learning & sustainability by it's own right.

And now for something completely different...

- Well it's not that different, but I want to give you an opportunity to rejoin if you stopped paying attention.
- Talk to Climate Town Youtuber on Sun.
- Theme of hope.
- How does this relate to reliability & validity.
- "Solutionism"

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