

Designing for systems thinking in One Health education

Across six activities, participants explained a system where three conditions were present. What the debriefing prompts asked determined how far the explanation extended.

6activities

514participants

2020–2024fieldwork

3conditions

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01 BACKGROUND

The problem

One Health problems cross species, sectors, and jurisdictions, and an intervention shows its effects far from the decision that produced it. Competency frameworks answer by naming systems thinking a core domain (Frankson et al., 2016; Laing et al., 2023; Rocheleau et al., 2022). None specifies what a teaching activity must provide for that reasoning to appear.

02 METHODS

Evidence and analysis

The evidence is what participants explained afterwards, in debriefs, focus groups, and writing, read against the artefact they had worked on and compared case by case (Pawson and Tilley, 1997). An explanation counts as systems-oriented when someone connects parts, follows a consequence, states who is answerable, or reconsiders how the problem was framed.

03 METHODS

The six activities

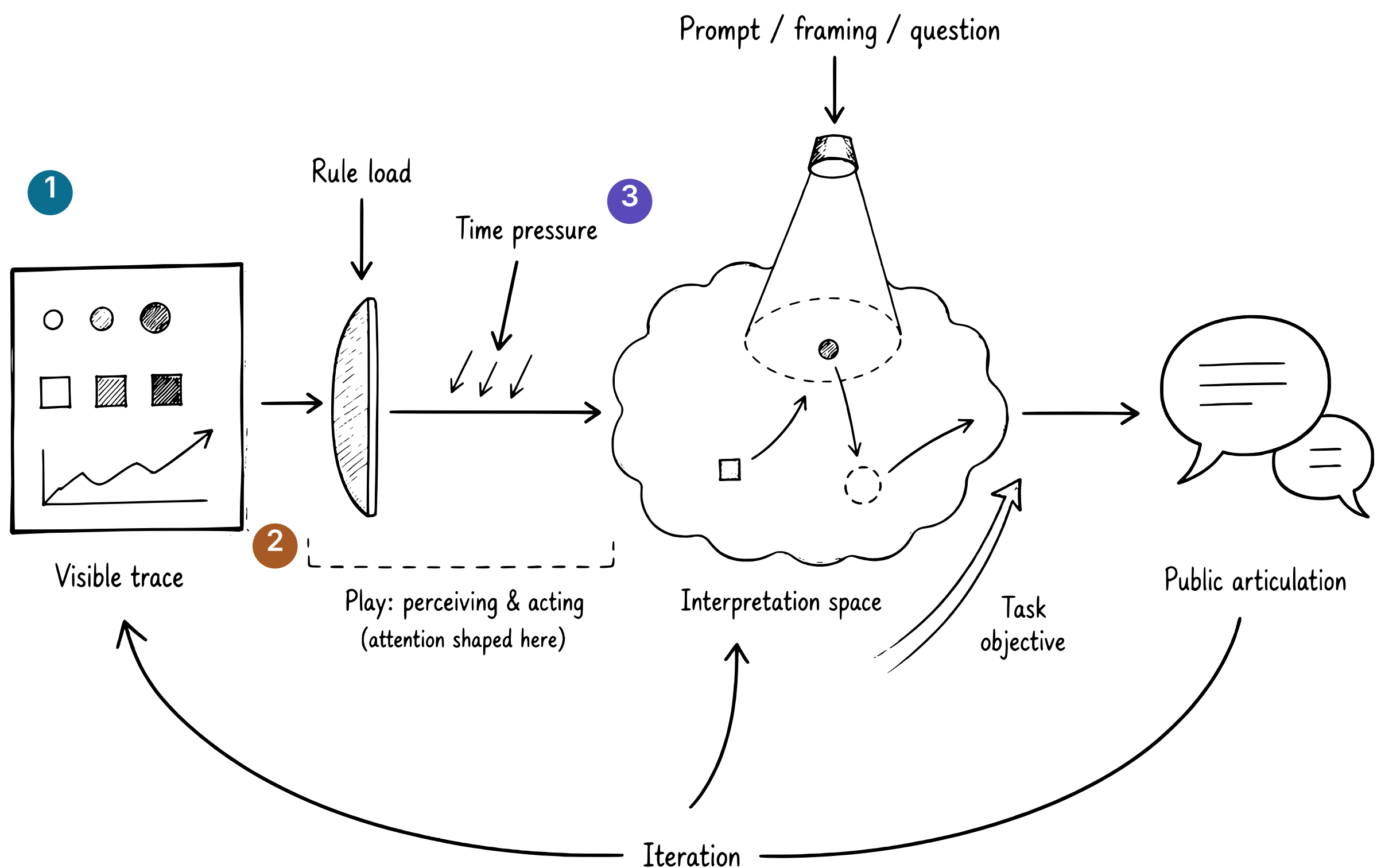
Each pair shares a format and differs in a single design feature.

- **BOARD GAMES**
 - Pandemic** · outbreak containment
 - Tipping Point** · an island filling with waste
- **MAPPING**
 - Ibadan mapping** · a compound mapped by residents
 - Territory Game** · siting a service in a region
- **NARRATIVE**
 - Micro-warrior** · antimicrobial resistance, alone
 - Avian Game** · avian influenza, facilitated

04 RESULTS

From the activity to what gets said

Explanation was fullest where the activity provided a record to return to, a demand to account for, and an occasion to reconstruct what had happened.



- 1 **Shared artefact**
The visible trace of what the group did.
- 2 **Friction**
The demand met during play, while rule load and time pressure compete for attention.
- 3 **Reconstruction space**
Where the group works out what happened. The prompt enters here.

AND THEN THE REACH IS SETTLED

If the prompts ask what changed, and why

The explanation reaches relations, accumulation, delay, and the boundary of the problem. Tipping Point, the Avian Game, Ibadan.

If they ask about the activity

It stays on roles, facilitation, and confidence. The Territory Game held all three conditions, and its prompts asked about the exercise.

FIGURE 1

Where the three conditions are present, what the reconstruction asks decides what the reasoning reaches.

Figure 1. The path from the activity to what participants say. The prompt enters the interpretation space from above, and iteration returns the group to the trace.

05 RESULTS

Three paired comparisons

Systems reasoning makes two demands at once: follow the behaviour a structure produces over time, and question where the boundary of the problem has been drawn. Each pair takes one of those demands, or the occasion on which either becomes sayable.

BOARD GAMES · CHANGE OVER TIME	MAPPING · WHERE THE PROBLEM ENDS	NARRATIVE · DELAYED CONSEQUENCE
THE DIFFICULTY Accumulation and delay place effects at a distance from the action that caused them, which makes behaviour over time the hardest part of a system to reason about (Sterman, 2000). Making the change visible is where design starts. WHAT THE PAIR SHOWS Both boards changed in front of the players. Pandemic's rules absorbed attention and its prompts asked about coordination, so the group explained its own conduct. Tipping Point left attention available, returned the debriefing to the board, and repeated the cycle, so accumulation entered the discussion. ● <i>If we favour competition, we will end up losing the entire real resource... the real resource here is the island, which is so limited.</i> Tipping Point Pandemic, 4 cohorts · Tipping Point, 5 cohorts × 3 sessions	THE DIFFICULTY Every account of a One Health problem draws a boundary, and that line settles which actors, timescales, and responsibilities count (Ulrich, 2005; Midgley, 2000). The activity supplies that boundary or leaves it open. WHAT THE PAIR SHOWS A blank map and an open task let residents widen the problem from hygiene behaviour to drainage, animal movement, and jurisdiction. The Territory Game supplied its categories on information cards, and judgement stayed inside them. ● <i>This is also not under the board of Agbeke, it is under Oyo State.</i> Ibadan mapping Ibadan, 12 residents · Territory Game, 156 students, 88 written responses	THE DIFFICULTY A consequence that arrives later, or to someone else, is easy to miss and hard to attribute, and a learner who meets it alone has nobody to test the reading against. Where the group meets the consequence decides whether it is examined. WHAT THE PAIR SHOWS Micro-warrior was met alone, so the focus group was the first shared setting and it assembled from memory what an artefact holds elsewhere. The Avian Game offered an antibiotic where regulation forbids treatment, and the facilitator worked from the group's own document. ● <i>Without the instructor's questions, we might not have realized we were missing the official reporting step.</i> Avian Game Micro-warrior, 42 students, 5 universities · Avian Game, 74 students

06 RESULTS

What the corpus does not show

FIGURE 2

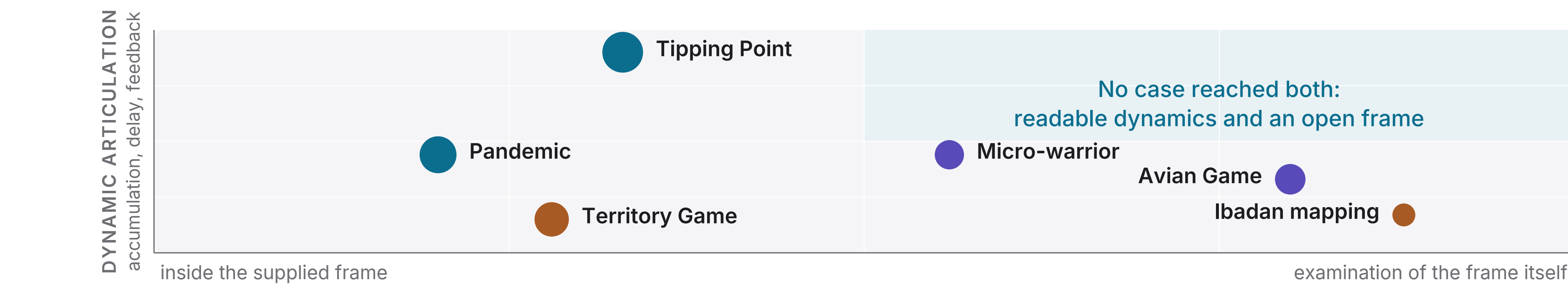


Figure 2. What each case reached, relative to this corpus. Marker size records the depth of the corpus behind each position.

Where accumulation and delay became readable, the activity worked through a settled frame. Where participants questioned the frame, the activity gave less access to dynamic pressure. Tipping Point came closest to both, inside the island its board defined.

HELD AS A DESIGN HYPOTHESIS

Settling it requires an activity designed for both, with prompts that would register both.

07 CONCLUSIONS

What follows for One Health teaching

Specify the artefact, the friction, and the reconstruction space of an activity, and state whom each is specified for. Decide which form of reasoning it should support, and write the prompts that would register it. Assess individuals after collective reconstruction: one before-and-after ranking recorded no change while the discussion around the same play carried systemic explanation.

SCOPE

Six purposive cases of unlike depth, with the framework drawn from the same cases. No case measured content attainment. The guidance is design logic and stops short of a demonstrated result.