A SYSTEMS STORY

DEFINITION OF KEY SYSTEMS THINKING CONCEPTS

STOCK
An accumulation of material or information that has built up in a system over time.

FLOW
Material or information that enters (**INFLOW**) or leaves (**OUTFLOW**) a stock over a period of time.

FEEDBACK LOOP
The mechanism (rule or information flow or signal) that allows a change in a stock to affect a flow into or out of that same stock. Called a 'loop' because the connections work in repetitive cycles.

REINFORCING FEEDBACK LOOP
An amplifying or enhancing feedback loop also known as 'positive feedback loop' because it reinforces the direction of change. There are vicious cycles and virtuous cycles.

BALANCING FEEDBACK LOOP
A stabilizing, goal-seeking, regulating feedback loop, also known as a 'negative feedback loop' because it opposes, or reverses, whatever direction of change is imposed on the system.

NON-LINEARITY
A relationship between two elements in a system where the cause does not produce a proportional (straight-line) effect. Non-linearities are often experienced as non-intuitive and unpredictable surprises by human observers in a system.

DELAYS
A delay is a gap in time between something that occurs in a system, and the information signal about that occurrence reaching a control point. A delay in a balancing feedback loop makes a system likely to oscillate. Changing the length of a delay may make a large change in the behavior of a system.

All definitions adapted from Donella Meadow's book, "Thinking in Systems: A Primer".

NON-EXISTENT BOUNDARIES

Systems rarely have real boundaries – everything is connected to everything else. We must remember that boundaries are of our own making, and they can and should be reconsidered for each new discussion, problem, or purpose.

POLICY RESISTANCE

Resistance to change arises when goals of subsystems are different from and inconsistent with each other. With actors in a system pulling in different directions, everyone has to put in great effort into keeping the system where no one wants it to be.

ESCALATION

Escalation comes from a reinforcing loop set up by competing actors to try and get ahead of each other. Being a reinforcing feedback loop, escalation builds exponentially.

ERODING GOALS

The actor in a feedback loop has a performance goal/desired system state, but their perceived state of the system is worse than it actually is. Instead of maintaining a balancing feedback loop that keeps the system state at the desired level, the system becomes overwhelmed by a reinforcing feedback loop, making the goal less ambitious and the system performance worse.

ADDICTION

Addiction is finding a quick and dirty solution to the symptom of a problem, which prevents or distracts one from the harder and longer-term task of solving the real problem. Since they do not solve the actual problem, addictions usually create their own reinforcing feedback loops.

SEEKING WRONG GOALS

If the goals of a system are defined inaccurately or incompletely, the system may obediently work to produce a result that is not really intended or wanted.

SYSTEMS THINKING WISDOM

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