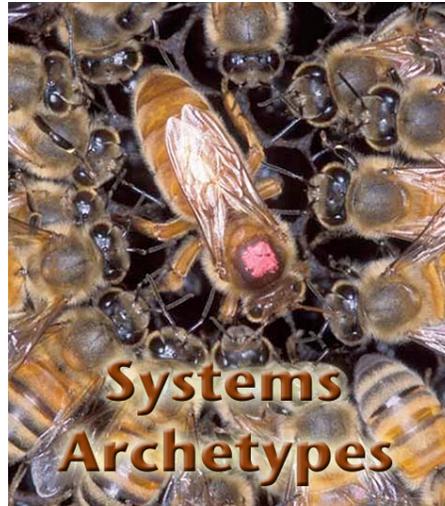


Lesson Week 8 – Systems Archetypes: A Practical Tool for Decision Making and Management



A dramatic demonstration the power of systems thinking is the discovery that a small number of generic feedback structures can reveal the causes of hard to solve problems in many of the most diverse real world situations. Because they are generic structures – where a single structure can explain many problem situations - they are known as **systems archetypes**. Each archetype is defined by its causal feedback structure and the characteristic outcome behavior over time that it generates. The structures are modeled as causal loop diagrams, with which you are already familiar. Because the archetypal outcomes are often unexpected and unwanted, it is useful when tackling a problem situation to learn to identify archetypal feedback structures that might be their cause.

What's an archetype again?

- **archetype** (ˈɑːrˌkɪːtəp) — *n*
 - 1. a perfect or typical specimen ...
 - 4. a constantly recurring symbol or motif in literature, painting, etc

An archetype is a term used to describe a universal symbols or stereotypes. In literature they are characters, images, and themes that embody universal meanings and basic human experiences. They keep the same characteristics regardless of plot or time period (setting).

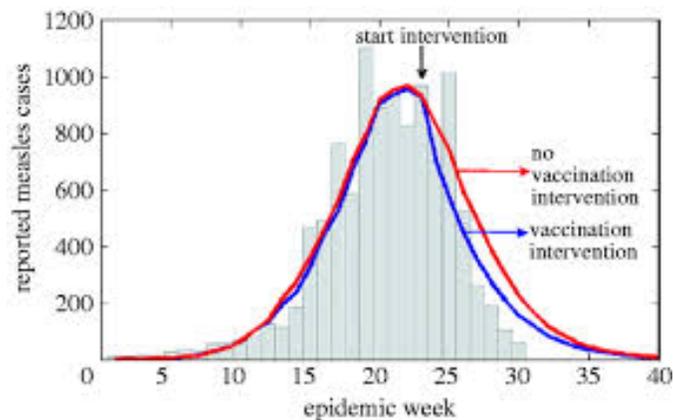
Building Blocks

The first two in the list of archetypes provided in the assigned reading, <http://www.exponentialimprovement.com/cms/uploads/ArchetypesGeneric02.pdf> are the **reinforcing and balancing feedback loops** first introduced in the lesson, Feedback Causality, in the sixth week of this course. They are actually the building blocks of all feedback structures, including the other archetypes in the list, but are important to be able to identify by their own archetypal behaviors.

Unlike the other archetypes, the behavior these basic feedback loops cause may be desirable or undesirable depending on how they influence a situation. The **reinforcing loop** ‘chickens and eggs’ produces exponential growth in both variables. That may be desirable if we want to expand our chicken business, but not so desirable once the flock size overshoots the carrying capacity of the farm in some way.



An epidemic may experience exponential growth and, after it peaks, accelerating decline, both due to a reinforcing loop that is dominant in the situation at different times. This insight might focus efforts to control the epidemic on weakening the growth loop and strengthening the decline loop.



Similarly the effect of a **balancing loop** may be to promote resilience, a desired ability of a system to return quickly to normal after a shock, as in a garden's ability to weather a windstorm, but may also cause unwanted resistance to desired change. In an example given earlier, the outcome of attempts to reduce traffic jams by widening roads led to more cars filling the road, no matter how many new lanes were constructed. A systems thinking approach would expand the boundary of the problem to identify and weaken the balancing loop that caused the transportation system to keep reverting to the status quo ante.

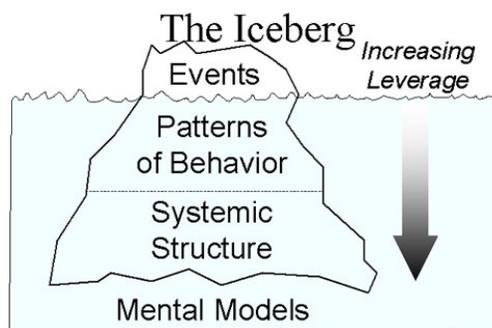


In sum, when we can model the feedbacks that are operative in a problem situation, we can often identify in the feedback structure the causes of a problem, and gain more lasting solutions by altering that structure. Often we can achieve lasting solutions by changing **loop dominance**, by weakening or strengthening the influence of different loops in the model.

How to Use Archetypes

The archetypes are simple models that often incorporate both types of the basic feedback loops discussed above. Because each archetype generates a pattern of unwanted behavior characteristic of that archetype, systems thinkers have identified a general pattern of intervention or policy action that tends to work for each type. These generic patterns are listed as “policy advice” along with real life examples in the assigned reading.

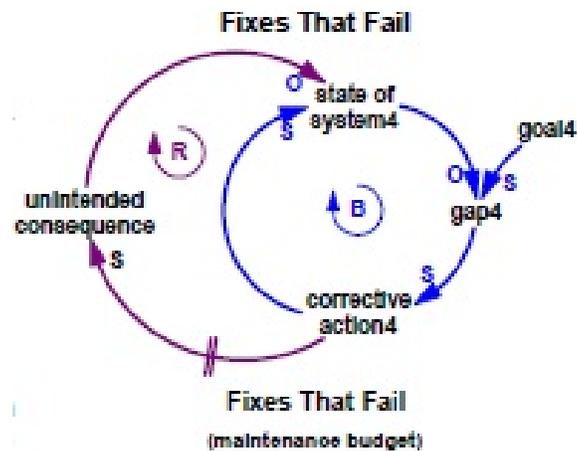
Learning to identify archetypal behavior is therefore of immense practical importance in finding solutions to problems that arise in any area of activity: personal life, managing the natural environment as in gardening or farming, or running a business or social or political organization. The benefit of the archetypes is to reveal the feedback structure that must be changed to eliminate the pattern of undesirable behavior. This focus on feedback structure returns us to the **iceberg concept** (lesson, week 5): intervention at the systemic level offers the best leverage to achieve lasting change.



A Practical Example



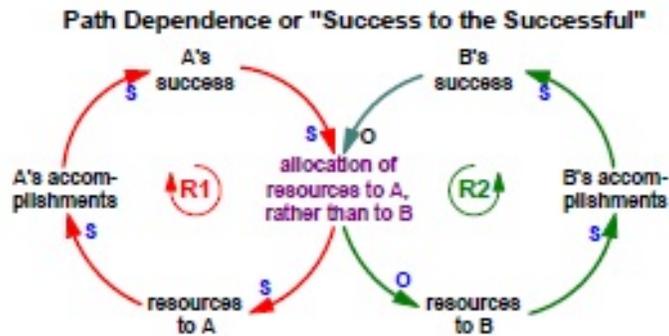
To learn how to use the archetypes to create more permanent solutions, let's employ the example of the attempt to change the food system in a community by creating farmers' markets, http://www.systemswiki.org/index.php?title=Farmers_Markets, whose dynamics as modeled correspond to the 'fixes that fail' archetype.



In that situation, the creation of more or bigger farmers' markets fails because the big retailers use their power to upstage, bringing in organic food in all seasons from distant sources, so that farmers' markets remain an insignificant source of food in the community.



If the goal of farmers' markets and other such institutions is to replace a distant food economy with a local one, a systems thinker might ask, How can we alter the archetypal feedback structure to achieve that goal? The narrative tells us that to maintain their hegemony in the local food system the supermarkets rely on the unwritten rule 'power to the powerful – actually itself an archetypal structure - built into the national economy. One could continue to create farmers' markets in a community, but as long as big food retailers can dominate the local food system, they will override such efforts.



If you look up this archetype - in the reading it is listed as Path Dependence or "Success to the Successful" - you will see that structure as two reinforcing feedback loops linked in competition, in this case for market share. The "policy advice" offered is to change the feedback structure to level the playing field. Actually the goal in this case is to give the advantage to the locals, so a solution that lasts must permanently slope the playing field in favor of locally produced food.

Of the many ways to change the slope of the playing field, one might be to weaken the supermarkets in their unfair ability to provide organic food in all seasons by adding more written rules to empower the local food economy, for example by taxing all local sale of food on a sliding scale according to number of food miles traveled. Another way might be to tax large supermarkets in the community and fund farmers' markets with the proceeds. In this Fixes That Fail archetypal structure such interventions strengthen the ability of written rules to favor the farmers' markets balancing loop relative to the reinforcing loop that favors supermarkets.

This case demonstrates how our grasp of the underlying archetypal structures can offer insights about where to best apply leverage to shift **loop dominance** by improving one or weakening another, and thus facilitates the search for solutions to many of the problems of life.

Summary

The strange inability - revealed in the archetypes - of many policy solutions to work as expected has long been recognized. When we often detect the same pattern in many diverse situations, it gets acknowledged with its own label. One example of archetypal behavior is called 'the red queen effect', a reference to the red queen's frustrated exclamation in *Through the Looking Glass*, "It takes all the running you can do to keep in

place!”. Einstein’s famous remark - “We can’t solve problems by using the same kind of thinking we used when we created them.” -expands on this insight to identify systemic causes. The identification of archetypal feedback structures expands our understanding further to supply the causal structures needed to properly address such problems.

Study all the archetypal structures in the readings by following the logic of their causal loops to see why each generates its typical outcome behavior. Pay close attention to the delay marks (//) in the models to understand the effects of slower change in some causal relations on overall behavior over time, for example why short term results are often quite different from outcomes later in time. Think of problem situations from your experience where one or another archetype would explain the undesirable dynamics of the situation. Study the feedback structure to see if you can detect where leverage could be applied to resolve the problem.



Assigned Readings

<http://www.exponentialimprovement.com/cms/uploads/ArchetypesGeneric02.pdf>

http://www.systemswiki.org/index.php?title=Farmers_Markets

Related Library Pages

<http://www.slideshare.net/Think2Impact/module-3-systems-archetypes>

http://en.wikipedia.org/wiki/System_archetype

Potential Assignment: Using a problem situation from your experience, identify the relevant archetype that might explain why conventional solutions are not working, adapt the archetypal structure to create a model of the feedback structure that explains your problem, and suggest how to alter that model to discover a more lasting solution.