cia

Systems Thinking:
It's more than you think.℠

Continuous Improvement Associates

Promotion Chain Dynamics

Why do organizations tend to get top heavy?
Why is high turnover so difficult to manage?

Because system structure drives behavior. That's why.

Why is this important?

Human Resource (HR) professionals understand the debilitating effects of top heavy organizations and high turnover. Both lead to higher costs. They must be explicitly managed and controlled. "Too many chiefs and too few indians" bring strife. High turnover brings the added costs of recruiting, hiring, training and a greater load on more experienced personnel to do the training ... plus the loss of institutional memory.

Why use systems thinking?

HR professionals have become aware of these effects over time. But many non-HR managers haven't developed the same appreciation for the impact on the bottom line, because these are dynamically complex situations in which it's difficult to connect effects to causes ... cause and effect are separated in time and space.

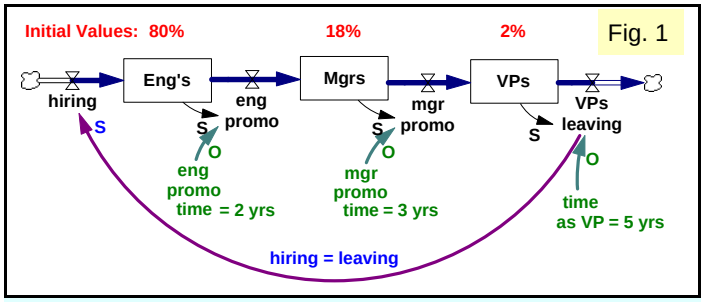
Humans haven't evolved to handle ***dynamic complexity***. To illustrate, driving a car is relatively easy when sober. But with too much to drink, there's a long delay between beginning to go off the road and perceiving it. And there's even more delay before reflexes kick in to make the needed correction, which is often an *over-correction*.

Delays cause similar late and over-corrections in our projects, our organizations, and our national economy. Because they're dynamically complex, we "drive" them as if intoxicated. Like drunk drivers, we weave along the road, taking longer to reach our destination or not getting there at all.

As humans, we're aware of our limitations in handling ***detail complexity*** (keeping track of lots of data in our heads). So we use spreadsheets and invest billions of dollars in Information Technology. But we're generally unaware that we have just as much difficulty dealing with ***dynamic complexity***.

What is systems thinking?
Seeking to understand system behavior by examining "the whole" ... instead of by analyzing the parts.

Fig. 1



This is a typical promotion chain: engineers are promoted to be managers, managers are promoted to be VPs, and finally VPs leave. Note that (hiring = VPs leaving) ... the total number of employees is held constant.

In this example engineers are promised promotions in 2 years, managers in 3 years, and VPs leave in 5 years. Note the Initial Values shown in the diagram: 80% engineers, 18% managers, and 2% VPs. What will be the percentages after 100 months, when the system reaches "steady state"?
Answer: see the simulation results on the reverse side,
... but consider your answer *before* you look.

The simple examples below illustrate just how difficult. And they show why we must similarly invest to develop systems thinking skills (see **Languages, Brains, and Skills**).

The promotion chain

Figure 1 shows the flow of hiring, promoting Eng's to Mgrs, and Mgrs to VPs. New hiring keeps total employment constant. We start with more Eng's; but what happens over time? Read the captions under Figure 1 and answer before reading on.

Considering turnover

Figure 2 shows a chain, with Rookies and Pros starting at 60 each. It takes 6 months for Rookies to get up-to-speed to become Pros. Initially, 10 Pros/month quit and 10 Rookies are hired; the system is in "steady state." But, when the pro quit rate goes from 10 to 15/month, which pattern in Figure 3 describes how the number of Pros evolves over time? Think

Fig. 2

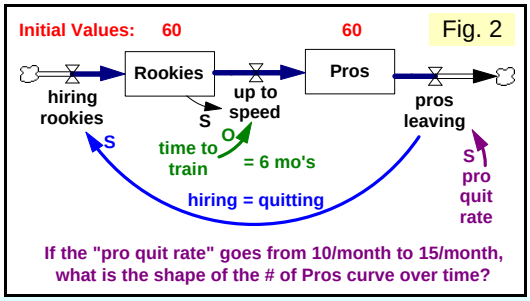
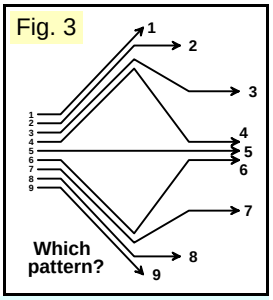


Fig. 3



A simple promotion chain. What happens over time? Choose a pattern from Figure 3.

this through before going on.

Simulating the chain

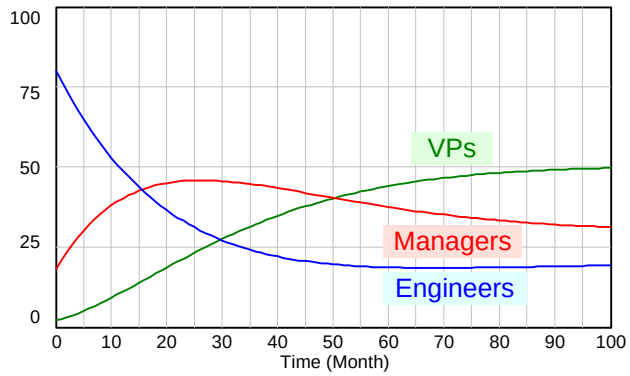
We're just not good at such mental simulations. But computers are. Figure 4 shows a computer simulation of the model in Figure 1.

It shows that the organization eventually has more VPs than Mgrs or Eng's. The order reverses; the percentages are proportional to the time at each level.

Long-lived organizations have learned to cope with this. For example, the Army has an "up-or-out" policy. If not promoted, you're out ... hopefully with the skills needed to find a job in civilian life. Without such a policy, the Armed Services would soon have mostly generals.

Many consulting organizations adopt a "burn-em-out" policy ... only the hardy survive. Many of them disclose this to new hires up front and promise that those who don't stay will get help in finding a job with a client.

Fig. 4

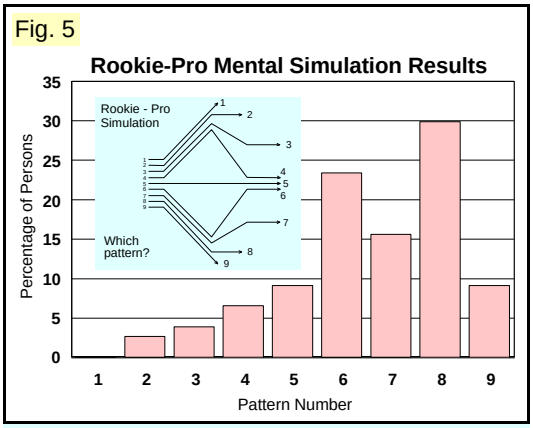


These are simulation results from the model of Figure 1. Over time, there are more VPs than Managers and even fewer Engineers. Note the final percentages are proportional to the time at each level.

Simulating turnover effects

Figure 5 shows the distribution of responses given by *CIA* workshop participants to the question in Figure 2.

Fig. 5



This is the distribution of responses to the Rookie-Pro question: What is the pattern of the Pros over time when turnover inceases from 10/month to 15/month? Note the substantial lack of agreement!

People select a wide distribution of patterns. Even if your mental simulation is correct (or you simply guessed the correct answer: pattern #8), the majority of the others with whom you're working have not.*

> "We're stuck with the minds that evolved in a hunter-gatherer society."
>
> Robert Wright on his book *The Moral Animal*

Such mental errors are a major source of conflict. And all the "conflict management" in the world will not end it ... "ropes courses" aren't the answer.

First, we must learn to recognize that we disagree ... some people may not speak up (see **Defensive Routines**), Second, we must share mental models and learn to identify the true source of the conflict. Finally, if disagreement persists, we know we either have to get more data or go to simulation. More often than we think, especially for strategic issues, the problem is not a need for more data ... it's because we haven't all gotten the same results from our mental simulations. We must disclose our thinking and, in complex situations, go to simulation.

Real life

This is an important example; it appears in organizations as a "replacement requisitions only" policy. The number of Pros never recovers; total staff is constant, but capability is lower (but the workload is probably not). The policy itself can lead to doubting the organization's future and the persistent exit of the most experienced personnel.

Conclusion

It's bad enough we're in conflict because we don't get the same answers when we think through dynamically complex problems. Often we don't even know that's the root of the conflict.

Systems thinking helps us understand our problems *and* identify solutions. Let's talk about how it can help you meet your challenges.

Feedback is Power - Tap It

The promotion chain illustrates feedback in the context of operational thinking (using stocks and flows). This is the "physics of the system." Perhaps a less intimidating metaphor is that it's the "plumbing of the system." While we can do a plumbing job ourselves, it takes practice to be a good plumber. Often it's the better part of valor to call a plumber.

Workshop Benefits

Explicitly examining the promotion chain structure, and expanding it to include exits at the different stages, leads to realistically evaluating the costs of turnover. The costs are often more than we think and at times HR professionals are frustrated by the difficulty in getting this point across to management. Examining impacts on costs and total capability is illuminating ... and important.

Intuition in dynamically complex systems

" ... even if children began serious study of physics in kindergarten, and continued it through a doctorate, it is ludicrous to suggest that they could ... understand what happens when two galaxies collide by intuition alone. Many human systems are just as complex."

John Sterman, "Learning in and about complex systems"
System Dynamics Review Vol. 10, nos. 2-3, 1994

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* Call or e-mail for the results of the simulation of Figure 2.