

Class 3, 4/21/04

Attendance		10
Systems Thinking Skills papers, Barry Richmond	LCD projection & discussion	50
Break		10
5D Chapters 3 & 4	Discussion of reading	60
Break		10
Reflection papers and Q&A	Discussion	20
Add'l points in Richmond's "Let's just get on with it" & "Systems thinking: critical thinking skills for the 90s and beyond"	Discussion	10
		170

**5D - Chapter 3.
Prisoners of the System or
Prisoners of Our Own Thinking?**

Lessons of the "Beer Game"

1. Structure influences behavior

- "More often than we realize, systems cause their own crises, not external forces or individuals' mistakes."
- When placed in the same system, people, however different, tend to produce similar results.
- Tolstoy on the "laws of history" *"For the investigation of the laws of history, we must completely change the subject of observations, must let kings and ministers and generals alone, and study the homogenous, infinitesimal elements by which the masses are led."*
- "Guards" and "prisoners" experiment.
- We seek a culprit
 - ◆ other players
 - ◆ the customer

2. Structure in human systems is subtle

- "how we make decisions"
- the "operating policies" that translate perceptions, goals, rules, and norms of behavior into actions.

3. Leverage often comes from new ways of thinking

- We tend to ignore how our decisions affect others

It isn't just for beer anymore ...

- Semiconductors
- Real estate

- "Inventory accelerator" theory of business cycles

The real world is worse than the beer game:
we can order from multiple suppliers.

How to improve performance in the beer game

- Adopt a "no strategy" strategy
- In the beer game and many other systems, in order for you to succeed others must succeed as well.
- Be aware there's a "pipeline delay"
- Don't panic: A vicious cycle can be set off by any player who panics, anywhere in the system.
- ...
- it takes discipline to ignore screaming customers

Finally

- Structural explanations are inherently generative.
- Pogo: "We have met the enemy and he is us."
- Multiple levels of explanation:
 - ◆ Structure (generative)
 - ◆ Patterns of behavior (responsive or adaptive)
 - ◆ Events (reactive)

5D - Chapter 4. The Laws of the Fifth Discipline

1. Today's problems come from yesterday's "solutions."

- Example: profits low due to high costs, reduce inventory, customer complaints to up, more lost sales decrease profits

2. *The harder you push, the harder the system pushes back.*

- Compensating feedback (policy resistance)
- Examples?

3. *Behavior grows better before it grows worse.*

- When?

4. *The easy way out usually leads back in.*

- We tend to stick with familiar solutions as conditions continue to worsen ...

5. *The cure can be worse than the disease*

- Archetype: "shifting the burden to the intervenor"

6. *Faster is slower.*

7. *Cause and effect are not closely related in time and space.*

- It's easy and tempting to find a proximate cause.

8. *Small changes can produce big results — but the areas of highest leverage are often the least obvious.*

- Systems thinking: the new "dismal science?"
- High leverage points are usually highly non obvious
- Example: rudder trim tab

9. *You can have your cake and eat it, too — but not all at once.*

- Example: Crosby - "Quality is free."

10. *Dividing an elephant in half does not produce two small elephants.*

- Silos keep us from seeing important interactions
- A problem is a "logical knife" that helps us define the system boundary

- Expand the boundary to encompass the problem ... be it the department, company, industry, ...

11. *There is no blame*

- You and the cause of your problems are part of a single system.
- Exception?

Paper: "System Dynamics/Systems thinking: Let's just get on with it" by Barry Richmond
<http://www.hps-inc.com/download/pdfs/paper.pdf>

Systems Thinking / System Dynamics Venn Diagram

System dynamics has evolved

- from an "expert" — "we'll tell you" mode
- to a "consultant" — "we'll help you" mode

Definition: "**Systems thinking** is the art and science of making reliable inferences about behavior by developing an increasingly deep understanding of underlying structure."

On causal loops vs. S&F diagrams

- "... it is poor practice to use causal loop diagrams before having laid out, and understood, the underlying stock/flow infrastructure of a system."
- "The appropriate role for causal loop diagrams is 'after the fact.' "

Paper: "Systems thinking: critical thinking skills for the 90s and beyond" by Barry Richmond
<http://sysdyn.clexchange.org/sdep/Roadmaps/RM6/D-4565.pdf>

The argument: "... *the primary source of the growing intractability of our problems is a tightening of the links between the various physical and social subsystems that make up our reality.*"