

MGM 315 - Class Plans - Spring 2004

Class 1, 4/07/04

• Class overview	What are your expectations Syllabus - general discussion about systems thinking	30
• Attendance • Admin hours?		5
• Introductions		15
Break		10
ST review	LCD projection & discussion	60
Break		10
Major Problems?	In organizations? Nominal group technique	40
		170

General Discussion:

Class Expectations

Architecture of Learning Organizations
... and the "infrastructure" of a learning organization

Syllabus

What is systems thinking?

What you need for "thinking and learning"

ST review:

Single-loop learning & Double-loop learning

Problems vs. messes vs. "wicked messes"

Taking the long view ... "balancing tubes"

Detail complexity vs. Dynamic complexity

System behavior is a result of

Perspectives on importance of Systems Thinking

Initial introduction to the systems languages

Problem Solving &
Continuous Improvement for Fire Prevention

- Causal Loop Diagram (CLD)

Management Practices: Primary & Secondary

- Stock & Flow diagram (S&F)

Strategy, Balanced Scorecard, & Systems Thinking

Reinforcing Feedback & Exponential Growth

The "learning curve"
... general perception vs. what it's really like

Policy resistance: Traffic Congestion Example

Deep learning cycle

What is the effect of "road building?"
It determines _____

Wheel of learning

Exercise: The Nominal Group Technique for
achieving consensus, problems facing organizations.

Class 2, 4/14/04

Attendance		10
ST review	LCD projection & discussion	40
Break		10
5D Chapters 1 & 2	Discussion of reading	30
"Learning in & about" & Sterman slides	Discussion of reading	30
Break		10
"Learning in & about" (cont'd)	Discussion of reading	20
Exercise	"circles in the air"	5
Q&A	General discussion	15
		170

5D - Chapter 1. Give me a lever ...

The only sustainable competitive advantage ...

Disability 4: The fixation on events

Discipline Definition: A body of theory and technique that must be studied and mastered to be put into practice for acquiring certain skills or competencies.

Disability 5: The parable of the boiled frog

Senge's Five Disciplines

Disability 6: The delusion of learning from experience

What's wrong with "best practices?"

- Core learning dilemma:

"metanoia"

- The problem with learning in cyclic situations

The problem with "team building"

- What this means for training

5D - Chapter 2. Learning Disability?

Avg. life of industrial enterprises:

Disability 7: The myth of the management team

Disability 1: "I am my position"

- "appearance" of a team
- defensiveness
- blame
- rewards advocacy, not inquiry

Disability 2: "The enemy is out there"

- "always know the answer"
- skilled incompetence

Disability 3: The illusion of taking charge

Scott Peck's Disciplines

“Learning in and about complex systems” by John Sterman

All learning depends on feedback.

Single-loop & double-loop learning

System dynamics makes mental models explicit

- beliefs about the network of causes & effects
- boundary of the model
- relevant time horizon

Reality is _____ constructed.

Barriers to learning

- *Dynamic complexity*
 - ♦ improvement half life & ADI
 - ♦ overshoot & oscillation
- *Limited information, flawed & delayed measures*

An important quote: “Sometimes the positive feedback assists learning by sharpening our ability to perceive features of the environment Often, however, the mutual feedback of expectations and perceptions limits learning by blinding us to the anomalies that might challenge our mental models.”

 - ♦ filters
 - ♦ example: GDP ... externalities
 - ♦ unemployment
 - ♦ ozone hole - Nimbus 7
- *Confounding variables and ambiguity*

- *Misperceptions of feedback*
 - ♦ policy resistance
 - ♦ Machiavelli quote
 - ♦ Human performance in complex environments is poor relative to normative standards, even compared to simple decision rules ...
 - ♦ Beer game
 - ♦ “... the mental models people use to guide their decisions are dynamically deficient.”
 - ♦ Management flight simulator experiments:
 - “naive strategy outperforms nearly 90% of the subjects.”
 - “subjects did not learn how to improve their performance in the dynamically complex conditions.
 - “misperceptions of feedback are robust to experience, incentives, opportunities for learning, and the presence of market institutions.”
 - “Subjects actually spent less time making their decisions in the complex markets than in the simple ones.
 - ♦ Two basic and related deficiencies in our mental models of complexity
 - “First, our cognitive maps of the causal structure of systems are vastly simplified compared to the complexity of the systems themselves.”
 - “Second, we are unable to infer correctly the dynamics of all but the simplest causal maps.
 - “Both are direct consequences of bounded rationality: the many limitations of attention, memory, recall, information processing, and time that constrain human decision making.”
- *Flawed cognitive maps of causal relations*
 - ♦ “... virtually no feedback processes in studies of the cognitive maps of political elites ...”
 - ♦ “fundamental attribution error”
 - ♦ HR implication
- *Erroneous inferences about dynamics*
 - ♦ “People cannot simulate mentally even the simplest possible feedback system
 - “... people significantly underestimate exponential growth ...
 - what’s the thickness after folding a sheet of paper
 - 42 folds ...
 - 100 folds ...

- *Unscientific reasoning; judgmental errors & biases*
 - ◆ overconfidence
 - ◆ wishful thinking
 - ◆ illusion of control
 - ◆ violate basic rules of probability
 - ◆ Don't understand the "law of small numbers":
Definition: "There aren't enough small numbers to meet the many demands made of them." *That is:* "We often see things happen with small numbers that are not normative, that is, often small numbers do not well represent the behavior of large numbers."
 - You can't tell by looking [at a few examples].
 - Superficial similarities spawn spurious statements.
 - Capricious coincidences cause careless conjectures.
 - Early exceptions eclipse eventual essentials.
 - Initial irregularities inhibit incisive intuition.
 - ◆ Don't understand basic statistical concepts
 - ◆ Do not update beliefs according to Bayes' rule
 - ◆ Memory distorted by hindsight & desirability of outcomes
 - ◆ "... the tendency to seek confirmation is robust in the face of training in logic, mathematics, and statistics. Search strategies that focus only on confirmation of current beliefs slow the generation and recognition of anomalies that might lead to learning, particularly double-loop learning."
 - ◆ Belief in "miracle, mystery, and authority" ... astrology, ESP, UFO's, creationism, conspiracy theories of history, channeling of past lives, cult leaders promising Armageddon, and Elvis sightings.
 - ◆ Wade Boggs
 - ◆ "For many people scientific thought leads not to enlightenment but to existential angst and the absurdity of human insignificance in an incomprehensibly vast universe. Others believe science and technology were the shock troops for the triumph of materialism ... over the sacred and spiritual."
 - ◆ **"A central principle of the systems view of the world is to examine issues from multiple perspectives; to expand the boundaries of our mental models to consider the long-term consequences and side effects of our actions, including their environmental, cultural, and moral implications."**
- *Defensive routines and interpersonal impediments to learning*
- *Implementation failure*

Requirements for successful learning in complex systems

- "... how do we get through the day without grave injury?"
- evolution by generating new candidate decision rules
- But evolution requires
 - ◆ generating new candidate rules with sufficient variety
 - ◆ better-performing rules are rewarded
 - ◆ evolution proceeds rapidly compared to changes in the system itself
- "Dynamic complexity and the misperceptions of feedback, however, reduce the effectiveness of all three."
 - ◆ riding a bicycle
 - ◆ real estate industry
- Virtual worlds
- Use of virtual worlds requires "reflective thought"
- "In practice, effective learning from models occurs bests, and perhaps only, when the decision makers participate actively in the development of the model.
- Need soft variables.
- When galaxies collide ...

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
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**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.*"

Class 4, 4/28/04

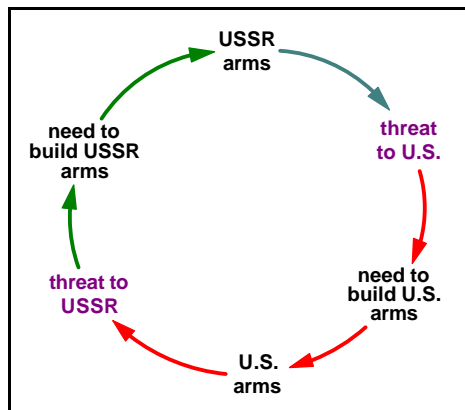
Attendance		20
Discussion on Coming Class Presentations		
5D Chapters 5	LCD projection & discussion	40
Break		10
Review Assignment (5D Ch 5 diagrams)		20
Counterintuitive Behavior of Social Systems	Discussion	20
Break		10
Counterintuitive Behavior of Social Systems	Discussion	20
Reflection Paper Review, General discussion		30
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5D. Chapter 5: A Shift of Mind

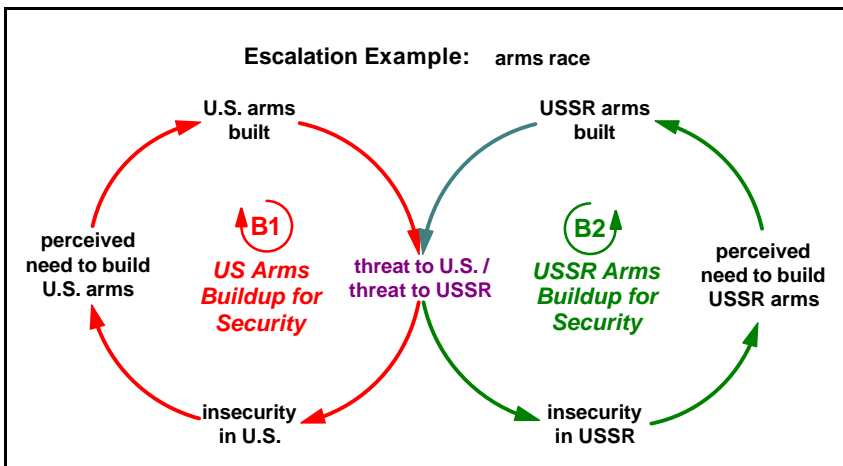
SEEING THE WORLD ANEW

- “whole” & “health” come from the same root
 “So it should come as no surprise that the unhealthiness of our world today is in direct proportion to our inability to see it as a whole.”
- Threads of tools and techniques of systems thinking
 - ♦ “feedback” concepts of cybernetics
 - ♦ “servo-mechanism” engineering theory
- The “arms race” ... a dynamically complex problem

- “Doing the obvious thing does not produce the obvious, desired outcome.”
- “The real leverage in most management situations lies in understanding dynamic complexity, not detail complexity.”
- Dynamic problem examples
 - ♦ developing profitable mix of price, product/service quality, design, availability for a strong market position
 - ♦ improving quality
 - ♦ lowering total costs
 - ♦ satisfying customers in a sustainable manner
- “Most “system analyses” focus on detail complexity not dynamic complexity.”
- How does one escape from an arms race dynamic?

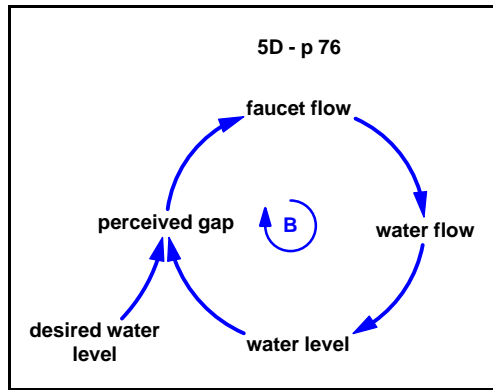


- Requires seeing:
 - ♦ interrelationships between actions and seeing threats created
 - ♦ delays between an action and its consequence
 - ♦ seeing patterns, not just events



- Influence is reciprocal. “... every influence is both *cause* and *effect*.”

SEEING CIRCLES OF CAUSALITY



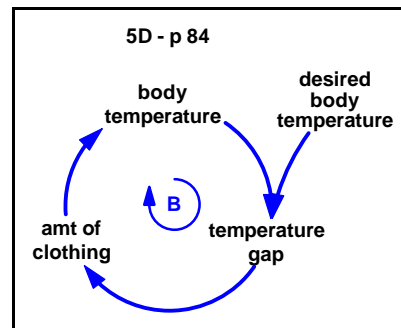
patterns (as many environmentalists fear occurs with such pollutants as CFAs). By the time the problem is noticed, it may be too late. Extinctions of species often follow patters of slow, gradually accelerating decline over long time periods, then rapid demise. So do extinctions of corporations.” !!!

♦ Balancing

- steering a car
- staying upright on a bicycle
- homeostasis
-
-

“... the system has its own agenda.”

- From the systems perspective, the human actor is part of the feedback process, not standing apart from it. This represents a profound shift in awareness.”
- “The feedback perspective suggests that everyone shares responsibility for problems generated by a system. That doesn’t necessarily imply that everyone involved can exert equal leverage in changing the system. but it does imply that the search for scapegoats — a particularly alluring pastime in individualistic cultures such as ours in the U.S. — is a blind alley.”

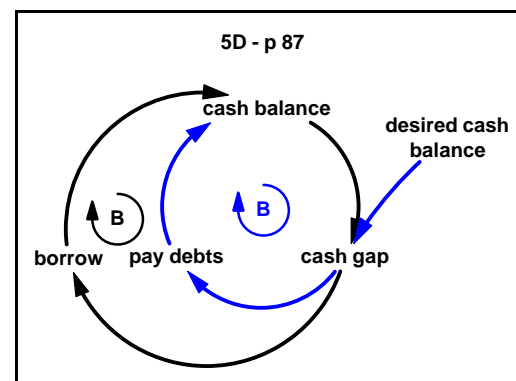
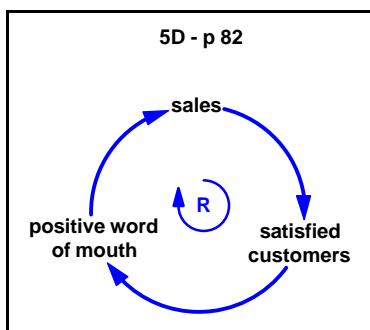
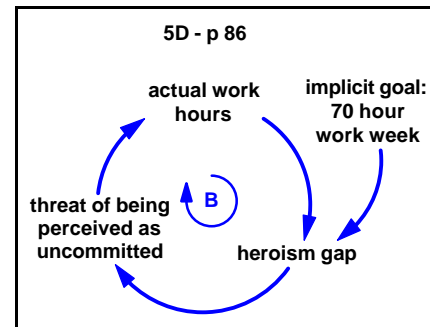


- Our language is limited ... we need a feedback language.

• Types of feedback loops

♦ Reinforcing (virtuous or vicious)

- “self-fulfilling prophecy”
- “Pygmalion effect”
- “gas crisis”
- “run on a bank”
- “word of mouth” sales



- Pond with lily pads

“That’s why environmental dangers are so worrisome, especially those that follow reinforcing

Question: In long-lived systems, are there more reinforcing or balancing processes?

Why is there resistance to change?

Compensating feedback

Policy resistance

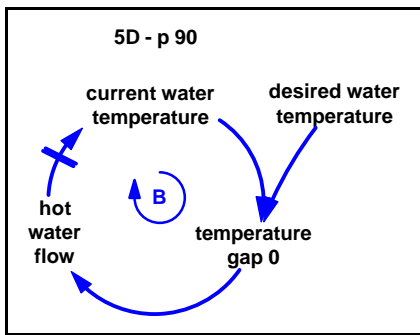
DELAYS

Ray Stata: "One of the highest leverage points for improving system performance is the minimization of system delays."

George Stalk: "The way leading companies manage time ... represents the most powerful source of competitive disadvantage."

Unrecognized delays can lead to

_____ and _____ (p. 89)



Systems thinking is generally oriented toward the long-term view. That's why delays and feedback loops are so important. In the short term, you can often ignore them' they're inconsequential. They only come back to haunt you in the long term."

Counterintuitive Behavior of Social Systems

Computer Models and Social Systems

- "Social systems are far more complex and harder to understand than technological systems."

- "The mental images in one's head about one's surroundings are models."
- "Fundamental assumptions differ but are never brought into the open. Goals are different but left unstated."
- "... system dynamics simulation models are explicit about assumptions and how they interrelate."
- "The problem is not shortage of data but rather inability to perceive the consequences of information we already possess."

Counterintuitive nature of Social Systems

- "In many instances it emerges that the known policies describe a system which actually causes the observed troubles. In other words, the known and intended practices of the organization are sufficient to create the difficulties being experienced."

Dynamics of Urban Systems

- For modeling exercise can choose the description of our urban problems in the paragraphs on p. 8 beginning with this sentence:

"The investigation showed how depressed areas in cities arise from excess low-income housing rather than from a commonly presumed housing shortage. ... "Show how policies on p. 10 influence the structure.

An important truth:

"Programs aimed at improving a city can succeed only if they result in eventually raising the average quality of life for the country as a whole."

On Raising the Quality of Life

- "To raise one component of quality of life without intentionally creating compensating counter pressures to prevent a rise in population will be self-defeating."

Characteristics of Social Systems

- "First, social systems are inherently insensitive to most policy changes that people choose in an effort to alter the behavior of systems."
- "Human intuition develops from exposure to simple systems."
- "Second, social systems seem to have a few sensitive influence points through which

behavior can be changed. These high-influence points are not where most people expect. Furthermore, **when a high-influence policy is identified, the chances are great that a person guided by intuition and judgment will alter the system in the wrong direction.**"

- "System dynamics models suggest sensitive control points for increasing the world-wide quality of life exist in the rate of generation of capital investment and in food production, but that expansion of industrialization and food output are the counter productive directions, both should be restrained."
- "Third, social systems exhibit a **conflict between short-term and long-term** consequences of a policy change.
- **A policy that produces improvement in the short run is usually one that degrades a system in the long run.** Likewise, policies that produce long-run improvement may initially depress behavior of a system.
- This is especially treacherous. The short run is more visible and more compelling. Short-run pressures speak loudly for immediate attention. However, sequences of actions all aimed at short-run improvement can eventually burden a system with long-run depressants so severe that even heroic short-run measures no longer suffice.
- **"Many problems being faced today are the cumulative result of short-run measures taken in prior decades."**

A global perspective

- **That current growth rates of population and industrialization will stop is inevitable.**
- Unless we choose favorable processes to limit growth, the social and environmental systems by their internal processes will choose for us. The natural mechanisms for terminating exponential growth appear the least desirable.
- **Unless the world understands and begins to act soon, civilization will be overwhelmed by forces we have created but can no longer control.**

Attractive Policies Can Create Disasters

- Figure 3 shows how a technological success (reducing our dependence on natural resources) can merely save us from one fate only to fall victim to something worse (a pollution catastrophe).

Throughout the world an undercurrent of doubt is developing about technology as a savior from social and environmental ills. There is a basis for such doubt. The source of doubt lies not in technology itself but in management of the entire technological-human-political-economic-natural complex.

- Figure 4 should make us cautious about rushing into programs on the basis of short-term humanitarian impulses. The eventual result can be antihumanitarian. Emotionally inspired efforts often fall into one of three traps set for us by the nature of social systems:
 - (1) The programs are apt to address symptoms rather than causes and attempt to operate through points in the system that have little leverage for change;
 - (2) the characteristic of systems whereby a policy change has the opposite effect in the short run from the effect in the long run can eventually cause deepening difficulties after a sequence of short-term actions; and
 - (3) the effect of a program can be along an entirely different direction than was originally expected, so that suppressing one symptom only causes trouble to burst forth at another point.

An Alternative to Catastrophe

- **"There are no utopias in social systems." !!!**
- "There appear to be no sustainable modes of behavior that are free of pressures and stresses."
- "The more promising modes may require a degree of restraint and dedication to a long-range future that people are not capable of sustaining."
- "... reduction in investment rate and reduction in emphasis on agriculture are counterintuitive and not likely to be accepted without extensive system studies and years of argument — perhaps more years than are available."

The Nation's Alternatives

- Be sure and read first full paragraph on p. 27 beginning with "Population grows ..."
Please, read it again.

Class 5, 5/05/04

Attendance		10
Forrester's paper on "Counterintuitive Behavior"	Discussion	10
Look for the loops	LCD projection & discussion	30
Break		10
5D Chapters 6 & Appendix 2 on the Systems Archetypes	LCD projection & discussion	45
Stocks and flows - assignment	LCD projection & discussion	10
Break		10
Questions about completing 5D diagrams	discussion	10
Reflection papers	discussion	10
Review for Exam	discussion	25
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Presentations

Students will present on the dynamic structure underlying behaviors observed from news articles, personal experience, or another source. There will be one presentation from each team of two or three.

After the team prepares a preliminary model, I will act as a consultant to the team to improve your model. In effect I will be an additional team member.

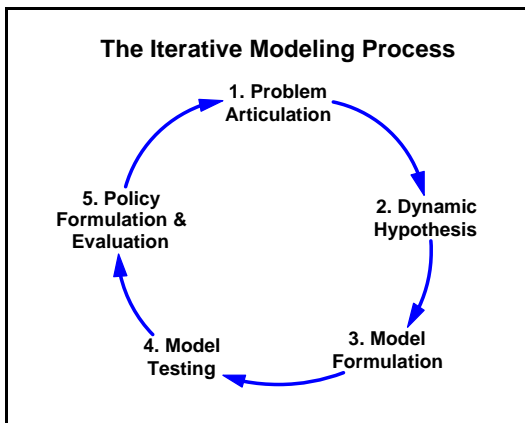
Specifics to be presented and submitted in the team report are in **bold** with an * below.

*Complete the Task Assignment Checklist

After the Presentation, complete the confidential ***Presentation Team Evaluations** and turn them in. This will count toward your grade.

The Modeling Process

For an overview, see the diagram on "The Iterative Modeling Process"¹ We're doing step 1, step 2, part of step 3 (which could include developing a simulation model), and a simplified step 5.



Problem Articulation (defines the boundary of the model)

- Select a story from news articles, personal experience, or another source. The story should

describe some problem for which the outcome is counterintuitive and which is dynamically complex.

- ***Provide a written summary of the story.**
- Describe the problem and why it's a problem.
 - ***Write a concise "problem statement."**
- Define key variables.
 - ***Identify and list the key variables.**
- Describe the behavior of the key variables over time.
 - ***Draw graphs of key variable behavior over time.**

Dynamic Hypothesis

- Describe your theory of the problematic behavior.
 - ***Write a description of the team's dynamic hypothesis that explains the dynamics as an internal (endogenous) consequence of the stock & flow or feedback structure of the system.**
- Map the causal structure using a causal loop diagram (CLD) or stock & flow (S&F) diagram and create transparencies for presentation to the class.
 - **Follow these guidelines:**
 - Use valid variable names: (1) don't include "less" or "more" (or equivalent indicator) as part of the name of the variables (2) valid variables can increase & decrease (e.g., "type of employee" isn't a variable, "number of engineers" is a variable).
 - Label links with link polarities.
 - Label loops with loop polarities.
 - Make the goals of balancing feedback loops explicit.
 - If appropriate, distinguish between "perceived conditions" and "actual conditions," because often there's a delay between a change in conditions and our perception of the change. An example is "perceived quality of life" vs. "actual quality of life." "Undesirable outcomes can result from taking action based on "perceived conditions," instead of basing action on "actual conditions".
 - Indicate important delays in causal links.

¹ From *Business Dynamics, Systems Thinking and Modeling for a Complex World* by John Sterman (2000)

- Name each loop to describe what's happening.
- Make important loops follow circular or oval paths.
- Minimize crossed lines.
- Don't try to get it right the first time, redraw and reorganize several times.
- If the diagram is complicated, create multiple layers that can be overlaid to build and build the structure.

Dynamic Behavior and Policy Recommendations

- **Tell the stories** using your CLD or S&F diagram model in the presentation to the class.
- **Identify systems thinking archetypes.**
- **Describe why you see the actual outcome as counterintuitive**, if what is happening differs from what one would think would happen, or **point to a conclusion or recommendation in the article, or generally accepted solution, that will not work or does not work for reasons you explain with your model** (e.g., the article may recommend a fix that will fail).

“Tragedy of the Commons” archetype & farming

From: <http://www.agpolicy.org/weekcol/169.html>

Current commodity programs: Are they for the producers or the users?

As we know, under current farm policy, up to half of the total US net farm income has come from government payments in recent years. In some grain-dominated farm-states government payments have equaled or exceeded net farm incomes on occasion.

It's no mystery why this has occurred. The 10 to 15 million acres that were periodically “set-aside” became permanently available for production with the 1996 farm bill. During the discussion of the bill, some were claiming that farmers would idle land on their own since “farmers would receive the decoupled payments whether or not they produced on the land.” That, of course, was an incredulous expectation. Farmers and others who understand how agriculture operates knew what to expect: in the main, farmers would farm every square foot available to them irrespective of whether the land had previously been part of a set-aside, 0/92 or any other land diversion program. That is just the way it is.

As a result, prices plummeted and government payments were provided to help fill the gap. In presentations, I often point out that this policy of all-out-production, with no regard for market needs, is a boon for users of grain and other crop. Crop agriculture is providing integrated livestock producers, millers and other processors, and importers with one of their most important raw-material inputs at a 40 to 50 percent discount with Uncle Sam picking up the difference. Furthermore, agribusinesses sell the seed, fertilizer, herbicides, transportation, handling

and other goods and services required to keep crop agriculture producing at full tilt.

The obvious conclusion is that it's the grain users and agribusinesses who are the real beneficiaries of today's government check-writing version of commodity programs, not crop farmers. Crop farmers could receive the same net income as now by producing less and receiving their revenue totally from the market.

Then grain users and agribusinesses would have to pay closer to the full-cost of production for grains, and the sales of inputs and other goods and services by agribusiness would settle down from their inflated levels.

This is a result that most economists would usually applaud but, in this case, are dead set against because actions would have to be taken to cut crop-production. They give a thumbs-up however when Sony announces plans to reduce production of TV sets by “setting aside” workers and production facilities as means to increase Sony profits and ultimately the value of 401Ks.

Of course, it would be preferable if crop farmers themselves could individually throttle production to better meet market needs. Since the absurdity of that is evident to all by now, second best solutions require collective action that could be farmer-run but have usually been administered as part of farm legislation.

If the intended major beneficiaries of the recent farm policies were the large integrated livestock producers, grain importers and multinational agribusinesses, kudos to the designers. If not, it may be time to rethink agricultural policy.

Daryll E. Ray holds the Blasingame Chair of Excellence in Agricultural Policy, Institute of Agriculture, University of Tennessee, and is the Director of UT's Agricultural Policy Analysis Center. (865) 974-7407; Fax: (865) 974-7298; dray@utk.edu; <http://www.agpolicy.org>.

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Class 6, 5/12/04

Attendance	discussion	10
Urban Dynamics extra credit problem	Overhead	20
5D Chapters 6 & Appendix 2 on the Systems Archetypes	LCD projection & discussion	45
Break		10
Class 6 slides “Limits to Growth” structures, product life cycle “S-Curve”, & overshoot and collapse.	LCD projection & discussion	40
Break		10
Reflection papers	discussion	5
Answers to adding links to 5D diagrams	LCD projection & discussion	20
Stocks and flows - assignment	Overhead projection & discussion	10
		170

5D. Chapter 7: The Principle of Leverage

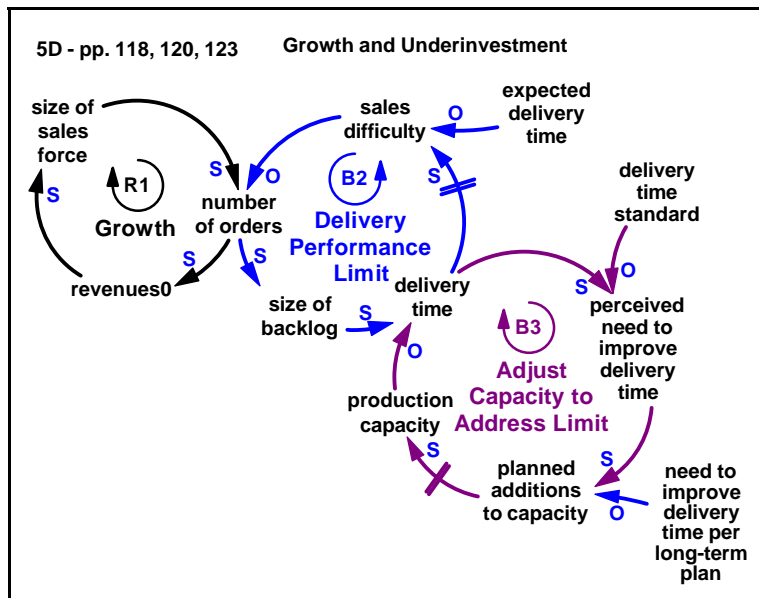
Another Archetype

Growth & Underinvestment

(note: I forgot to show both the delays on archetype handout & the “need to improve delivery time per long-term plan” variable.)

problem, but we can’t rush into major investments unless we’re certain demand will be sustained.’ They didn’t realize that demand would never be sustained until they made the investment.”

- “It is the gradualness of the eroding goals and declining growth that makes the dynamics of this structure so insidious. This is the structure that underlies the “boiled frog” syndrome ...”



- “For an entire industry, the result is increasing vulnerability to foreign competitors with higher standards, happening so slowly that it’s difficult to detect, often masked by “shifting the burden” palliatives such as increased advertising, discounting, “restructuring,” or lobbying for tariff protection.”
- “In my opinion, the dynamics of eroding goals and underinvestment lie at the heart of the demise, between the mid-1960s and mid-1980s, of many American manufacturing industries, such as steel, autos, machine tools, and consumer electronics. In each of these industries, loss of market share to foreign competitors, which was invariably blamed on external factors, had its origins, at least in part, in weak standards for customer satisfaction, underinvestment, and unhappy customers.”

- “WonderTech’s fate could have been reversed.
- “There was a point of leverage in the structure: the firm’s original commitment to an eight-week delivery time.”
- Continuing financial stress is both the cause & “consequence of underinvestment.”
- “His counterpart in manufacturing acknowledged that they occasionally got behind their backlogs, but only when their capacity was inadequate.. But the top managers said, ‘Yes, we know it’s a

- Story about “Digital Equipment” avoiding the underinvestment trap.
- “The art of systems thinking lies in being able to recognize increasingly (dynamically) complex and subtle structures ... [and] ... in seeing patterns where others see only events and forces to react to.

5D. Chapter 8: The Art of Seeing the Forest and the Trees

- “... the fundamental ‘information problem’ faced by managers is not too little information but too much information. What we most need are ways to know what is important and what is not important, what variables to focus on and which to pay less attention to — and we need ways to do this which can help groups or teams develop shared understanding.”
- The story of People Express Airlines.
- “... People Express *could* have been an enduring success”
- “The key is strengthening the ‘fundamental solution’ of building service capacity. This is best done by *limiting* demand growth and by a commitment to service quality.”
- “Many have suggested that People grew too fast, but the leverage lies in pricing somewhat higher, both to slow down growth *and* to increase profits to invest in building service capacity.”
- “In the end, People Express’s executives’ belief that the enemy was ‘out there’ kept them from seeing the contradictions in their own policies and strategies.”

Class 7, 5/19/04

Attendance		10
Class 6 slides on "Limits to Growth" structures, product life cycle "S-Curve", & overshoot and collapse.	LCD projection & discussion	20
5D Chapters 7 & 8, Growth & Underinvestment, Seeing the Forest & the Trees: People Express	LCD projection & discussion	10
Project Management Dynamics	LCD projection & discussion	30
Break		10
Project Management Dynamics	LCD projection & discussion	45
Answers to exam	LCD projection & discussion	15
Break		10
5D Chapters 9 & 10 Personal Mastery & Mental Models	LCD projection & discussion	20
Reflection papers	discussion	10
		180

5D. Chapter 9: Personal Mastery

- Organizations learn only through individuals who learn. Individual learning does not guarantee organizational learning. But without it no organizational learning occurs.

** Note: But organizations can learn more than organizations do because individual managers "learn too much from too little" when they do not tap the learning of everyone in the organization. And organizations don't have to forget when individuals do; they can maintain checklists to not repeat mistakes and create learning histories to remember the lessons of the past.*

- When personal mastery becomes a discipline — an activity we integrate into our lives — it embodies two underlying movements.
 - The first is continually clarifying what is important to us. (**vision**)
 - The second is continually learning how to see **current reality** more clearly.
- ... personal mastery is not something you possess. It is a process. It is a lifelong discipline. People with a high level of personal mastery are acutely aware of their ignorance, their incompetence, their growth areas. And they are deeply self-confident. Paradoxical? Only for those who do not see that "the journey is the reward."
- O'Brien ...: "In the type of organization we seek to build, the fullest development of people is on an equal plane with financial success. This goes along with our most basic premise: that practicing the virtues of life and business success are not only compatible but enrich one another. This is a far cry from the traditional 'morals of the marketplace.'"
- There are obvious reasons why companies resist encouraging personal mastery.
 - It is "soft," based in part on unquantifiable concepts such as intuition and personal vision.

- Cynicism. The human potential movement, ... overpromised itself to corporations during the 1970s and 1980s. It prompted executives to idealize each other and expect grand, instant, human character transformations, which can never happen.
- ... some fear that personal mastery will threaten the established order of a well-managed company. This is a valid fear. *To empower people in an unaligned organization can be counterproductive.* ... [and] only increase organizational stress and the burden of management to maintain coherence and direction.
- Most adults have little sense of vision.
 - ... [they have] "negative visions" ... a teenager in one of our programs once said, "We should call them 'grown-ups' we should call them 'given ups.'"
 - A subtler form of diminished vision is "focusing on means not the result." ... *The ability to focus on ultimate intrinsic desires, not only on secondary goals, is a cornerstone of personal mastery.*
 - * Note: e.g., profits seen as a means to fulfilling an organization's Values, Purpose and Vision, not as an end in itself.* Book: *The Living Company* by Arie de Geus
- Mastery of creative tension transforms the way one views "failure." ... Failure is an opportunity for learning ... Ed Land, founder of Polaroid, ... plaque on his wall ... "A mistake is an event, the full benefit of which has not yet been turned to your advantage."
- Common view: "Things must get bad enough or people will not change in any fundamental way." This leads to the mistaken belief that fundamental change *requires* a threat to survival.
- ... human beings are more complex than we often assume. We both fear and seek change. ... "People don't resist change. They resist being changed."
- Commitment to the truth: ... a relentless willingness to root out the ways we limit or deceive ourselves from seeing what is, and to continually challenge our theories of why things are the way they are.

- Structures of which we are unaware hold us prisoner. The Koran: “What a tragedy that man must die before he wakes up.”
- ... the learning challenge faces by us all: to continually expand our awareness and understanding, to see more and more of the interdependencies between actions and our reality, to see more and more of our connectedness to the world around us.

5D. Chapter 10: Mental Models

- Harvard’s Chris Argyris, who has worked with mental models and organizational learning for thirty years, puts it this way: “Although people do not [always] behave congruently with their espoused theories [what they say], they do behave congruently with their theories-in-use [their mental models].”
* *Note: We’ll review this in detail when we cover Team Learning.*
- As Albert Einstein once wrote: “Our theories determine what we measure.” For years, physicists ran experiments that contradicted classical physics, yet no one “saw” the data that these experiments eventually provided, leading to revolutionary theories — quantum mechanics and relativity — of twentieth-century physics.
* *Note: This is why forming theories of organizations and other social systems is so vital.*
- “Scenario planning” ... a method for summarizing alternative future trends.
- Shell ... Group planners developed a set of scenarios ... which forced the managers to identify all the assumptions that had to be true in order for the managers’ “trouble-free” future to occur. This revealed a set of assumptions only slightly more likely to come true than a fairy tale.
- “In the traditional authoritarian organization, the dogma was managing, organizing and controlling,” says Hanover’s CEO Bill O’Brien. “In the learning organization, the new ‘dogma’ will be vision, values, and mental models.”
- The impact [of the Beckett, “Thinking about Thinking” program’s survey of major philosophies of thought over 5 full days, which Beckett describes as “sandpaper on the brain”] on managers’ understanding of mental models is profound — most report that they see for the first time in their life that all we ever have are assumptions, never “truths,” that we always see the world through out mental models and that the mental models are *always* incomplete, and especially in Western culture, chronically nonsystemic.

... he emphasizes the distinction between “process thinking” and seeing only “snapshots,”

and poses systems thinking as a philosophical alternative to the pervasive “reductionism” in Western culture — the pursuit of simple answers to complex issues.

- **Leaps of Abstraction:** ... occur when we move from direct observation (concrete “data”) to generalization without testing. Leaps of abstraction impede learning because they become axiomatic. What was once an assumption becomes treated as a fact.
- **Left-Hand Column:** (see class slides)
- **Balancing Inquiry and Advocacy:** Advocacy without inquiry begets more advocacy.
* *Note: ... provoking an escalating argument.*
- The most productive learning usually occurs when managers combine skills in advocacy and inquiry.
- **Espoused Theory versus Theory-in-Use:** ... recognizing the gap between our espoused theories (what we say) and our “theories-in-use” (the theories that lay behind out actions) is vital. Otherwise, we may believe we’ve “learned” something just because we’ve got the new language and concepts to use, even though our behavior is unchanged.
- Gaps between espoused theories and theories-in-use ... for example ... a gap between ... my vision [that people are basically trustworthy] and my current behavior [in that I never lend friends money] holds the potential for creative change.
The problem lies not in the gap but ... in failing to tell the truth about the gap. Until the gap between my espoused theory and my current behavior is recognized, no learning can occur.
- Mental Models & The Fifth Discipline (Systems Thinking): Contemporary research shows that most of our mental models are systematically flawed. [As we read in John Sterman’s paper on “Learning in and about complex systems.”]
- Eventually, what will accelerate mental models as a practical management discipline will be a *library of “generic structures”* used throughout an organization. These “structures” will be based on systems archetypes ... but they would be suited to the particulars of a given organization — its products, market, and technologies.
- Just as “linear thinking” dominates most mental models used for critical decisions today, the learning organizations of the future will make key decisions based on shared understandings of interrelationships and patterns of change.

Class 8, 15/26/04: Class time used for Team Projects, Mid-term exam, and Catchup: Class 7 Slides, Project Mgmt Dynamics

Class 9, 6/02/04

Project Management Voting Results	LCD projection & discussion	10
Class 9 slides on 5D Chapters 11 - 12. Shared Vision, Team Learning, Defensive Routines, Dialogue, Undiscussables, Facilitation	LCD projection & discussion	40
Break		10
Attendance		5
Places to Intervene, SD Meets the Press	discussion	20
Break		10
Team presentations		55
Reflection papers	discussion	20
		170

5D. Chapter 11: Shared Vision

- Learning can be difficult, even painful.
- I have come to feel that our failure lies not in unpersuasiveness or lack of sufficiently compelling evidence. ***It may simply not be possible to convince human beings rationally to take a long-term view.***
- People do not focus on the long term because they *have* to, but because they *want* to.
- With its emphasis on extensive analysis of competitors' strengths and weaknesses, of market niches and firm resources, typical strategic planning fails to achieve the one accomplishment that would foster longer range actions — in Hamel's and Prahalad's terms, setting a "goal that is worthy of commitment."
- Shared vision can generate levels of creative tension that go far beyond individuals' "comfort levels."
- ... when a group of people come to share a vision for an organization, each person sees his own picture sees his own picture of the organization at its best. Each shares responsibility for the whole, not just for his piece. But the component "pieces" of the hologram are not identical. Each represents the whole image from a different point of view.
- **Understand:**
 - ♦ **Commitment**
 - ♦ **Enrollment**
 - ♦ **Compliance**
- Governing ideas
 - ♦ Vision - What?
 - ♦ Purpose - Why?

- ♦ Values - How do we act?
- **Growth of "shared vision" can encounter a "limits to growth" structure with limits due to:**
 - ♦ diversity and conflicting visions
 - ♦ discouragement due to the perceived gap between vision and reality
 - ♦ insufficient time for vision due to the demands of dealing with current reality
 - ♦ proselytizing divides people into those who are "true believers" and those who are not ... damaging the quality of relationships
- **Assignment: correctly add link polarities to the CLD on pages 228 - 230.**
- Vision paints the picture of what we want to create. Systems thinking reveals how we have created what we currently have.
- **Vision becomes a living force only when people truly believe they can shape their future.**
- *NOTE: Remember our "creating reality" survey and the wide distribution of responses?*
- *NOTE: I would add "... and know how they can shape their future by understanding structure and designing policies that will bring their desired results."*
 - ... remember the cartoon showing the Vikings, even with a vision and mission, going in circles because they hadn't looked at the structure of their system?

5D. Chapter 12: Team Learning

- Individuals do not sacrifice their personal interests to the larger team vision' rather, the shared vision becomes an extension of their personal visions. In fact, alignment is the *necessary condition* before

empowering the individual will empower the whole team.

- **Empowering the individual when there is a relatively low level of alignment worsens the chaos and makes managing the team even more difficult.**
- The discipline of team learning involves mastering the practices of
 - ♦ dialogue
 - ♦ skillful discussion
- Team learning also involves learning how to deal creatively with the powerful forces opposing productive dialogue and discussion in working teams. Chief among these are what Chris Argyris calls “defensive routines,” habitual ways of interacting that protect us and other from threat and embarrassment, but which also prevent us from learning.
- **Systems thinking is especially prone to evoking defensiveness because of its central message, that our actions create our reality.** Thus, a team may resist seeing important problems more systemically. To do so would imply that the problems arise from our own policies and strategies — that is “from us” — rather than from forces outside our control.
- ... the discipline of team learning, like any discipline, requires practice. Yet, this is exactly what teams in modern organizations lack. Imagine trying to build a great theater ensemble or a great symphony orchestra without rehearsal. Imagine a championship sports team without practice.
- In fact, the process whereby such teams learn *is* through continual movement between practice and performance ...

The Discipline of Team Learning Dialogue and Discussion

- Bohm ... argued that the purpose of all science was not the “accumulation of knowledge” (since, after all, all scientific theories are eventually proved false) but rather the creation of “mental maps” that guide and shape our perception and action, bringing about a constant “mutual participation between nature and consciousness.”
- **Discussion:** ... has the same root as percussion ... it suggests something like a “ping pong” game ... the purpose of a game is normally “to win.”
- **Dialogue:** ... a free flow of meaning between people ... a group accesses a larger “pool of

common meaning.” The purpose ... is to reveal the incoherence in our thought. Thought ...

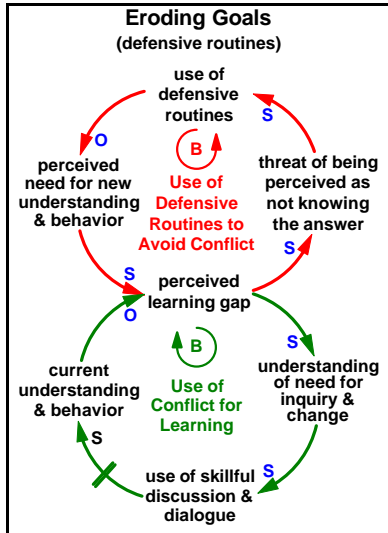
- ♦ denies it is participative
- ♦ stops tracking reality and “just goes, like a program”
- ♦ establishes its own standard of reference for fixing problems, problems which it contributed to creating in the first place.
- The prejudiced person can’t see how his prejudice shapes what he “sees” and how he acts.
- Conditions for dialogue
 - ♦ Suspending assumptions
 - ♦ Seeing each other as colleagues
 - ♦ A facilitator who “holds the context” of dialogue
- ... great teams are not characterized by an absence of conflict. On the contrary ... **one of the most reliable indicators of a team that is continually learning is the visible conflict of ideas. In great teams conflict becomes productive.**
- ... in mediocre teams, one of two conditions usually surround conflict
 - ♦ **an appearance of no conflict** on the surface ... members believe that they must suppress their conflicting views in order to maintain the team — if each person spoke her or his mind, the team would be torn apart by irreconcilable differences
 - ♦ **rigid polarization** ... managers “speak out,” but conflicting views are deeply entrenched. Everyone knows where everyone else stands, and there is little movement.

Dealing with “Current Reality”: Conflict & Defensive Routines

- Chris Argyris: “We are programmed to create defensive routines and cover them up with further defensives routines ... This programming occurs early in life.”
- The source of defensive routines, according to Argyris, is not belief in our views or desire to preserve social relations, as we might tell ourselves, but fear of exposing the thinking that lies behind our views. “Defensive reasoning,” says Argyris “... protects us from learning about the validity of our reasoning.” For most of us, exposing our reasoning is threatening because we are afraid that people will find errors in it.

- It is simply unacceptable for managers to act as though they do not know what is causing a problem. Those that reach senior positions are masters at appearing to know what is going on, and those intent on reaching such positions learn early on to develop an air of confident knowledge.

- “We are the carriers of defensive routines, and organizations are the hosts. Once organizations have been infected, they too become carriers.”



- “The paradox,” writes Argyris, “is that when [defensive routines] succeed in preventing immediate pain they also prevent us from learning how to reduce what causes the pain in the first place.”

- ... where is the leverage for reducing [defensive routines]? In most shifting the burden structures, there are two possible areas of leverage: weaken the symptomatic solution and strengthen the fundamental solution
 - ♦ ... diminishing the emotional threat that prompts the defensive response in the first place.
 - ♦ ... learning how to deal with defensive routines ... also weaken the symptomatic solution. To retain their power, defensive routines *must remain undiscussable*.

Skillful managers learn to confront defensiveness without producing more defensiveness. They do so by self-disclosure and by inquiring into the causes of their own defensiveness.

- ... learning teams practice a special form of alchemy, the transformation of potentially divisive conflict and defensiveness into learning.

Practice

- Team learning requires practice: **The almost total absence of meaningful “practice” or “rehearsal” is probably the predominant factor that keeps most management teams from being effective learning units.**
 - ♦ dialogue
 - Suspension of assumptions.

- Acting as colleagues.
- Spirit of inquiry.
- ♦ “learning laboratories” & “microworlds”

Team Learning and the Fifth Discipline

- ... Charles Kiefer says it this way: “Reality is composed of multiple-simultaneous, interdependent cause-effect-cause relationships. From this reality, normal verbal language extracts simple, linear cause-effect chains. This accounts for a great deal of why managers are so drawn to **low leverage interventions.**” For example:

- ♦ if the problem is long product development times we hire more engineers to reduce times;
- ♦ if the problem is low profits we cut costs;
- ♦ if the problem is falling market share we cut price to boost share.

- Because we see the world in simple obvious terms, we come to believe in simple, obvious solutions. this leads to the frenzied search for simple “fixes” ...

- This situation is unlikely to improve until teams share a new language for describing complexity.

- **Today, the only universal language of business is financial accounting. But accounting deals with detail complexity not dynamic complexity.** It offers “snapshots” of the financial conditions of a business, but it does not describe how those conditions were created.

- Today, there are several tools and frameworks that provide alternatives to traditional accounting as a business language. These include competitive analysis, “Total Quality,” and, though much less widely used, scenario methods such as those developed at Shell. **But none of the tools deals with dynamic complexity very well or at all.**

- When the systems archetypes are used in conversations about complex and potentially conflictual management issues, reliably, they “objectify” the conversation. The conversation becomes about “the structure,” the systemic forces at play, not about personalities and leadership styles.

- Difficult questions can be raised in a way that does not carry the innuendoes of management incompetence or implied criticism. ... This, of course, is precisely the benefit of a *language for complexity* — it makes it easier to discuss complex issues objectively and dispassionately.

- Without a shared language for dealing with complexity, team learning is limited. If one member of a team sees a problem more systemically than others, that person's insight will get reliably discounted — if for no other reason than the intrinsic biases toward linear views in our normal everyday language.
- On the other hand, the benefits of teams developing fluency in the language of the systems archetypes are enormous, *and* the difficulties of mastering the language are actually reduced in a team.
- As David Bohm says, **language is collective**. Learning a new language, by definition, means learning how to converse with one another in the language.

5D. Chapter 13: Openness

- Hanover's Bill O'Brien, (on getting used to the smell of a paper mill and not noticing it after a time) "... **Organizational politics is such a perversion of truth and honesty that most organizations reek with its odor. Yet, most of us take it for granted and don't even notice it.**"
- "So long as there are organizations there will be politics." Yet, very few people truly want to live in organizations corrupted by internal politics and game playing. This is why internal politics is the first of many organizational "givens" challenged by prototype learning organizations.
- Challenging the grip of internal politics and game playing starts with building shared vision. ... building an organizational climate dominated by "merit" rather than politics — where doing *what is right* predominates over *who wants what done*.
- Openness
 - ♦ **participative openness:** the norm of speaking openly and honestly about important issues
 - ♦ **reflective openness:** the capacity to continually challenge one's own thinking.
- Without openness it is generally impossible to break down the game playing that is deeply embedded in most organizations.
- Together vision and openness are the antidotes to internal politics and game-playing.

Shared Vision: Building an Environment where Self-Interest is Not Paramount

- ... "practitioners [of political leadership] believe that people are motivated by self-interest and by a search for power and wealth." As with many

assumptions, ***this one can be self-fulfilling.*** (emphasis added)

- On a management team of a Boston area technology firm building shared vision: ... one of the senior salespeople commented offhandedly, "Of course, we don't mean that we will be honest to our customers." ... The president broke the silence by stating, "Yes. For me this means being completely honest with our customers." The salesman responded, "If we do we'll lose 30% of our booking next month. ... If we tell the truth, our delivery times will be 50% longer than what customers believe they will get from competitors." ... "I don't care," was the president's response. "I simply don't want to be part of an organization that sanctions lying ... I believe that over time, we'll establish a reputation for reliability with our customers that will win us more customers than we'll lose."
- This session took place six years ago. In the intervening period, the firm has prospered and established a preeminent position in its niche market.

Participative Openness and Reflective Openness

- Participative openness may lead to more "buy-in" on certain decisions, but by itself it will rarely lead to better quality decisions because it does not influence the thinking behind people's positions.
- Reflective openness is based on skills, not just good intentions. The skills of reflection and inquiry (mental models chapter) ... include ... recognizing "leaps of abstraction" distinguishing espoused theory from theory-in-use, ... becoming more aware of and responsible for what we are thinking and not saying, ... dialogue and dealing with defensive routines (team learning chapter).

Openness & Complexity

- Nothing undermines openness more surely than certainty. Once we feel as if we have "the answer," all motivation to question our thinking disappears. But the discipline of systems thinking shows that there simply is "no right answer" when dealing with complexity.
- On a group process creating a systems diagram to figure out how to balance our work and family responsibilities: Within a half hour, we've covered the wall with circles and arrows. Everyone in the room feels overwhelmed ... People gradually come to realize that no one could possibly come to figure out all these interactions.

- **The “Wall” reveals ... insights into the roots of authoritarianism ...** As children, their parents had the answers. As students, their teachers had the answers. ... when they enter organizations, they assume that “the boss” must have the answers.
- This mentality weakens them as individuals, and the organization as a whole. ...it absolves them of responsibility in the organization’s learning. It also predisposes them to cynicism when events eventually reveal that the people at the top did not have all the answers.
- Conversely, when people in an organization come collectively to recognize that nobody has the answers, it liberates the organization in a remarkable way.
- A VP of a Boston-based high-tech company, a student of Zen Buddhism: **“Many people will say that once you recognize that you can never figure life out, you have denied rationality. But that’s not true. You have simply recontextualized rationality. To search for understanding, knowing that there is no ultimate answer, becomes a creative process — one which involves rationality, but also something more.”**
- ... The “Wall” experience shows, that any “answer” you have is at best an approximation — always subject to improvement, never final.
- **The “compartmentalization of knowledge” creates a false sense of confidence.** For example, the traditional disciplines that influence management — such disciplines as economics, accounting, marketing, and psychology — divide the world into neat subdivisions within which one can often say, “This is the problem and here is its solution.” But ... life comes to us whole. It is only the analytic lens we impose that makes it seem as if problems can be isolated and solved.
- Types of problems:
 - ♦ **Convergent problems** ... that have a solution. Examples: “What is 2 + 2?” “What is the fastest route from Colorado Springs to Denver?”
 - ♦ **Divergent problems** have no “correct” solution. Examples: “What is the best way to educate children?” “What is our company’s value proposition?” “How do we best satisfy customers?”
- **“The impulse to openness, as O’Brien says, “is the spirit of love.”** ... the full and unconditional commitment to another’s “completion,” to another being all that she or he can and wants to be.
- M. Scott Peck, *The Road Less Traveled*, 1978:

- ♦ **“Love is** the will to extend one’s self for the purpose of nurturing one’s own or another’s spiritual growth.” (p. 81)
- ♦ **“Love is** work or courage directed toward the nurture of our own or another’s spiritual growth.” (p. 120)

Freedom

- ... in the beer game ... people can run their local operation any way they want. Yet, ironically, the results they produce, in almost all cases, are contrary to what they intend. Because of this they often feel helpless, trapped with a set of forces they cannot control, despite being free to make their own decisions.
- **This is the great irony of freedom of action; by itself, it can result in helplessness, in feeling trapped and impotent.**
- “People think they are free because of the absence of external controls,” says O’Brien. “But, in fact they are **prisoners of a deeper and more insidious form of bondage — they only have one way of looking at the world.**”
- “Freedom to” (rather than “freedom from”) is the freedom to create the results we truly desire.”

5D. Chapter 14: Localness

How Do You Achieve Control without Controlling?

- People learn most rapidly when they have a genuine sense of responsibility for their actions. ... if we know our fate is in our own hands, our learning matters.
- That is why learning organizations, will increasingly, be “localized” organizations, extending the maximum degree of authority and power as far from the “top” ... as possible.
- **But localness means unique new challenges:**
 - ♦ **giving up “being in control”** ... keeps many senior managers from discover their new role ...: responsibility for continually enhancing the organization’s capacity for learning.
 - ♦ **making local control work:** [knowing when and addressing when] ... local decision makers did not ... make good decision makers.

The Illusion of Being in Control

- Beyond money, beyond fame, what drives most executives ... is power, the desire to be in control. most would rather give up anything than control.”

- ... imagine that you have two roller skates, attached to one another by a spring. You use the first roller skate to control the motion of the second. ... Keep adding roller skates. ... It doesn't take long to give up any hope of controlling the roller skate at the far end of the line.
- Organizations are infinitely more complex
- The illusion of being in control can appear quite real.

Control Without "Controlling"

- **In the absence of systems thinking, local decision making can become myopic and short-term.** This happens because local decision makers fail to see the interdependencies by which their actions affect others outside their local sphere.
- **"The Tragedy of the Commons"** ... is especially relevant for making localness work. ...
- Hardin's situations where two conditions are met:
 - ♦ there exists a "commons," a resource shared among a group of people.
 - ♦ individual decision makers, free to dictate their own actions, achieve short-term gains from exploiting a resource but do not pay, and are often unaware of, the cost of that exploitation — except in the long run.
- "Tragedies of the Commons" take place all over the world --- in the world's fisheries, in farmlands in developing countries, in the Brazilian rain forests, and with acid rain and greenhouse-effect gases.
- Corporations have many depletable "commons" to share: financial capital, productive capital, technology, community reputation, good will of customers, good will and support of suppliers, and morale and competence of employees ...
- Tragedy of the Commons structures are most insidious when the coupling from individual action to collective consequence is weak in the short run, yet strong in the long run.
- Divisionalism and autonomy has created more short-term oriented managers, managers who are more driven by the bottom line, than ever before. The reason is simple. ... they are accountable for their own profits, they are measured by their quarterly and yearly results, and they expect to stay in that position for two to four years. That produces a system designed to be driven by the short term.
- Who will manage the "commons"?
... two general options:

- ♦ **set up a manager of the commons** ... Being the manager of a commons can be thankless and counterproductive, unless there is a broad-based understanding throughout the organization — of why the resource is a commons and why depleting it will work to *everyone's* disadvantage.
- ♦ ... **establish signals**, perhaps coupled to rewards and costs, that alert local actors that a "commons" is in danger.
- W. L. Gore's "water-line" principle: ... mistakes below the "water-line" will sink the ship. Below-the-water-line risks — actions which might jeopardize important "commons" — should be undertaken only after careful consultation with representatives of all other parties who might be affected.

The New Role of Central Management

- The essence of the new role ... will be what we might call *manager as researcher and designer*.
- Research: Understanding the organization as a system and understanding the internal and external forces driving change.
- Design: The learning processes whereby managers throughout the organization come to understand these trends and forces.

The New Role of Central Management

- To be effective, localness must encourage risk taking among local managers. But to encourage risk taking is to practice forgiveness. Real forgiveness includes "forgive" and "forget."
- Learning organizations practice forgiveness because, as Cray Research's CEO John Rollwagen says, "Making the mistake is punishment enough."
- **NOTE:** Managers can put in place processes and safeguards to assure that the same mistakes do not reoccur.

5D. Chapter 15: A Manager's Time

How Do Managers Create the Time for Learning?

- ... numerous experiments ... to study managers' learning habits ... show that *even* when there is ample time for reflection and the facility for retrieving all manner of relevant information (in the form of a computer-based simulation, in which the managers play out their real-life roles), most managers do *not* reflect carefully on their actions.
- In a simulated four-year exercise, managers may run through three to six different strategies, without *once* examining why a strategy seems to be failing or articulating specifically what they hope to accomplish through a change in strategy.
- O'Brien: "... my job is not consumed with making many decisions. It is consumed with identifying important issues the organization must address in the future, helping others sort through decisions the must make, and the overarching tasks of organizational design" (see Chapter 18 on the design functions of leadership).
- One useful starting point for all managers is to look at their time for thinking.

5D. Chapter 16: Ending the War between Work and Family

How can personal mastery and learning flourish at work *and* at home?

- ... one Ann Arbor Michigan study found that 36% of the children of executive undergo treatment for psychiatric or drug abuse each year, vs. 15% of children of non-executives in the same companies. The author went on to cite the executives' long hours and personal characteristics (perfectionism, impatience, and efficiency) as the chief culprits and counseled that high-powered managers need to learn how to boost their children's "self esteem."
- What was most interesting about the article, however, was what it didn't say ... about how the executives' organizations contributed to their problems as parents or what they might do to improve matters. It seems that the author, like most of the rest of us, simply accepts the fact that work inevitably conflicts with family life, and that the organization has no part to play in improving imbalances between work and family.

The structure of Work/Family Imbalance

- [The] systems archetype underlying the work-family imbalance ... is called "Success to the

Successful" because it consists of two reinforcing growth processes, each of which tend to fuel increasing levels of success — albeit to competing activities.

- ... the imbalances are not self-correcting. Indeed, they grow worse and worse over time.

The Individual's Role

- ... setting clear personal goals.
- In some organizations, **managers may pay a price in their career opportunities if they take a stand** for a vision of balance between work & family.
- I know of **no simple advice** to offer in such circumstances except
 - ♦ Identify what is truly important to you
 - ♦ Make a choice (commitment)
 - ♦ Be truthful with those around you regarding your choice
 - ♦ Do not try to manipulate them into agreement or superficial support.

The Organization's Role

- Ironically, conflicts between work and family may be one of the primary ways through which traditional organizations limit their effectiveness and ability to learn. By fostering such conflict, they distract and unempower their members — often to a far greater degree than they realize. Moreover, they fail to exploit a potential synergy that can exist between learning organizations, learning individuals, and learning families.
- ... the most important ... first step — acknowledging that one cannot build a learning organization on a foundation of broken homes and strained personal relationships.

5D. Chapter 17: Microworlds: The Technology of the Learning Organization

How can we rediscover the child learner within us?

- ... **"learning by doing" only works so long as the feedback from our actions is rapid and unambiguous. When we act in a complex system the consequences of our actions are neither immediate nor unambiguous. Often, they are far removed from us in time and space.**
- "Microworlds" & "Management Flight Simulators"
- Understand the behaviors, dynamic and lessons of "The Claims Learning Laboratory"

- **Assignment: correctly add link polarities to the CLD on page 330.**

Microworlds and Organizational Learning

- Key issues that are being studied:
 - ♦ Integrating the microworld and the “real” world
 - ♦ Speeding up and slowing down time
 - ♦ Compressing space
 - ♦ Isolation of variables
 - ♦ Experimental orientation
 - ♦ Pauses for reflection
 - ♦ Theory-based strategy
 - ♦ Institutional memory ... Stata: “Organization memory must depend on institutional mechanisms,” rather than on individuals ... or else you risk “losing hard-won lessons and experiences as people migrate from one job to another.
- **Note: Use checklists as living documents, rather than documenting processes and procedures and putting them in “Document Control.”**

5D. Chapter 18: The Leader’s New Work

What does it take to lead a learning organization?

- Our **traditional views of leaders — as special people** who set the direction, make the key decisions, and energize the troops — **are deeply rooted in an individualistic and nonsystemic worldview.** Especially in the West, leaders are *heroes* — great men (and occasionally women) who “rise to the fore” in times of crises.
- **So long as such myths prevail, they reinforce a focus on short-term events and charismatic heroes rather than on systemic forces and collective learning.**
- In a learning organization, leaders are designers, stewards, and teachers.
 - ♦ building organizations where people continually expand their capabilities to understand complexity, clarify vision, and improve shared mental models — that is they are responsible for learning.

Leader as Designer

- Imagine that your organization is an ocean liner, and that you are “the leader.” What is your role?
- Captain? Navigator? Helmsman? Engineer?
- ... another ... eclipses them all in importance.
- “leader as designer” ... “design of the organization [structure] and its policies. This will require seeing

the company as a system in which the parts are not only internally connected, but also connected to the external environment ... clarifying how the whole system can work better.”

- O’Brien: “Organization design is widely misconstrued as moving around boxes and lines.” “The first task of organizational design concerns designing the governing ideas — the purpose, vision, and core values by which people will live.”
- Many of the best intentioned efforts to foster new learning disciplines founder because those leading the change forget the first rule of learning: people learn what they need to learn, not what someone else thinks they need to learn.
- In essence, the *leader’s task is designing the learning processes* whereby people throughout the organization can deal productively with the critical issues they face, and develop their mastery in the learning disciplines.

Creative Tension

- ... the gaps between reality and the vision.
- Leaders generate and manage ... creative tension — not just in themselves, but in an entire organization.

How can such leaders be developed?

- ... the five learning disciplines are ... important to those who would lead. They provide a framework for focusing the effort to develop the capacity to lead.
- [The disciplines] might just as well be called the *leadership disciplines* as the learning disciplines.

Time to choose

- **One of the paradoxes of leadership in learning organizations is that it is both collective and highly individual.**
- Moving to choice is moving from “I want.” vs. “I choose.” ... passive vs. active.

Class 10, 6/9/04

Attendance		10
5D Chapters 9 - 21 from Class Plans		40
Break		10
Places to Intervene	discussion	20
Bathtub Dynamics, Cloudy Skies	Overhead projection & discussion	25
Break		10
Team presentations?		45
Reflection papers	discussion	10
		170

5D. Chapter 20: Rewriting the Code

- Two types of complexity
 - ♦ detail complexity ... [lots of data and possibly] many variables
 - ♦ dynamic complexity ... “cause and effect” are not close in time and space and obvious interventions do not produced expected outcomes.
- ...one of the subtler lessons of the systems perspective is that this enormous detail complexity renders all rational explanations inherently incomplete. Human systems are infinitely complex. “You can never figure it out,” ... because it’s “un-figure-out-able.” Nonetheless, we *can* enhance our mastery of complexity.
- ... there is an aspect of our minds that deals quite well with detail complexity — in fact, which is designed for the task. ... “the subconscious” ... automatic mind or “tacit knowledge.”
- In fact, all learning involves an interplay of the conscious mind and the subconscious that results in training the subconscious. ... we practiced ... and more of the task is “taken over” by the subconscious ... This frees our conscious mind (with its limited information processing ability) to focus on the next stage of learning.
- ... language programs the subconscious. ... language appears not so much to affect the *content* of the subconscious but the way the subconscious *organizes and structures* the content it holds.
- If all we have is a linear language, then we think in linear ways, and we perceive the world linearly — that is, as a chain of events.
- ... if we begin to master a systemic language, ... the subconscious is subtly retrained to structure data in circles instead of straight lines. ... we become ... “looped for life.”
- Charles Kiefer: “When this switch is thrown subconsciously, you become a systems thinking ever thereafter. Reality is automatically seen

systemically as well as linearly (there are still lots of problems for which a linear perspective is perfectly adequate). Alternatives that are impossible to see linearly are surfaced by the subconscious as proposed solutions. Solutions that were outside our ‘feasible set’ become part of our feasible set. **‘Systemic’ become a way of thinking (almost a way of being) and not just a problem solving methodology.**”

- This is why practice is so important. For any meaningful interplay of conscious and subconscious, practice is essential.
- Yet today the primary threats to our collective survival are slow, gradual developments arising from processes that are complex both in detail and in dynamics.
- The spread of nuclear arms is not an event, nor is the “greenhouse effect,” the depletion of the ozone layer, malnutrition and underdevelopment in the Third World, the economic cycles that determine our quality of life, and most of the other large-scale problems in our world.
- Learning organizations themselves may be a form of leverage on the complex system of human endeavors.
- Given the influence of organizations in today’s world, this may be one of the most powerful steps toward helping us “rewrite the code,” altering not just what we think but our predominant *ways of thinking*.
- In this sense, learning organizations may be a tool not just for the evolution of organizations, but for the evolution of intelligence.

5D. Chapter 21: The Indivisible Whole

- Floating in space, Rusty [Schweickart] discovered the first principles of systems thinking. But he discovered them in a way that few of us ever do — not at a rational or intellectual level but at a level of *direct experience*. The earth is an indivisible whole, just as each of us is an indivisible whole.
- Nature (and that includes us) is not made up of parts within wholes. It is made up of wholes within wholes.
- All the boundaries, national boundaries included, are fundamentally arbitrary. We invent them and then, ironically, we find ourselves trapped within them.
- Something new is happening. And it has to do with *it all* — the whole.

Class 11, 6/16/04

Attendance		5
Team presentations	LCD projection & discussion	40
Reflection papers	discussion	10
Break		10
Final Exam Review	LCD projection & discussion	20
Class 11 Slides on Change, What's Required for Learning Organizations, System Dynamics for Going from Issues to Action, People Express Management Flight Simulator	LCD projection & discussion	30
Break		10
Run People Express Management Flight Simulator OR Review Skeptic's Guide to Computer Models, Places to Intervene, SD Meets the Press OR General Discussion		45
		170