

# In Search of a Clear Picture For Unifying our Community of Practice

a  
Keynote Presentation  
to the  
Systems Thinking and Dynamic Modeling Conference

by  
**Barry Richmond**  
*High Performance Systems, Inc.*

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## Overview

1. A Two-Tiered Vision
2. Mapping the Strategy Space
3. A Contentious Continuum of Tactics

# 1. A Two-Tiered Vision

## Tier 1

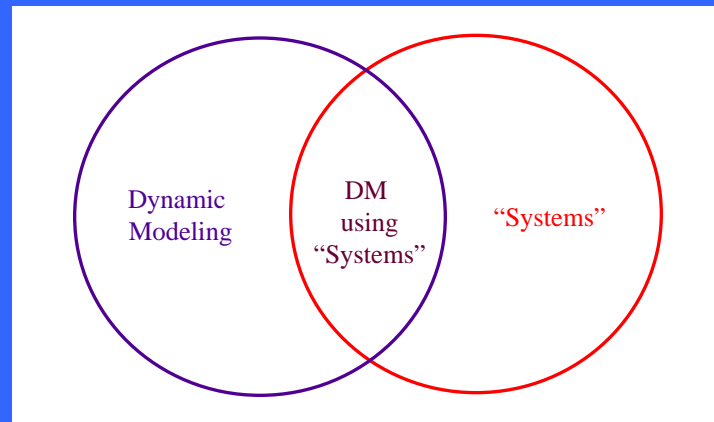
- Many educators are drawn to “systems” because of its reputation as a vehicle for leveraging the building of discipline-specific understanding.
- The associated concepts and tools enable teachers to create, or be provided with already-created, curriculum materials that students find *authentic* and *engaging*.
- The materials lend themselves to learner-directed, discovery-oriented learning.

## 1. A Two-Tiered Vision (cont'd)

- At the Tier 1 level, “systems” per se is not the main attraction.
- It is rather a means to the end of leveraging the development of discipline-specific understanding.
- The larger, *discipline-transcendent* messages of “systems” are often muted.
- In fact, not all of what currently is classified under the general rubric of “systems” is really “systems!”

### 1. A Two-Tiered Vision (cont'd)

As the dual name of this Conference implies, there are two (actually *three!*) things going on in our community...



...and that's just fine!

### 1. A Two-Tiered Vision (cont'd)

What the previous picture says is that...

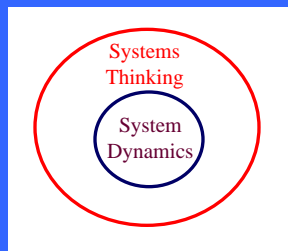
- Not all models being constructed using stocks, flows, and feedback loops are “systems” models.
- Not all “systems” materials involve dynamic models...

...which brings us to the issue of  
System Dynamics / Systems Thinking

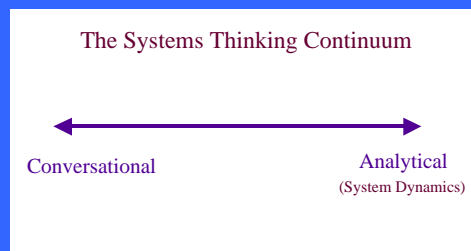
### 1. A Two-Tiered Vision (cont'd)

- What follows are two pictures that relate the two.
- I hope you will consider embracing at least one of them.
- An “us and them” posture has persisted for years, and works against development of a unified community of practice.

Picture 1



Picture 2



### 1. A Two-Tiered Vision (cont'd)

In both Tier 1 pictures,  
**System Dynamics**

is a foundational part of a *larger whole*  
called **Systems Thinking**.

Let's acknowledge and describe it as such.

## 1. A Two-Tiered Vision (cont'd)

### Tier 2

*"Education is more about transformation than information;  
more about heart than about head."*

Henry Louis Gates, Jr., Chair  
Afro-American Studies Program at Harvard

In Tier 2, Dynamic Modeling *and* Systems Thinking  
are seen as strategies for achieving the larger end of  
seeking to develop...

# Systems Citizens !

## 1. A Two-Tiered Vision (cont'd)

Systems Citizens engage not just in  
Systems *Thinking*, but in...

# Systems *Being*!

*"We are all tied together in the single garment of destiny, caught in  
an inescapable network of mutuality. And whatever affects one  
directly, affects all indirectly. This is the way God's universe is made,  
this is the way it is structured."*

-Martin Luther King Jr.  
*A Christmas Sermon of Peace, in The Trumpet of Conscience, 1967.*

*"We must become the change we wish to create in the world."*

-Ghandi

# Walking the talk.

### 1. A Two-Tiered Vision (cont'd)

Systems *Beings* are distinguished by four key attributes...

- **Expanded self-boundary** \*
- (High levels of ) **Empathy**
- **Excellent communication skills**  
(includes listening skills!)
- **R-e-s-p-e-c-t**

\* (see illustration)

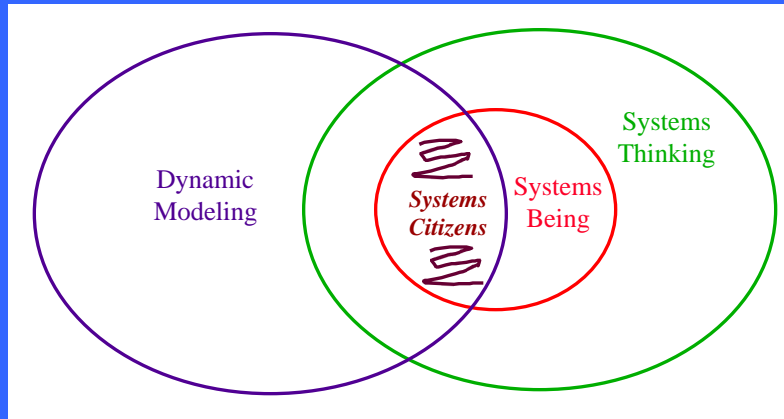
### 1. A Two-Tiered Vision (cont'd)

Illustrating the (lack of an) expanded self-boundary...



### 1. A Two-Tiered Vision (cont'd)

“Systems Beings” are well-motivated, but that doesn’t mean their actions always will be *systemically appropriate*! We need “Systems Citizens!”



### 1. A Two-Tiered Vision (cont'd)

**Systems Citizens** are *being* the changes they wish to create in the world...

but...

...they also know how to best pursue the *systemic orchestrations* required to bring those changes about!

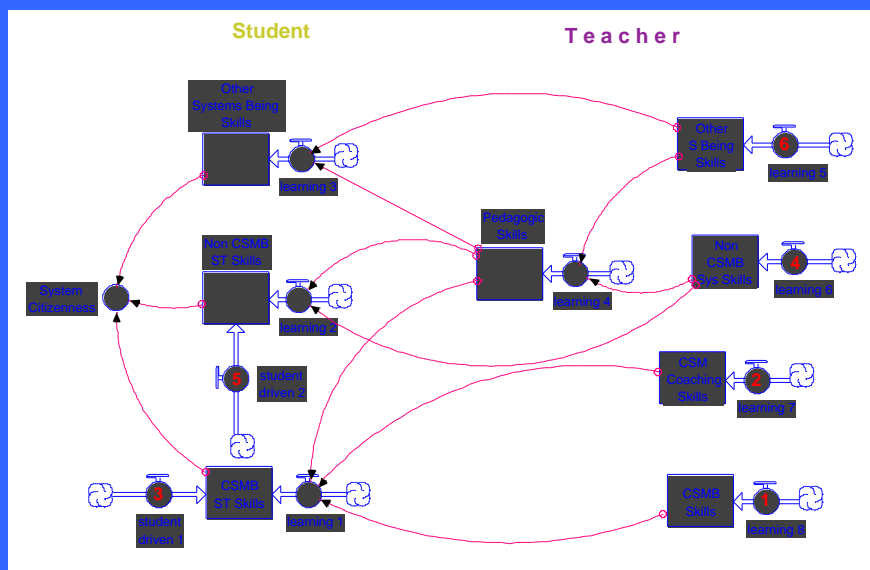
## 2. Mapping the Strategy Space

To clarify the picture of strategic options for pursuing realization of the vision, it is useful to map the space within which the strategies will operate...

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## 2. Mapping the Strategy Space (cont'd)

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## 2. Mapping the Strategy Space (cont'd)

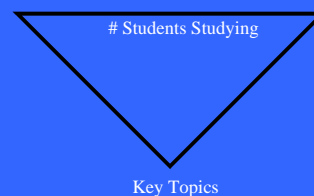
### Summary of Strategic Agenda

1. Building “Systems Being” skills may help teachers to master the “habits of thought” needed to leverage all types of student learning.
  - + More non-model-building “systems” training/mats are needed.
2. *Currently*, most students will become proficient at model-building faster than most teachers.
  - + Need more and better student self-study (probably web-based) model-extending and model-building materials.
  - + Focus for current teachers should be on developing *coaching* and *using* (as opposed to model-building) skills. Need associated materials & training.

## 2. Mapping the Strategy Space (cont'd)

### Summary of Strategic Agenda

3. If we hope to achieve even a modest broad-scale impact within the next decade, we will have to complement *overt* “systems”-focused strategies that target building *teachers’* model-building skills, with Trojan Horse strategies that target leveraging the building of *students’* discipline-specific understanding...
  - + Students can still develop *Systems Being* capacity via a fortuitous “unintended consequence” **Launch STELLA**
  - + More discipline-specific Trojan Horse materials are needed...but not a “huge” amount more!



### 3. A Contentious Continuum of Tactics

The “tactics” being followed for implementing Systems Thinking can be arrayed along a continuum...



- The *notion* of a continuum is “valid!”
- **Teachers** know best where to operate along the continuum.
- Questions have arisen with respect to the “legitimacy” of certain tools that are in use.

### 3. A Contentious Continuum of Tactics (cont'd)

Clearly, not *everything* has a legitimate place on the continuum...

**If it did, there would be nothing to distinguish Systems Thinking from any other framework for thinking.**

## How do we determine what's legitimate?

### 3. A Contentious Continuum of Tactics (cont'd)

**What distinguishes/defines Systems Thinking is a unique collection of thinking skills...**

**10,000 Meters Thinking**  
**System as Cause Thinking**  
**Dynamic Thinking**

**Filtering Skills**  
(what to include, what to omit;  
and at what level of aggregation?)

**Operational Thinking**  
**Closed-loop Thinking**  
**Continuum Thinking**  
**Nonlinear Thinking**

**Representing Skills**  
(stocks, flows, converters,  
feedback loops)

**Quantitative Thinking**  
**Scientific Thinking**

**Simulating Skills**  
(internally-consistent numbers;  
controlled experiments)

### 3. A Contentious Continuum of Tactics (cont'd)

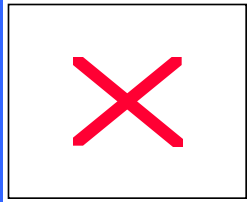
**To me, it makes sense to use Systems Thinking's *distinguishing* set of thinking skills as a filter for deciding what is legitimate to include and what is *not*...**

**If the curriculum material/approach inculcates one or more of the ST skills, it's legitimate. (If not, not).**

**BUT...**

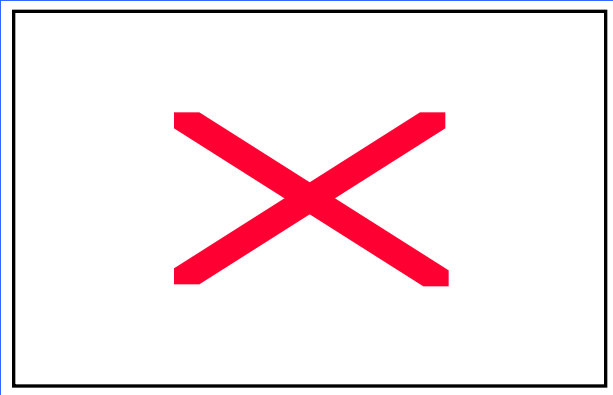
**If, in the process, the material/approach violates (or encourages violation of) the dictates of one or more of the ST skills, it should be used *with appropriate caution*.**

### 3. A Contentious Continuum of Tactics (cont'd)



The Exchange, 2001

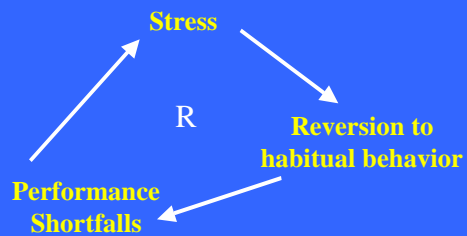
Let's illustrate using  
Word 'n Arrow Diagrams...



Business Dynamics, John Sterman, p 366, Fig 10-11

### 3. A Contentious Continuum of Tactics (cont'd)

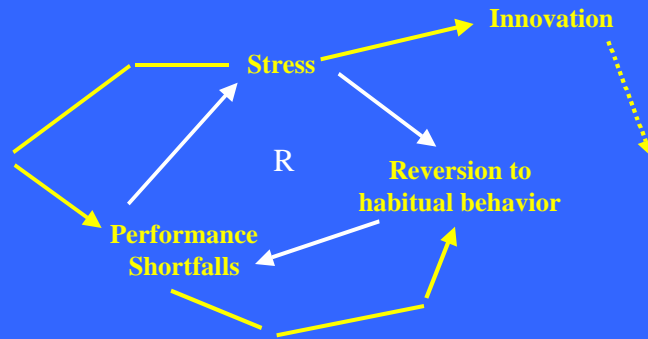
In Peter's Keynote, he *very effectively* used the  
following simple causal loop diagram...



The diagram was a very effective communication vehicle,  
and supports/inculcates **Closed-loop Thinking...**

### 3. A Contentious Continuum of Tactics (cont'd)

But the diagram *encourages* violating the dictates of a few of the other Thinking Skills...

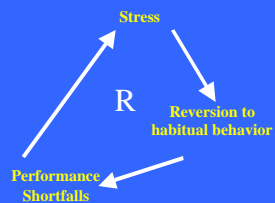


10,000 Meters Thinking says “Begin by setting the boundary as tightly as possible!”

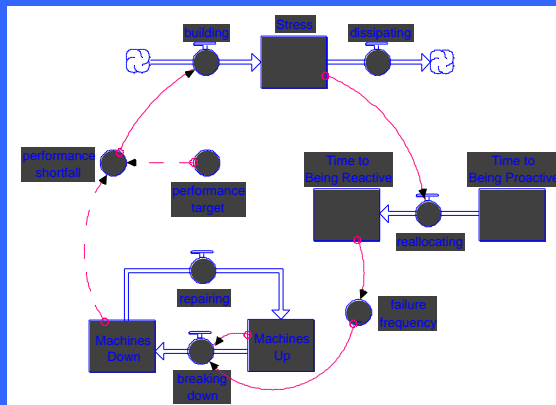
### 3. A Contentious Continuum of Tactics (cont'd)

Operational Thinking says...

1. Respect the difference between the two fundamental types of variables (Stocks & flows)
2. Respect unit consistency
3. Think in terms of how things *really* work



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### 3. A Contentious Continuum of Tactics (cont'd)

And so...

...when using a tool/technique that teaches one of the Systems Thinking skills but violates (or encourages violation) of one of the others...

...do it with a *systems perspective*—i.e., an eye for the longer-term implications of doing so.

### 3. A Contentious Continuum of Tactics (cont'd)

**For example, in the case of word 'n arrow diagrams...**

- They are wonderful for “after-construction” communication
- *In my experience*, they interfere with the subsequent learning of *Operational Thinking*
- They encourage unnecessarily large extensive and intensive model boundaries (in the model conceptualization process)

### 3. A Contentious Continuum of Tactics (cont'd)

- Our task as teachers using Systems Thinking, is to work at making the aspects of our discipline that are difficult to learn, *easier* to learn.
- In doing so, it is important that we *preserve the integrity of our discipline*—not compromise it in service of easing the task of learning.