Use of Simulations of All Kinds in Teaching Systems Thinking and Dynamic Modeling

Examples, Possibilities, and Doors to Explore
We come from different places...

Systems Thinking and System Dynamics

Connecting Two Types of Models

System dynamics builds two-way communication between mental models and simulation models....

Computer simulation meshes nicely with mental models by taking the mentally stored information and then displaying the dynamic consequences.

“Some Basic Concepts in System Dynamics” Jay W. Forrester
Elbow Partner Talk

How would you define the term “simulation model?”

To what degree are there different perceptions?

...a few considerations

Having to know the answers puts us in terrible positions from which to learn. D. Kim

Systems folks would say you change paradigms by modeling a system, which takes you outside the system and forces you to see it whole. We say that because our own paradigms have been changed that way. Donella Meadows
Shifting Mental Models

...a few considerations

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All models are wrong, some models are useful. G. Box

...and many more.
What kinds of simulation models are useful within PK – 12?

One answer: anything that gives students the ability to explore their mental models of a system over time.

**Kinesthetic Models:**
Primary students become part of a model about people visiting the zoo.
Seeing and exploring stocks and flows

Dynamic Systems Models: Middle school students copy a population/resource model and use it to explore some of the dynamics within the book, *The Giver*, about a “utopian” society.
Simulations:
Middle school students then use an accompanying simulation.

Group Modeling Process:
High School students use a group modeling process to understand the school’s culture and to look for leverage.
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Perceptions and Emerging Ideas

I use simulations to support science learning of things that my second and third graders can't directly observe.... Acting out these models helps children see the patterns and also explore what can happen if the conditions change.

Primary School Teacher
Perceptions and Emerging Ideas

...rich learning will come from modifying variables to see the impact of different choices.

Middle School Technology Integration Specialist

Perceptions and Emerging Ideas

Modeling provides our students and colleagues with the ability to visualize entire systems or parts of a system and communicate ideas/assumptions, etc. more clearly.

Assistant Superintendent
Perceptions and Emerging Ideas

I think that computer modeling will really help students learn in a different and more desired way.... Computer modeling is a great visual which can also help students learn and teachers teach.

High School Student

Perceptions and Emerging Ideas:
HS students introduced to building models
Realizing that all doors are interconnected...

Here are some doors to explore today.

Financial Simulations – Jeff Potash
Kinesthetic Games: The Bean Game – Tracy Benson

Engaging, Online Simulations – Anne LaVigne
STELLA Modeler: Creating Models on the iPad – Bob Eberlein