

## 2010 EEN Forum Notes

**Session Name:** Program Learning in Complex Systems: Improvement Through Modeling

**Session Date/Time:** Tuesday June 8, 2010; 11:00 AM

**Notetaker:** Jeremy Schreiner

### Main Themes:

- Organizational Learning through Modeling
- Modeling Dynamic Systems

### Detailed Notes:

Presenters: Jeff Wasbes, Research Works Inc.

Daniel Hayden, Rare Conservation

- Modeling Dynamic Systems
- Methodologies of System Dynamics
- What is it?  
Methodology for studying and managing complex feedback systems—key point is the recognition of feedback loops
- Where is it used?  
Management  
Public Policy  
Environment  
Energy
- While its use is broad, it could be utilized more deeply.
- Steps:  
Develop a dynamic hypothesis.  
Build computer simulation  
    Illustrate causal feedback loops  
    Explore non-linear relationships, calibrated against existing data  
Devise and test alternative policies by changing appropriate variables.
- Help decision makers rely less on mental models.  
Systems dynamics is only a model but gives us insights that aren't apparent in mental models
- System dynamics is especially useful in addressing problems that occur over and over
- Example—filling glass at a party, and adjusting pouring rate as the glass becomes more full.  
Graphical example—rate of pouring vs. time and fluid level vs. time
- System dynamics use stocks (which accumulate over time) and flows (change in accumulation over time.)
- Our models allow us to compare outputs under different situation.  
By changing inputs, we compare scenarios against an ideal scenario.

- World 2—Jay Forrester's model of an expanding global population and its effect on resources.  
Example of how numerous variables interact to create output.  
Stocks: capital, natural resources, population, pollution.  
May have to build in assumptions.
- Result is a graphical depiction of the behavior of the model over time and its relevance to a particular scenario.
- Technique can be applied to numerous applications.
- Comment: Carrying capacity of the world has been way off; this incorrectness has troubling implications for predictive models.
- Organizational Learning through Modeling  
Hands on view of modeling
- RARE—global conservation (local solutions to reduce environmental threats)
- Utilizes Deming PDCA Model  
Car companies—Inputs+ Process=output; Results in improved quality  
Rare uses the same model—Great people at great places+Training and mentoring="Pride campaign"  
But how do we measure quality?
- How can we get to some sort of quality standard?  
Theory of Change—you must know what you want to achieve.  
Standardize Project Management—this frames the analysis.
- Utilize standard project management tools
- Output—one should capture data that can be shown to a specific audience (i.e, donors, staff) and address the audience's needs
- Experimentation  
Decision Tree Models
- Lessons learned  
Get started, be patient, get started  
Iterative processes  
Use your data  
Doing something is better than nothing  
Start simple  
Try different approaches  
Drive decisions—present data in way that people can use it effectively
- Expand boundaries of logic model. Logic model helps you know where you're going. Logic model should change over time.