A Pedagogical Device for Building Experiential Memory and Motivation for Formal System Modeling

Les Waguespack, Ph.D.
Professor of Computer Information Systems
Bentley College

ISECON 2006, Dallas Texas, 4 November 2006
Overview

* System Modeling
* Pedagogical Device Design
* Learning Objectives
* Learning Device
* The Tinkertoy® Exercise
* Summary
System Modeling

- SA&D is at the core of IS and IS Education
- Modeling is at the core of SA&D
- It is the key to stakeholder communication
- Requirements, feasibility, analysis, design, testing, documentation, support
- Students don’t find formal modeling easy!
The Need for a Pedagogical Device

- Two primary obstacles to teaching modeling
  - the problem being modeled
  - the modeling abstractions and syntax
- If attacked in a single course that course must motivate, be effective and be efficient (“no student left behind!”)
Pedagogical Device Design (structure)

* Fit the opportunity

* early - introduction to modeling
* terse - fit a single class period
* physical and visual - participation with objects
* sustain persistent recollection - deliver impact
* appear intuitively obvious - feel like a game
Metaphor Casting Potential

Events and actions portend the formal aspects of modeling ahead.

The metaphor "selects, emphasizes, suppresses, and organizes features of the principal subject by implying statements about it that normally apply to the subsidiary subject" (Black 1962)
Learning Objectives

* **Model** the primary communication aspects of the analysis and design task

  * **Identification** - “naming”
  * **Description** - creating shared experience
  * **Explanation** - normalizing expression
  * **Communication** - clarity, conciseness, completeness, consistency
Learning Device

* Tinkertoy® construction experience
* Build a series of “abstract assemblies”
  * guide - provides building instructions
  * builder - builds by assembling parts
  * judge - reports result correctness
* Manipulate the task: structure / behavior
The Tinkertoy® Exercise

- Vary the clarity of the requirement
  - image clarity, perspective
- Vary the communication constraints
  - who may speak and when
- Vary the domain knowledge
  - provide partial vocabularies
- Manipulate feasibility
Summary

* “Active Learning” is invigorating
* Student naturally discover several design principles
* The experience is extensible
  * part design, dynamic issues, modularization, componentization, reuse, etc.
* The experience can be “cast forward” throughout the course
* This only “scratches” the surface