Modeling

An Exploratory Exercise in System Modeling
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System Analysis and Modeling

Identification

Communication

Description

Explanation
Systems analysis is the process of understanding and acting upon that understanding.

- identification
- description
- explanation
- communication

Understanding is constructed from experience and analysis:

- abstraction
- terminology
- context
- responsibility
- clarity
- fidelity

The most effective tool for building understanding is the MODEL.
model

n 1: a simplified description of a complex entity or process; "the computer program was based on a model of the circulatory and respiratory systems" [syn: theoretical account, framework] 2: a type of product; "his car was an old model" 3: a person who poses for a photographer or painter or sculptor; "the president didn't have time to be a model so the artist worked from photos" [syn: poser] 4: representation of something (sometimes on a smaller scale) [syn: simulation] 5: something to be imitated; "an exemplar of success"; "a model of clarity"; "he is the very model of a modern major general" [syn: exemplar, example, good example] 6: someone worthy of imitation; "every child needs a role model" [syn: role model] 7: a representative form or pattern; "I profited from his example" [syn: example] 8: a woman who wears clothes to display fashions; "she was too fat to be a mannequin" [syn: mannequin, manikin, mannikin, manakin, fashion model] 9: the act of representing something (usually on a smaller scale) [syn: modelling, modeling] v 1: plan or create according to a model or models [syn: pattern] 2: form in clay, wax, etc; "model a head with clay" [syn: mold, mould] 3: assume a posture as for artistic purposes; "We don't know the woman who posed for Leonardo so often" [syn: pose, sit, posture] 4: display (clothes) as a mannequin; "model the latest fashion" 5: create a representation or model of; "The pilots are trained in conditions simulating high-altitude flights" [syn: simulate] 6: construct a model of; "model an airplane" [syn: mock up]
Problem Solving and Modeling

**Setting**
- Three volunteers for each exercise
  - Guide - provides a description of the assembly to be reconstructed
  - Builder - performs the construction of the new assembly
  - Judge - determines if the construction so far is consistent with the source

**Process**
- A pre-existing assembly is shown on the screen
- The Builder sits with back to the screen unable to see the assembly
- The Guide describes the assembly to the Builder
- The Builder reconstructs the screen image with real parts
- The Judge informs the Builder whether the work is consistent or not
Experiment One

- **Process Instructions**
  - Guide describes the screen image verbally without watching the Builder's work
  - Whenever Builder stops work putting down any parts the Judge may indicate either
    - Consistent
    - In-consistent
  - Class times the attempt
  - Observations...
Experiment Two

* Process Instructions
  * Guide describes the screen image verbally without watching the Builder’s work
  * Whenever Builder stops work putting down any parts the Judge may indicate either
    * Consistent
    * In-consistent
  * Class times the attempt
  * Observations . . .
Experiment Three Preparation

**Process Instructions**

* Guide describes the screen image verbally without watching the Builder’s work using Parts List One
* Builder has a copy of Parts List One
* Whenever Builder stops work putting down any parts the Judge may indicate either
  * Consistent
  * In-consistent
* Class times the attempt
* Observations . . .
Parts List One

- Link A
- Link B
- Link C
- Link D
- Link E
- Flexor
- Rod Cover
- Diverter
- Round Channel
- One Wheel
- Four Wheel
- Joiner
- Flex
- Restraint
Process Instructions

Guide describes the screen image verbally while watching the Builder's work using Parts List Two

Builder has a copy of Parts List Two

Whenever Builder stops work putting down any parts the Judge may indicate either

Consistent

In-consistent

Class times the attempt

Observations . . .
Parts List Two

- Rod
- Blade
- Belt
- Axle Cap
- Pulley
- Fixed Hub
- Free Hub
- Shaft Bearing
- Cord
Experiment Four

Parts List Two

- Rod
- Pulley
- Blade
- Axle Cap
- Belt
- Fixed Hub
- Free Hub
- Shaft Bearing
- Cord
Experiment Four
Process Instructions

Guide describes the screen image verbally while watching the Builder’s work using Parts List Two

Builder has a copy of Parts List Two

At any time the Judge may indicate to the Builder if the work is consistent or inconsistent

Class times the attempt

Observations . . .
Experiment Five
What modelers try to do...

- identify as many characteristics of modeling as possible using the exercises with the tinker toys above...
  - domain knowledge
    - experience
    - history
    - exploration
  - vocabulary
  - quality control
  - communication
    - medium
      - written
      - oral
  - accuracy
    - perspective
    - quality control
  - clarity
    - terminology
    - consistency
    - relevance
modeling is a skill that is developed by building a set of knowledge resources to make the modeling easier . . .

**domain knowledge**
- experience
  - history - formal education, work experience
  - exploration - experimentation, research
- vocabulary - terminology, paradigms, methodologies
- quality control - testing, work reviews, client interaction

**communication**
- medium - analysts spend most of their time communicating
  - written - documentation becomes long term memory, resource, knowledge asset
  - oral - builds confidence and trust between analysts and with client
- accuracy
  - perspective - “who is right?” often depends upon the viewing angle
  - quality control - “Assuming only makes an A__ out of You and Me!”
- clarity
  - terminology - we all need to speak the same language, maybe a new one for us!
  - consistency - the parts need to fit from every angle, over and over again
  - relevance - the world is a big place, how much of it is needed in this problem?