Overview

Software Design
- Information Architecture
- Information Design
- Interaction Design

Representation
- Definition
- Application in Education
ID Examples

- Samorost
- We feel fine (Jonathan Harris)
- Jeff Han @ TED
- Molecules & Minds @ CREATE
ID Examples

Ideal Gas Law (Oklahoma State)
ID Examples

Odyssey Simulation Package
ID Examples

Gizmo (ExploreLearning)
ID Examples

Molecular Workbench (Concord)

Charles's law: The V-T relationship under constant pressure

The following model seeks to prove that the volume of a gas is proportional to the temperature under constant pressure.

Instruction: In this activity, we will investigate the relationship between volume and temperature for a gas under constant pressure. A constant external force is exerted on the piston to maintain constant pressure of the gas.

Click the rightmost button in the VCR-like panel to start the simulation. And then click the “Automatically heat the gas” button to start heating the gas gradually. A sandbox image will appear at the lower-right corner of the window, which indicates that a heating process is going on to stir up the gas. While the model is running, observe the graph on the right. When the hourglass image disappears, meaning that the heating process ends, pause the simulation. Right-click (Windows) or CTRL+click (Mac OS)
Software Design

Plass & Salisbury, 2002
Software Design

How are the three major design phases in Software design defined in the Plass & Salisbury system?

- Information Architecture
- Information Design
- Interaction Design
Software Design

Information Architecture
Software Design

Information Architecture

- Conceptual Design of System
- Theoretical approach (philosophical, educational, ...)
- Functionality and Structure
- Navigation approach
Software Design

Information Design
Software Design

Information Design

- Art and science of preparing information so it can be used by people to learn with efficiency and effectiveness
- Selection of representation mode of information
- Instructional ID takes into account cognitive impact of these choices
Software Design

Interaction Design
Software Design

Interaction Design

- CHI/HCI design
- Instructional Strategies
- Navigation
- Instructional ID: takes into account cognitive aspects of interactions
Representation

Definition

Leci n’est pas une pipe.
Definition of Representation

- To look like or to resemble something, i.e., to describe or depict it
- To stand in for something or someone, i.e., to symbolize it
- Mental representation of external reality through internal cognitive symbols
- Language - set of signs representing concepts and relationships
- To present a second time-to re-present (O’Shaughnessy & Stadler 2002).
Representation

Types of Representation

- **Iconic**
  Most basic representation, relies on physical resemblance to convey meaning

- **Index**
  Obtains meaning from temporal or spatial proximity or causality

- **Symbol**
  Abstract, arbitrary, relies on social conventions for meaning
How does representation through language work?

- Reflective (mimetic) approach
- Intentional approach
- Constructionist approach
Meaning is not in the object or in the word; it is constructed by the system of representation.

Culture: codes which govern the relationships of translations between shared concept maps and language systems.
What are implications of the nature of representation for the design of educational materials?

- How can the theory of representation inform the design of educational materials?
- How well is each of the three theoretical approaches suited to inform the design of educational materials?
- How can you best match a representation to a task?