

# Human Computer Interaction

## 3. Conceptual Models

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Ref course slides:

- CS, Stanford, "Introduction to Human Computer Interaction Design"
- CS, UC Berkeley, "User Interface Design, Prototyping, and Evaluation"

# Objectives

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- *Conceptualize interaction design before trying to build anything.*
- Understand the need for a clear conceptual model in interface design
- Be able to analyze and create appropriate models for specific applications.
- Understand the use of metaphors in designing interfaces
- Be able to choose them appropriately

# Conceptual Models

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- In interacting with any system (software or others), a person has a concept of what the system is: what its components are, what properties they have, and what interactions they can enter into...
- This conceptual model underlies the more specific aspects of interface, such as screen representations and command structures.

# Conceptual Models based on Activities (Instructing)

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## 1. Instructing

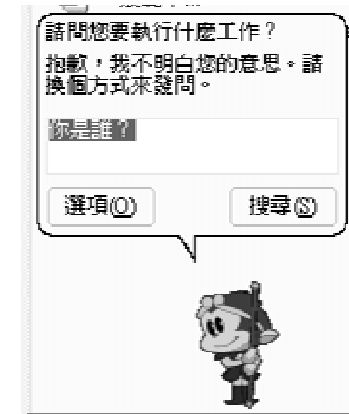
- E.g. Commands in DOS or Unix.
- E.g. Control keys, menu options in windows.
- Benefits: quick and efficient for repetitive actions.
- Have to avoid remembering a large set of command names.



# Conceptual Models based on Activities (Conversing)

## 2. Conversing

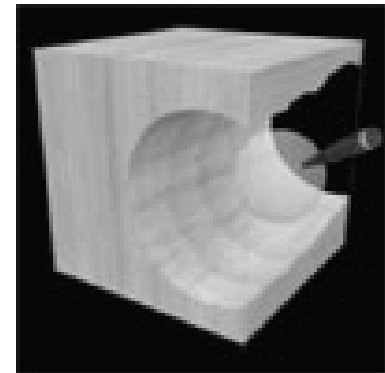
- E.g. help facilities, search engines, etc.
- E.g. Voice or natural language based system
- Benefits: friendly for novices
- Drawbacks:
  - Misunderstanding (for NLP)
  - Repetition and inefficiency (e.g. phone-based systems)
  - Too much expectation (e.g. intelligent or animated agents.)



# Conceptual Models based on Activities (Manipulation)

## 3. Manipulation and navigation

- Exploiting users' knowledge of how they do this in the physical world.
- Properties
  - Continuous representation of objects and actions.
  - Immediate feedback.
  - Physical actions instead of issuing commands.



Virtual Sculpting,  
CMLab

# Conceptual Models based on Activities (Manipulation)

## 3. Manipulation and navigation

- Benefits:
  - Learning basic functions rapidly
  - Easily remembering how to use
  - Usually no error messages
  - Immediate responses
  - Users feel in control
- Drawbacks:
  - Expecting reactions like the physical ones.



GT4, PS2 game

# Conceptual Models

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4. Exploring and browsing (based on activities)
  - E.g. CD-ROMs, web pages, etc.
  
  - **Conceptual Models based on objects**
    - Focusing on a particular objects.
    - E.g. spreadsheet (Excel)

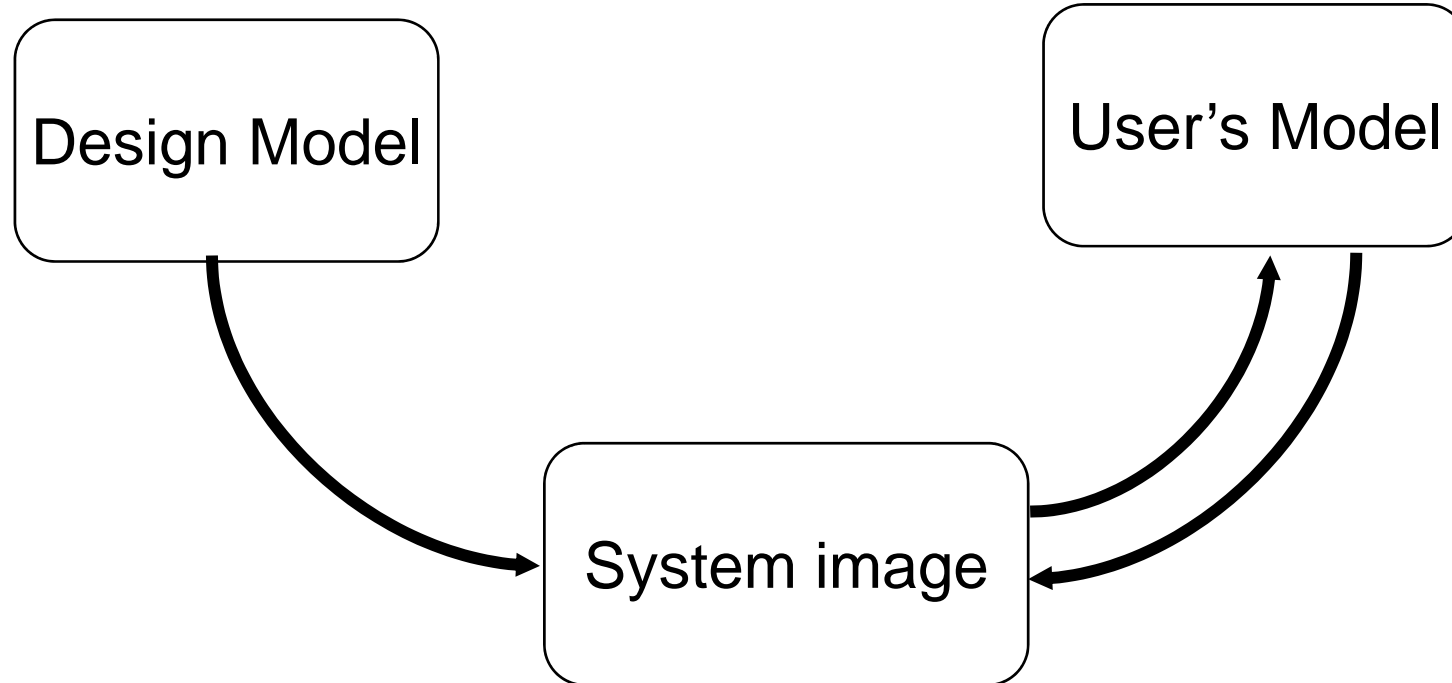


# Conceptual Models

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- Mental representation of how object works & how interface controls affect it
- People have preconceived models that you may not be able to change
  - dragging to trash ?
    - deletes (eject disk a bad idea!)
  - Visual Clues (affordances)

# Design Model & User's Model



Customers get model from experience & usage

- through system image

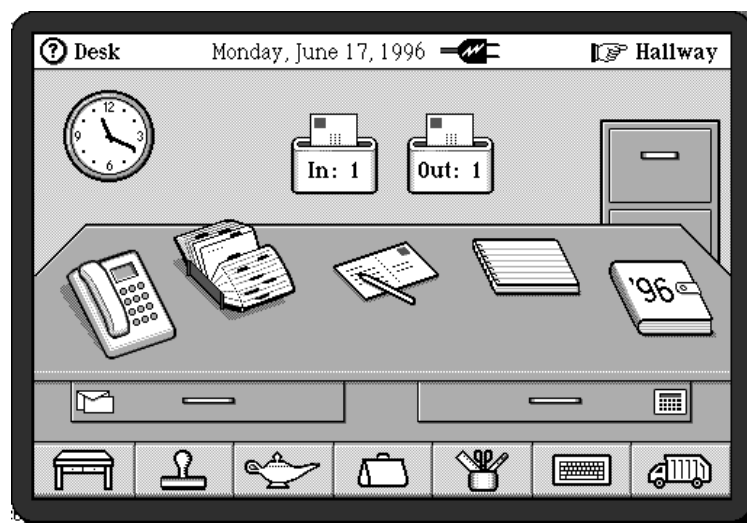
# Design Guides

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- Provide good conceptual model
  - customers want to understand how UI controls impact object
- Make things visible
  - if object has function, interface should show it
- Map interface controls to customer's model
  - infix -vs- postfix calculator -- whose model?
- Provide feedback
  - what you see is what you get!

# Metaphors

- A metaphor implies many elements of the model to a user who is familiar with the metaphorical object (e.g., a physical desktop)
- In general a model requires more learning without metaphors to which users can anchor it to their previous experience.



# Example Metaphors

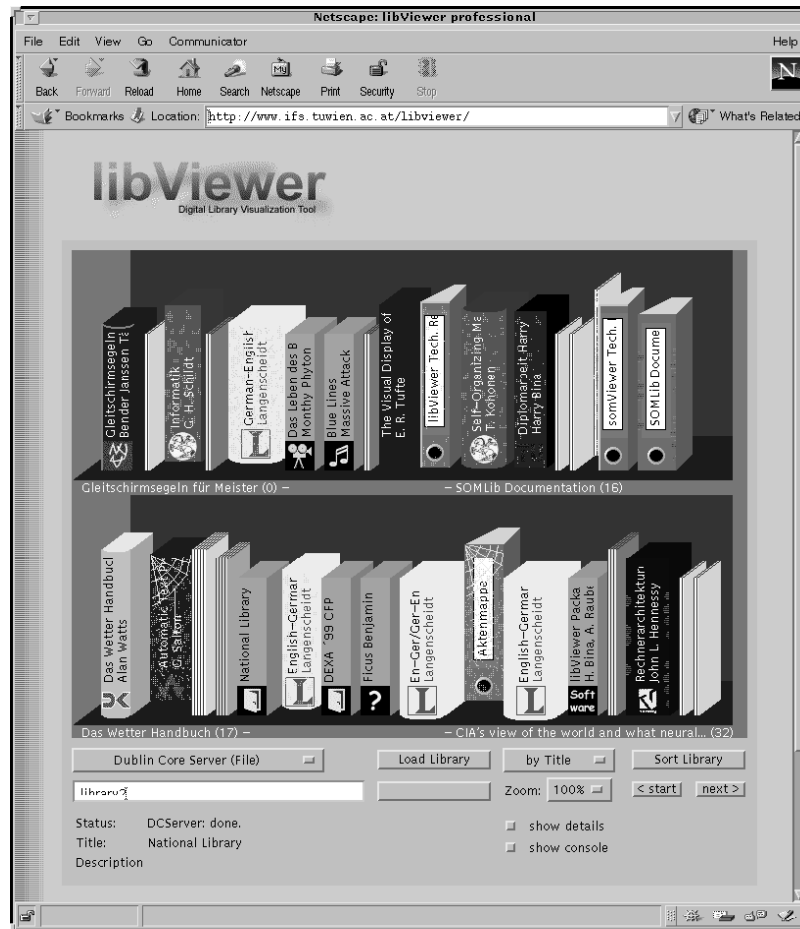


Figure 2-3: IBM's RealPhone Application Interface



# Misused Metaphors

- Direct translations
  - Software CD player that requires turning volume knob with the mouse
  - Software telephony solution that requires the user to dial a number by clicking on a simulated keypad
  - Airline web site that simulates a ticket counter!



# Quicktime 4.0

The player includes a large fixed border, much like that found on a Sony Watchman or similar device. Overall, the player space dominates the application, not the movie which is the intended user target.

The volume control is in the form of a thumbwheel (rather than the traditional slider) and originally required difficult rotary mouse motion to operate. (Later versions of the player allowed vertical mouse motion).

The channel drawer can only be accessed by manually dragging the tab out; a user cannot simply click on the tab to expand the window.

The brushed steel appearance dominates all controls. This causes the play and pause controls (and others) to appear disabled (grayed out) whether or not their function is available.

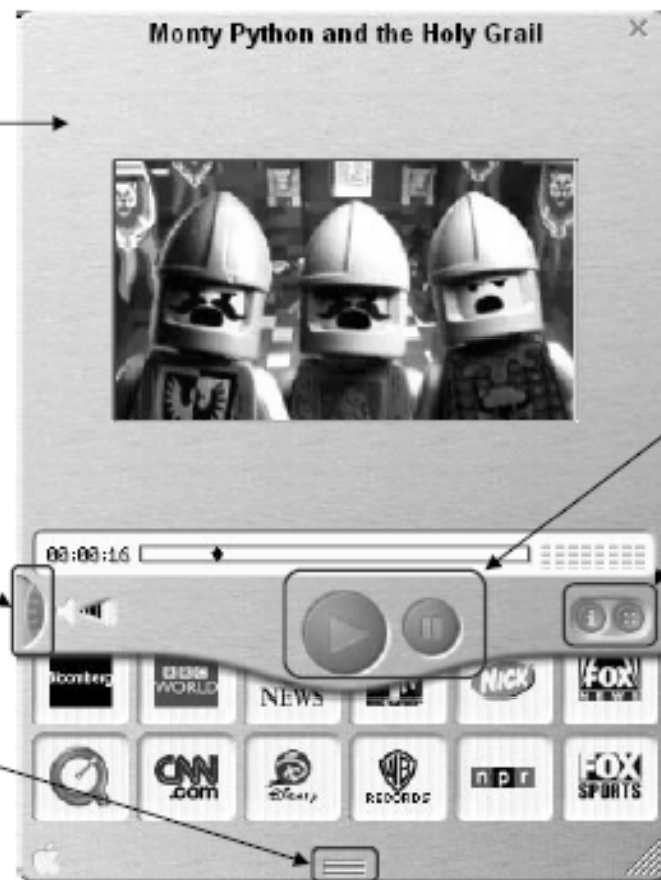


Figure 3-4: Too Real: The Imbalance of Form, Substance and Context

# Conceptual Models & our project 1



EyeToy games, PS2

- Game stages should belong to direct manipulation.
  - Continuous & immediate response, etc.
- Conceptualizing the interaction.