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

- *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

- 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)

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.

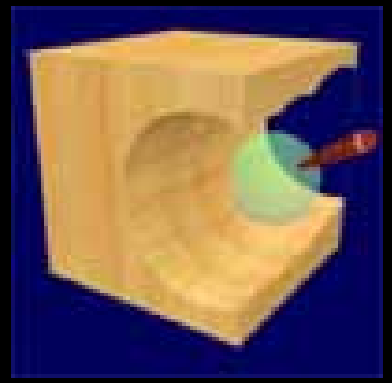
Conceptual Models based on Activities (Conversing)

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

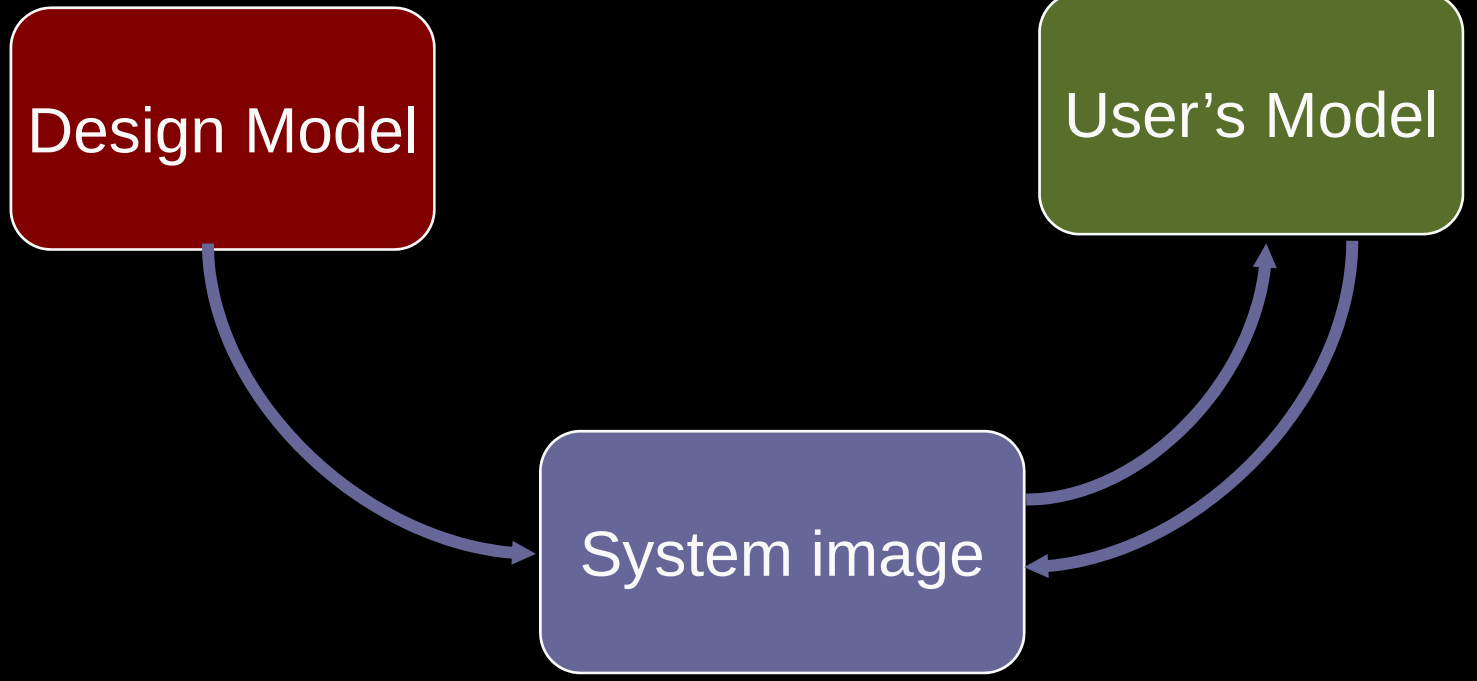
4. Exploring and browsing (based on activities)
   - E.g. CD-ROMs, web pages, etc.

- **Conceptual Models based on objects**
  - **Focusing on a particular objects.**
  - **E.g. spreadsheet (Excel)**

Conceptual Models

- 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

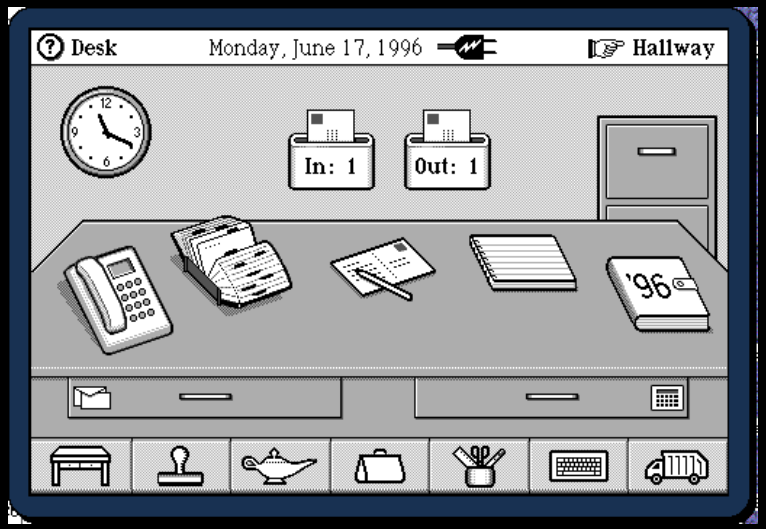
- through system image

Design Guides

- 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!

Southwest Airlines Home Gate

The Home of Southwest Airlines on the World Wide Web

Quicktime 4.0

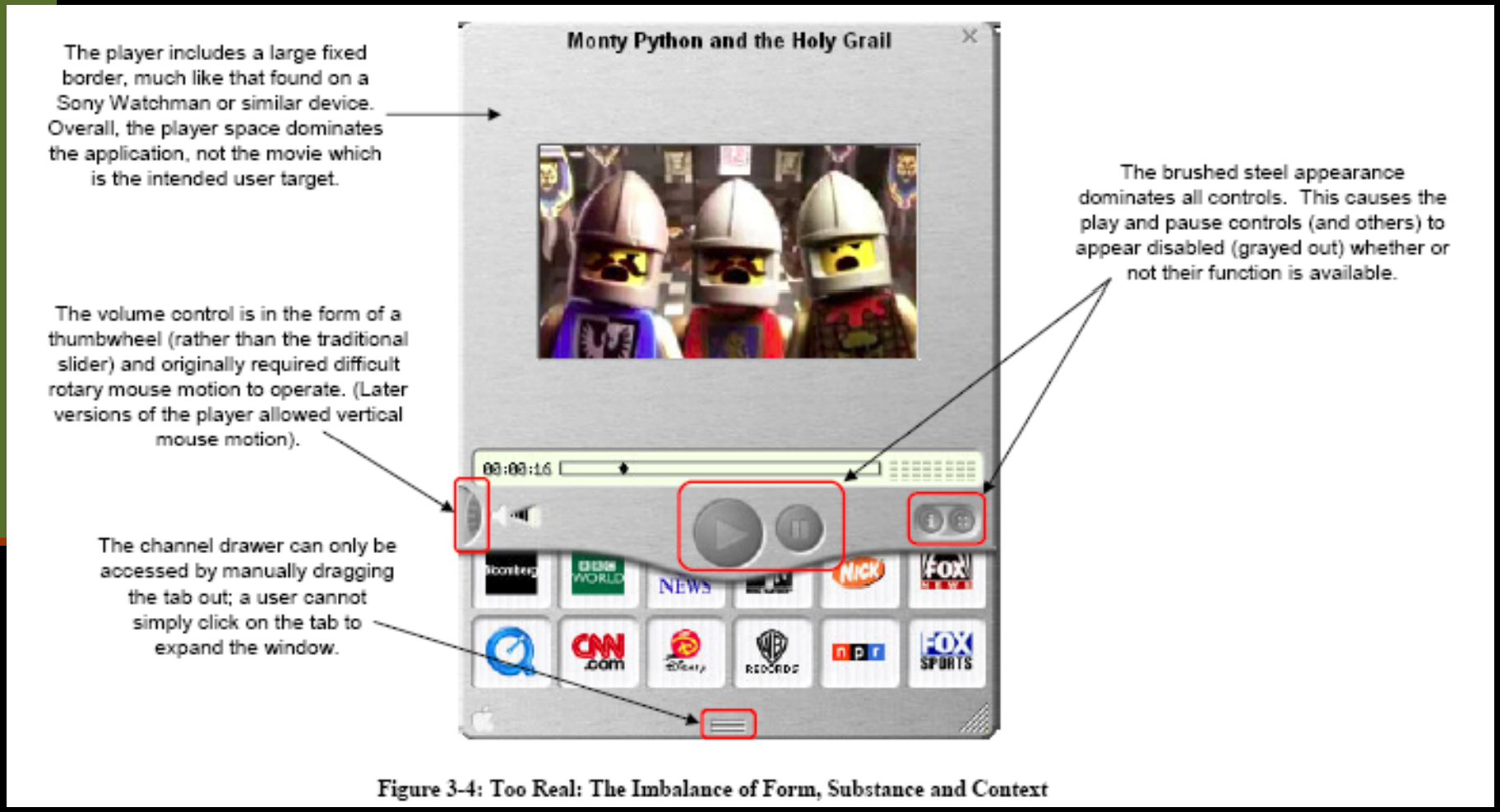


Figure 3-4: Too Real: The Imbalance of Form, Substance and Context

Conceptual Models & our project 1

Eyetoy games, PS2

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