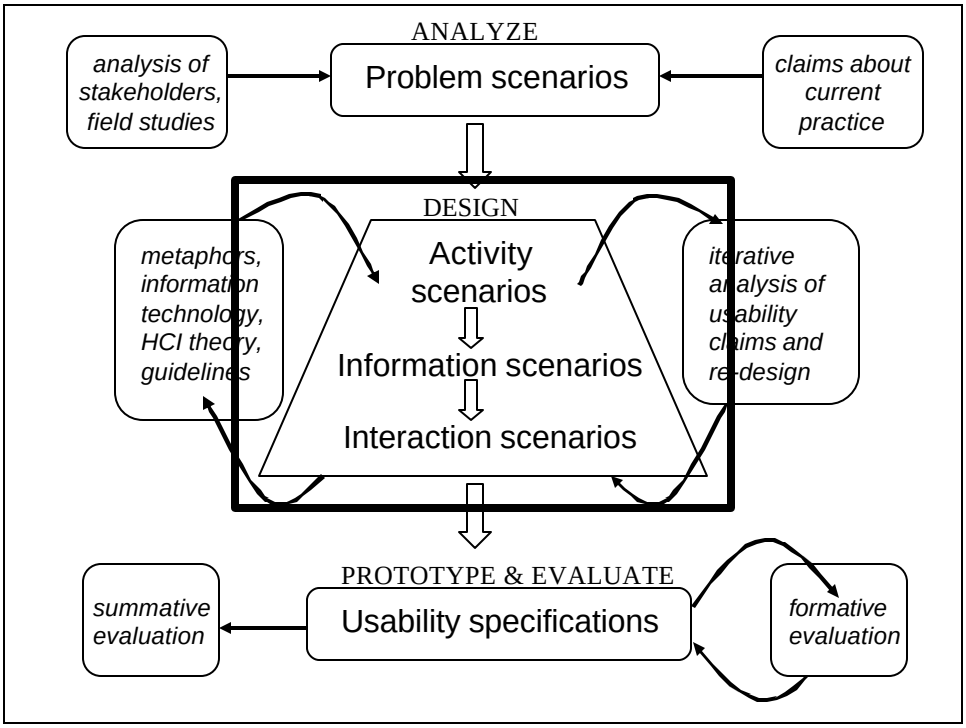


Norman's Stages of Action

A different look at design

Stages of Action

- What makes something difficult to do?
  - What are you trying to do?
  - What ways can you achieve it?
  - How do you execute one of those ways?
  - What happened as a result?

Action

- Start with goal (goal formation)
- You have to do something (execution)
- Check to see that goal is made (evaluation)

Four parts

- Goal
- What is done to world
- The world itself
- Check on the world

Not that easy...

- Real tasks are imprecisely defined
  - Get to work, get some food
- Goals do not state what to do
  - Intentions: lower level statements of what is to be done
  - Still not enough: too vague

Execution

- Three stages
  - Intention
  - Action sequence
  - Execution

Evaluation

- Three stages
  - Perceiving what happened
  - Interpreting it
  - Evaluating (did what happened match what we wanted?)

7 Stages of Action

- Forming the goal
- Forming the intention
- Specifying an action
- Executing the action
- Perceiving state of world
- Interpreting state of world
- Evaluating the outcome

Activity design

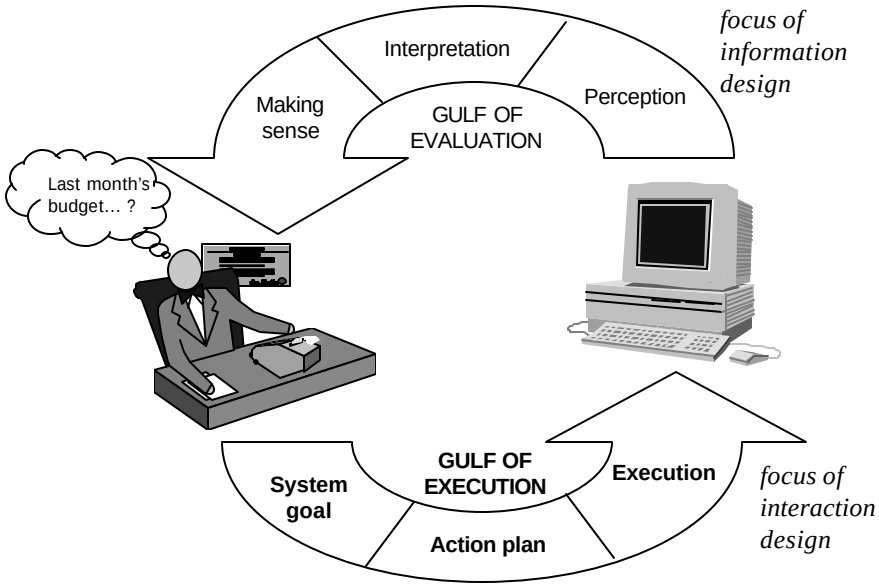
Interaction design

Information design

Notes

- Only approximate model
- Stages are not discrete
  - Not in sequence
  - Some activities satisfied by single actions
- Continual feedback
  - Results of one activity feed goals of another

Stages of Action in HCI

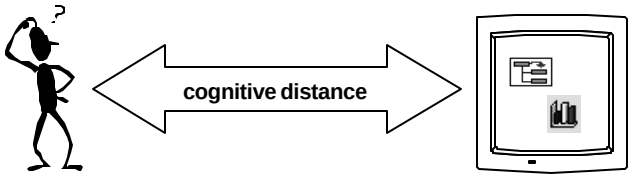


What are Gulfs?

- The distance between the mental representations of the person and the physical components and states of the environment
- Illustrates difficulty in deriving relationships between mental intentions and interpretations and the physical actions and states

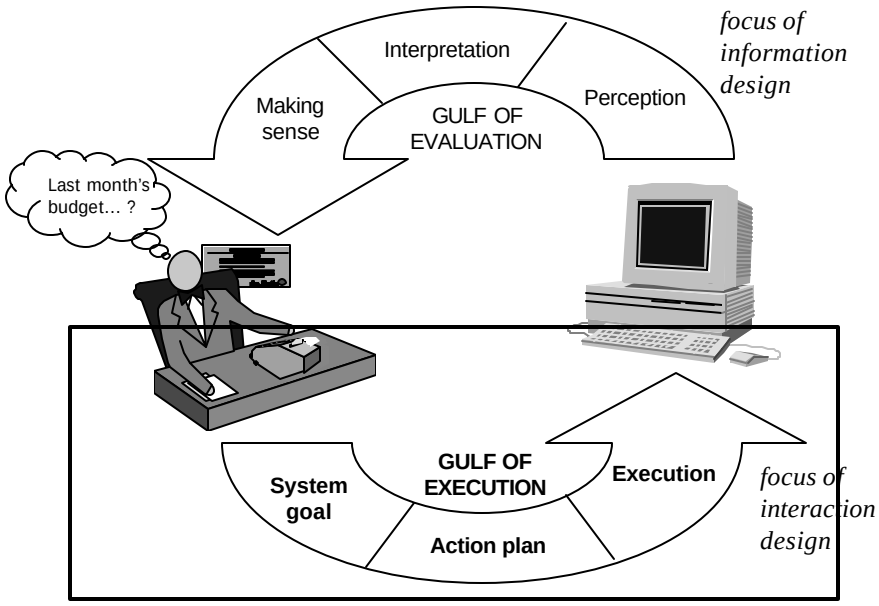
Example: Gulf of Execution

- Going from users' task concept to system concept: the *cognitive distance* between two models
  - Mental model held by users tells them what to do
  - This must make connection with designers' model that is conveyed and supported by the user interface



- The closer the match, the easier to find and pursue a relevant goal

Stages of Action in HCI



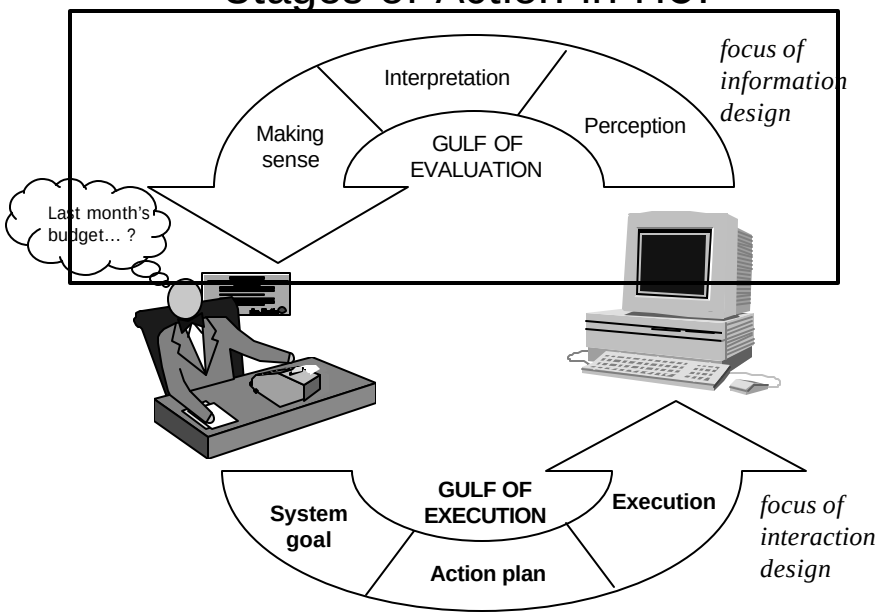
Suggesting Goals to the User

- Menu titles, folder names, application names, ...
- Decreasing the distance via direct manipulation:
  - UI controls appear as *physical analogs* of real objects; their affordances suggest interaction goals
  - Key ideas are visual representation, immediate and continuing feedback, and simple reversibility
- Visual or auditory UI elements sometimes lead to opportunistic selection of goals
  - Interesting object or message intrudes on a task
  - Or user is paused, choosing among things to do; especially common among novice users

Gulf of Evaluation

- Reflects amount of effort that a person exerts to interpret physical state of a system
- Small gulf when system provides state information in a form that is easy to get, easy to interpret, and matches the thinking

Stages of Action in HCI



About Gulfs

- Present in all interfaces
- Most are unremarkable and invisible
- Users blame themselves or decide they are incapable
  - Water faucets, temperature controls, stove tops, etc.
  - Sewing machines, washing machines, digital watches

Design Aids

- Each stage requires special design strategies
- Simple questions

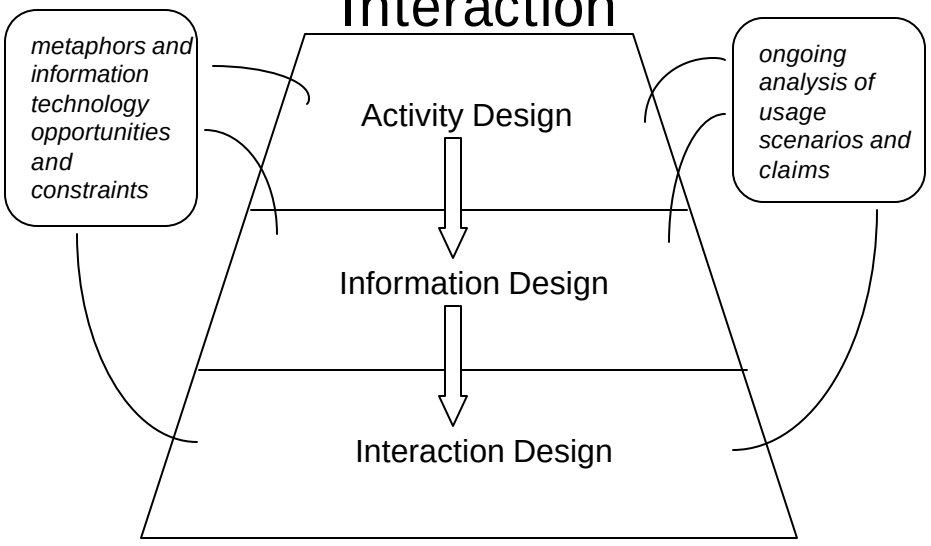
How easily can one:
Determine function of device?

Tell possible actions?	System in desired state?
Determine Mapping?	Mapping?
Perform action?	What state is system in?

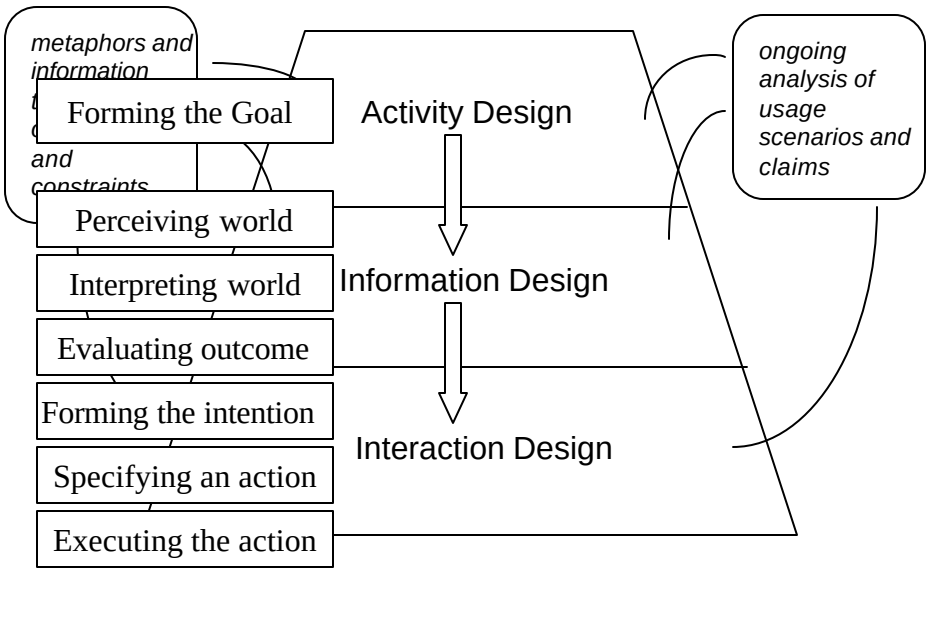
Design Advice

- Visibility: can user tell state of system and alternatives for action?
- Good conceptual model: consistency in presentation of operations and results
- Good mappings: relationships between actions and results, between controls and effects, system state and what we see are all clear
- Feedback: full and continuous feedback on results of actions

SBD: From Activity to Interaction



7 Stages and SBD



Coming up...

- Information design
- Interaction design
- Prototyping
- Evaluation