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
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
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
  Determine Mapping? desired state?
  Perform action? Mapping?
  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

- Activity Design
- Information Design
- Interaction Design

Metaphors and Information Technology Opportunities and Constraints

Ongoing Analysis of Usage Scenarios and Claims

7 Stages and SBD

- Forming the Goal
- Perceiving World
- Interpreting World
- Evaluating Outcome
- Forming the Intention
- Specifying an Action
- Executing the Action
Coming up...

• Information design

• Interaction design

• Prototyping

• Evaluation