

HCI

(Slide #8) Cognitive Model

The modal aspect of user

• Understanding

- knowledge
- Intentions
- Processing

} In every cognitive modal

① Goal and task hierarchies

→ Divide and conquer rule

- Goals - Intentions - What you want
- Tasks - Actions - How to achieve

Techniques of Cognitive model

① GOMS

G - Goals - want to achieve

O - Basic operat actions to performs

M - decomposition of goals into subgoal

S - Selecting the right a method

Example: Delete of a file using we

② alternative methods

① Drag-to-trash

② Delete key

③ Right-click

Problem

-Expert vs Novice

Linguistic Notation

- Understanding the user's behaviour
- Cognitive (mental)(model) difficulty
- Analysis between of language between user and system

• Backus - Naur Form (BNF)

- Very common notation for command syntax
 - Divide the exp. until the terminal reaches
- Terminals

- Lowest level of user behaviour

e.g. CLICK - MOUSE, MOVE - MOUSE

- Non-terminals (Can divide into terminals)
 - Higher level of abstraction

e.g. Select - menu, position - mouse

An expression of BNF

- contains terminals and non-terminals
- combined in sequence (+) or as alternatives (|)

e.g.

delete - file ::= pos - mouse + select - delete

select - delete ::= drag - delete | key - delete | b mouse

confirm - yes ::= PRESS - Y | CLICK - MOUSE

③ Physical and device models

- Based on empirical knowledge of human motor system
- Acquisition then execution

Keystroke Level Model (KLM)

- Lowest level of (original) GIOMS

- Seven execution phase operator

- Physical motor

K - keystroking

B - mouse-button

P - pointing

H - homing

D - drawing

- Mental modal

M - mental preparation

- System

R - response (Measure)

- Time of execution is

$$T_{\text{exec}} = T_K + T_B + T_P + T_H + T_D + T_M + T_R$$

(Slide #9) Sketching

- fidelity → loyalty → faintfulness
- heuristic → hands-on → informative
 - ↳ method of problem solving

Sketching involves

- Paper work - drawing

e.g Story boards - sequence of sketches illustrating a scenario

Conclusion

- ① Generate many ideas
- ② Capture your ideas with sketches
e.g storyboards
- ③ Study design patterns
- ④ Keep it simple

(Slide #10) Prototype

Why?

- Get feedback earlier
- Easy to change
- Alternatives

(Storyboard, form)

Paper prototype

- ① Low fidelity

Computer Prototype

- ① High fidelity

Tools

Paper, Pencil

Tools

HTML, PP, Drawing program

- ② Front end (Human point of view)
- ③ User understand low
- ④ Easier to change
- ⑤ Faster to build
- ⑥ Focuses attention on big pictures
- ⑦ Nonprogrammers can help

⑧ Screen layout + interface

- ⑨ Colors, fonts, icons and other elements
- ⑩ Interactive feedback

Wizard of Oz

- man behind the curtain
- Latest Technology

e.g. Speech recognition, Learning

- Not mechanical

(Slide #12) Design Synthesis

- Guidance for Design
 - Creative process
 - Depends on existing body of knowledge
- Type of Guidance

① Principles

- A broad statement that is based on research

Principles Minimize Minimize Work

- Optimize user experience
- Work minimized includes

② Logical work

Comprehension of text and organizational structure

③ Perceptual work

Decoding visual layout and semantics of shape, size, color and representation

④ Mnemonic work

Recall of passwords, command vectors name and other relationships b/w objects

- Physical / motor work

Number of keystrokes, degree of mouse movement, use of gestures

e.g. ① Consistent in words, graphics and procedures (principle)

② Consistent in the way you have users leave every menu (guideline)

• Bye • Exit • Quit • End

(Slide # 13) Evaluation

Heuristic Evaluation

- Performed by an Expert
- Steps
 - Inspect UI
 - Compare UI against heuristics
 - List usability problems
 - Explain & Justify each problem with heuristic
- ~~Evaluator~~ Evaluator is not User

→ Kind of User Tests

① Formative Evaluation (User, facilitator)

→ Find problems for next iteration

- Evaluate prototype or implementation on lab on chosen tasks
- Qualitative Observations (Usability problems)

② Field Study

- Find problems in context
- Evaluates working implementation, in real context, on real tasks
- Mostly qualitative observations

③ Controlled experiment

- Test a hypothesis
- Evaluates working implementation in controlled lab environment on chosen tasks.
- Mostly quantitative observations

Variables

Independent Variable

① Element of the experiment manipulated or controlled to produce different conditions for comparison

② Each of these can have different value called levels.

③ One or more called factors

Dependant Variable

① Characteristics measured in the experiment. Their values are dependent on the changes made to the Independent Variable

• Time taken, number of error

② for usability testing, they were the "measures"

Evaluation Controlled Quantitative

- Precise measurement, numerical values
- Bounds on how correct our statements are

Methods

- User performance data collection
- Controlled experiments

Controlled Experiment

- Start with a hypothesis
 - Manipulate independent variables
 - Measure dependant variables
-
- Are observed results actually caused by the independent variables
 - Can observed results be generalized to the world outside
 - Will consistent results be obtained by repeating the experiment

→ Counterbalancing

- Latin Square Design

T-test

- A simple statistical test
 - allows one to say about difference between means at a certain confidential level
- Null hypothesis
 - no difference exists between the mean of two sets of collected data

ANOVA

- Compares relationship between many factors

A/B Testing

- A/B testing goes by other names as well
- During a testing interval, randomly assign arriving users to one condition or the other

A/A Testing

- An experiment that divides users into two groups with the same condition for both groups.

Gestalt Principles

Gestalt Principles explains how eye creates a whole from a part

- Idea of perception in context

Units

① Proximity - group by distance

② Similarity - group by type

③ Symmetry - group by shape

④ Alignment Continuity - group by alignment

⑤ Closure - group by shape that are not

CRAP



Contrast

- make different things different

Repetition

- repeat design throughout the interface

Alignment

- Visually connects elements

Proximity

- groups related elements