Human Computer Systems

Heuristic Evaluation

Evaluating Implementation :

Experimentation, Observation, Query Techniques

Heuristic Evaluation

- Heuristic - 'guidelines or general principles or rules of thumb' - can help guide design decisions
  - Jakob Neilson & Rolf Molich
  - method for structuring critique of a system using a set of simple & general heuristics
  - aims to identify potential usability problems

Heuristic Evaluation

- suggest 5 evaluators will find 75% of usability problems
- Best on early designs, but can be done at any stage e.g. Storyboard or fully functional system in the field
- original list of 9 heuristics, recently upgraded to 10

10 Heuristics

- 1. Visibility of System Status
  - always keep users informed about what is going on, through feedback within reasonable time
- 2. Match between System & Real World
  - speak user's language (words, phrases, concepts familiar to user)
  - follow real-world conventions in natural & logical order

10 Heuristics

- 3. User Control & Freedom
  - users often choose functions by mistake and need clear 'emergency exit' to leave unwanted state without extended dialog
  - support undo & redo
- 4. Consistency & Standards
  - users should not have to wonder whether different words, situations or actions mean the same thing
  - stick to platform conventions

10 Heuristics

- 5. Error Prevention
  - careful design to prevent errors occurring in the first place is better than good error messages
- 6. Recognition rather than Recall
  - make objects, actions and options visible
  - users should not have to remember information from one part of the dialog to another
  - instructions for use of system should be visible or easy to get at

10 Heuristics

- 7. Flexibility and efficiency of Use
  - accelerators (unseen by novice users) can speed up interaction for expert users so that system can cater for both inexperienced and experienced users
  - allow users to customise frequent actions
- 8. Aesthetic & Minimalist Design
  - Don't use irrelevant/rarely needed information in dialogs - extra information competes with relevant information and makes it less visible

10 Heuristics

- 9. Help users recognise, diagnose & recover from errors
  - error messages expressed in plain language (no codes)
  - precisely indicate problem
  - constructively suggest solution
- 10. Help & Documentation
  - even if system can be used without it, provide help & documentation
  - ensure it is easy to search, focused on user tasks, lists concrete steps to follow and is not too large

The Ten Most Violated Homepage Design Guidelines (Jakob Neilsen)

- "There are ten usability mistakes that about two-thirds of corporate websites make. The prevalence of these errors alone warrants attention, especially since they appear on sites with significant investment in usable design."
- focus on the **known usability principles that designers most frequently violate**.

The Ten Most Violated Homepage Design Guidelines (Jakob Neilsen)

- **1. Emphasize what your site offers that's of value to users and how your services differ from those of key competitors**
- Compliance rate: **27%**

2. Use a liquid layout that lets users adjust the homepage size

- **Compliance rate: 28%**

The Ten Most Violated Homepage Design Guidelines (Jakob Neilsen)

- **3.** Use colour to distinguish visited and unvisited links
  - Compliance rate: 33%

- **4. Use graphics to show real content, not just to decorate your homepage**
- **Compliance rate: 35%**

The Ten Most Violated Homepage Design Guidelines (Jakob Neilsen)

- **5.** Include a tag line that explicitly summarizes what the site or company does
- Compliance rate: 36%
- **6. Make it easy to access anything recently featured on your homepage**
- **Compliance rate: 37%**

The Ten Most Violated Homepage Design Guidelines (Jakob Neilsen)

- 7. Include a short site description in the window title
- Compliance rate: 39%
- 8. Don't use a heading to label the search area; instead use a "Search" button to the right of the box
- Compliance rate: 40%

The Ten Most Violated Homepage Design Guidelines (Jakob Neilsen)

- 9. With stock quotes, give the percentage of change, not just the points gained or lost
- Compliance rate: 40%
- 10. Don't include an active link to the homepage on the homepage
- Compliance rate: 41%

Top Ten Guidelines for Homepage Usability (Jakob Neilsen)

- **Summary:**
  A company's homepage is its face to the world and the starting point for most user visits. Improving your homepage multiplies the entire website's business value, so following key guidelines for homepage usability is well worth the investment.

Top Ten Guidelines for Homepage Usability (Jakob Neilsen)

- **Make the Site's Purpose Clear: Explain Who You Are and What You Do**

1. **Include a One-Sentence Tagline**
2. **Write a Window Title with Good Visibility in Search Engines and Bookmark Lists**
3. **Group all Corporate Information in One Distinct Area**

Top Ten Guidelines for Homepage Usability (Jakob Neilsen)

- Help Users Find What They Need

4. Emphasize the Site's Top High-Priority Tasks
5. Include a Search Input Box

Top Ten Guidelines for Homepage Usability (Jakob Neilsen)

Reveal Site Content

6. **Show Examples of Real Site Content**
7. **Begin Link Names with the Most Important Keyword**
8. **Offer Easy Access to Recent Homepage Features**

Top Ten Guidelines for Homepage Usability (Jakob Neilsen)

Use Visual Design to Enhance, not Define, Interaction Design

9. Don't Over-Format Critical Content, Such as Navigation Areas

10. Use Meaningful Graphics

Evaluating the Implementation

- Involves the user
- involves actual implementation in some form e.g. Simulation through to full system
- uses query techniques to ask user for feedback
- 1. EXPERIMENTS
- 2. OBSERVATIONS

1. Experiments

- Provide evidence to support hypothesis
- wide range of issues at different levels
- Subject:
  - match expected user population
  - sample size? (at least 10)
- Variables:
  - measure variables under controlled conditions
  - independent & dependent variables

1. Experiments

- Independent variables
  - those that are manipulated
    - eg interface style, level of help, number of menu items, icon design
  - given different values (levels)
    - e.g. Experiment tests whether search speed improves as number of menu items decreases might consider menus with 5, 7 and 10 items - independent variable (menu items), level = 3

1. Experiments

- Dependent variables
  - those that are measured in an experiment
    - E.g. speed of menu selection
  - common examples:
    - time taken to complete task
    - number of errors made
    - user preferences
    - quality of user performance

1. Experiment Design

1. Choose hypothesis
2. Decide on experimental method (between/within)

- between-group
  - each subject assigned different condition
  - at least 2 conditions (1. Manipulated, 2. Control)
  - advantage - control of learning effect since user only performs 1 condition
  - disadvantage - need more users, individual difference between users can cause bias

1. Experiment Design

within-group

- each subject performs all conditions
- advantage - cheaper, and effective where learning is involved -also less chance of effects from variation between users
- disadvantage - can suffer from learning effect

- compromise
  - mix of both

3. Analyse results - statistical methods

2. Observation

- Think Aloud
  - users describes what they believe is happening, why they take an action, what they are trying to do etc
  - advantages
    - simple
    - useful insight into interface problems
    - observe how system is actually used
    - use at any stage eg simulation, on paper etc

2. **Observation**

- Think Aloud
  - disadvantages
    - process of observation can often change the way you do things (e.g. ask centipede how he walks)
- Cooperative Evaluation
  - (variation of think aloud)
  - user cooperates with evaluator & answers questions
  - more relaxed, less constrained, user in encouraged to criticise system, can clarify problems as they arise

2. Observation

- Protocol is a record of an evaluation session
- 1. paper & pencil
  - cheap & easy but limited by writing speed
  - often use coding system
  - can use computer notebook - limited by typing speed, diagrams difficult etc
- 2. Audio recording
  - useful for think aloud
  - difficult to record enough info about actions

2. Observation

- 3. Video recording
  - can see what is happening and for how long
  - viewing angles can be a problem unless user is asked not to move, but again that could lead to unnatural situations

2. Observation

- 4. Computer Logging
  - easy to record keystroke actions e.g. Software
  - software often has playback facilities
  - cheap & unobtrusive
  - technical problems managing volume of data
  - does'nt show why action was performed
- 5. User Notebooks
  - user keeps log of activity/problems

2. Observation - Automatic Protocol Analysis Tools

- still experimental
- EVA (Experimental Video Annotator) runs on multimedia workstation with direct link to video recorder - evaluator can devise buttons to indicate different events including time stamps & snapshots - used to annotate video with notes
- Workplace Project at Xerox PARC includes system to aid protocol analysis, supporting synchronised info from various sources, eg video, audio etc
- DRUM - provides video annotation & tagging

3. Query Techniques

- Less formal
- can be useful in getting user views
  - interviews
  - questionnaires see Dix pp 432- 435 2nd ed, pp348-352 3rd edition

Choosing an evaluation method

- Design vs. Implementation
- lab vs. Field studies
- subjective vs. Objective
- qualitative vs. Quantitative
- consider: information provided, immediacy of response & resources
- classification of techniques see Dix pp 439 – 440 2nd ed, pp360-361 3rd ed