Design Heuristics and Evaluation

SWEN-444

Selected material from *The UX Book*, Hartson & Pyla

Software Engineering
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Heuristic Evaluation

- Another method for **finding usability problems** in a UI design
- **Validation during design** - does the proposed interface …
  - Implement all variations of every user task correctly?
  - Achieve all user requirements?
- A **small set of evaluators** examine the interface and judge its **compliance against recognized usability principles** (the "heuristics")
- Use **Nielsen's Heuristics**

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What is a Heuristic?

- “Experience-based techniques for problem solving, learning, and discovery” Wikipedia
  - Useful when exhaustive exacting work is impractical
  - Trial-and-error
  - Self educating
  - Examples include using experiential guidelines including …
    - a rule of thumb, an educated guess, an intuitive judgment, or common sense

Who is Nielsen?

- Jakob Nielsen is a Danish usability consultant http://www.nngroup.com/
- Developed the Discount Usability Engineering (DUE) model
  - **Simplify usability design methods** to encourage wide spread adoption by the development community
- Three techniques:
  - **Scenarios** – simple focused prototypes
  - Simplified **thinking aloud** – have a small sample of real users think out loud while they perform tasks
  - **Heuristic evaluation** – evaluate designs early using 10 simple usability guidelines
    - NOTE: these are quality evaluation measures, NOT design principles

Nielsen's Usability Goals

- Learnability
- Memorability
- Efficiency
- Minimize errors (understandability)
- Satisfaction

Fundamental measures of usability quality

Nielson’s Heuristics

10 Usability Rules of Thumb

1. Visibility of system status

- Always **keep users informed** about what is going on, through **appropriate feedback within reasonable time**

2. Match between the system and the real world

- **Speak the users' language**, with words, phrases and concepts familiar to the user, rather than system-oriented terms
- **Follow real-world conventions**, making information appear in a natural and logical order

Nielson’s Heuristics

3. User control and freedom

- **Support undo and redo**. Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue.

4. Consistency and standards

- **Follow platform conventions.** Users should not have to wonder whether different words, situations, or actions mean the same thing.

Nielson's Heuristics

5. Error prevention

- **Design to prevent problems** from occurring - better than good error messages
- Either **eliminate** error-prone conditions or **check for** them ….
- … and present users with a **confirmation option** before they commit to the action

6. Help users recognize, diagnose, and recover from errors

- **Error messages** should be expressed in **plain language** (no codes), precisely indicate the problem, and suggest a solution

Nielson's Heuristics

7. Flexibility and efficiency of use

- Mechanisms to allow for **efficient interaction** for **inexperienced** and **experienced** users
- Mechanisms can be hidden for novices
- Allow users to tailor frequent actions

8. Aesthetic and minimalist design

- Dialogues should not contain irrelevant or rarely needed information
- Every extra unit of information in a dialogue competes with the relevant units of information and diminishes understanding

Nielson’s Heuristics

9. Recognition rather than recall

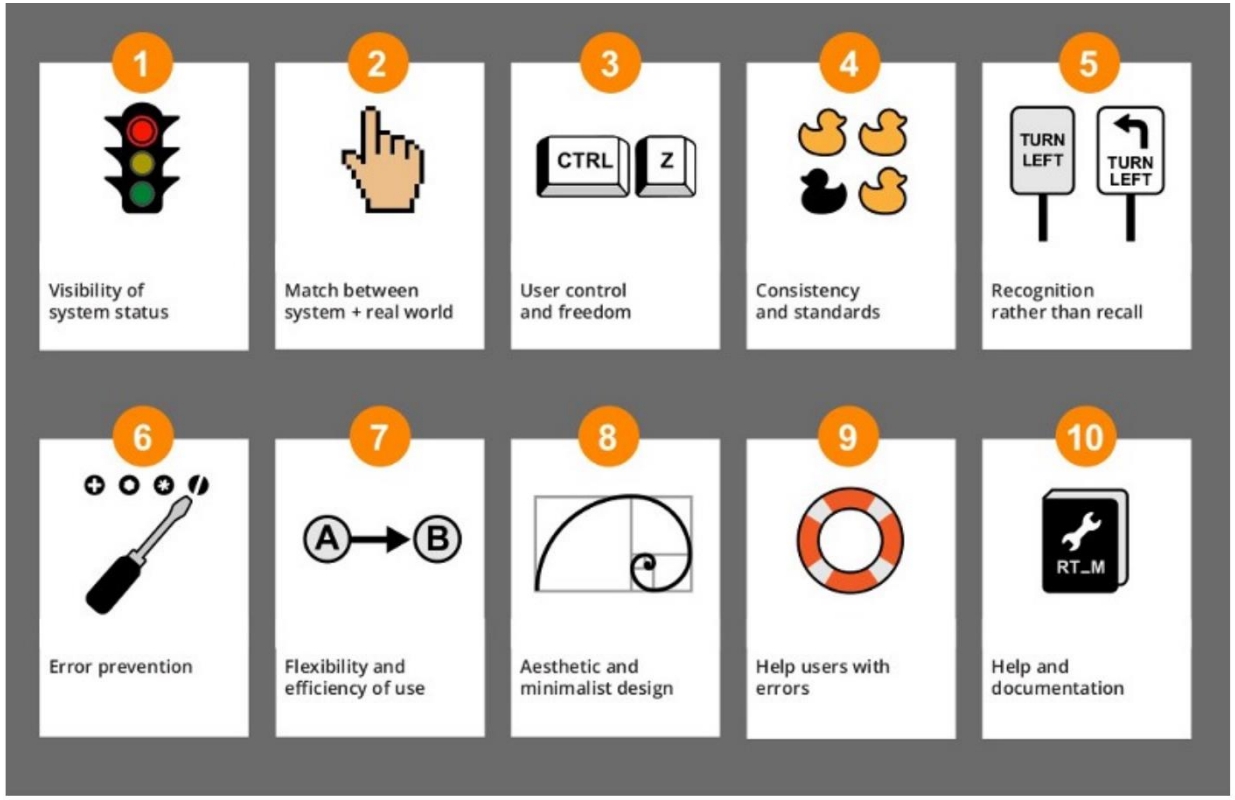
- Minimize the user's memory load by **making objects, actions, and options visible**
- The user should not have to remember information from one part of the dialogue to another
- **Instructions for use** of the system **should be visible or easily retrievable** whenever appropriate

Nielson’s Heuristics

10. Help and documentation

- Even though it is better if the system can be used without documentation, **it may be necessary to provide help and documentation**
- Any such information should be
  - easy to search,
  - focused on the user's task,
  - list concrete steps to be carried out, and not be too large.

Nielson's Heuristics Summary



Heuristic Evaluation Practice

- Let's solve an online puzzle

  http://www.jigzone.com//
- Do an evaluation; the task is to select and solve a puzzle
  - Step 1: Choose a puzzle and become familiar with it
  - Step 2: Evaluate the usability by applying Nielson's 10 heuristics
    - Fill out a table – for each applicable heuristic, describe the interface design problem
  - Dropbox – "Practice Heuristic Evaluation"

Task Action	Heuristic Violated	Defect Description

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Heuristic Evaluation: During

- Each **individual evaluator inspects the interface alone** and documents problems
- The evaluators use a set of **typical usage scenarios** for a sample set of **realistic tasks**
- Task scenarios are evaluated against a **checklist of recognized usability principles (the heuristics).**
- The **results** of the evaluation are **recorded** either as written reports from each evaluator OR …
- … the evaluators **verbalize their comments** to an observer as they go through the interface
- The **session** for an individual evaluator lasts **one or two hours**, but can last longer

Heuristic Evaluation: Evaluators

- Evaluators should **go through** the interface **at least twice.**
  - The **first pass** would be intended to **get a feel** for the flow of the interaction and the general scope of the system
  - The **second pass** then allows the evaluator to **focus on specific interface elements** while knowing how they fit into the larger whole
- It is acceptable to perform heuristic evaluation of low fidelity (paper) interfaces

Heuristic Evaluation: Observer

- The observer (or the "experimenter"):
  - **Records the evaluator's comments** about the interface, but **does not interpret** the evaluator's actions
  - As necessary, **answers evaluator questions** and **may provide hints** on using the interface
  - The evaluators **should not be given help** until they are **clearly in trouble** and have commented on the usability problem in question

Heuristic Evaluation: Output

- After individual evaluations, **evaluators (**with observers**)** **aggregate their findings** to produce …
- A **list of usability problems** in the interface with **references** to those **usability principles** that were violated
  - Each problem is listed separately, even if from same element
  - Sufficient detail
- Evaluators can’t just say they don’t like it
- The “not liking it” needs to have a reference to the heuristics

Heuristic Evaluation: Debriefing

- Provide some **design advice AFTER the evaluation**
- The participants should include the evaluators, the observers, and design representatives
- The session
  - Discussions (brainstorming) of **possible redesigns** to address the major usability problems and general problematic aspects of the design
  - Also discuss the **positive aspects** of the design, since heuristic evaluation does not otherwise address this

In Class Evaluation

- Each team will have two observers, two evaluators for another team's system
- Pre:
  - Each team needs to have **each HTA task(5) documented**
  - The checklist to be used is Nielson's (that's it)
  - Have the system ready for evaluation for the next class
- During (in class)
  - **Pass 1**: The evaluator will go through the system to be familiar with it and note any overall problems using the checklist that the observers write down
  - **Pass 2**:Then go through each task and note any problems using the checklist
  - The observer will answer questions
  - Use the **"Heuristic Testing Worksheet"** in myCourses to document issues
  - **Evaluators work independently**

In Class Evaluation

- During (continued)
  - Following the evaluation, debrief evaluator to discuss possible fixes and positive observations
- After
  - Team merges individual evaluations to create one problem list
    - Assign a severity priority
  - As a team brainstorm solutions and adjust the project plan
  - Submit an evaluation report to the “Deliverable 6: Heuristic Evaluation Notes” dropbox
    - The two original heuristic testing worksheets
    - The consolidated problem list with severity ratings
    - Summary of the teams problem analysis and plan forward

References

- Jakob Nielson's Design Heuristics http://www.useit.com/papers/heuristic/heuristic_list.html
- Heuristic How-to http://www.useit.com/papers/heuristic/heuristic_evaluation.html