Design Principles and Usability Heuristics - Part I

You can avoid common design pitfalls by following 9 design principles
You can inspect an interface for usability problems with these principles

Design principles and usability heuristics (I)

Broad “rules of thumb” that describe features of “usable” systems

Design principles
• broad usability statements that guide a developer’s design efforts
• derived by evaluating common design problems across many systems

Heuristic evaluation
• same principles used to “evaluate” a system for usability problems
• becoming very popular
  - user involvement not required
  - catches many design flaws
• is an “expert review”
### Design principles and usability heuristics (II)

#### Advantages

- **the “minimalist” approach**
  - a few general guidelines can correct for the majority of usability problems
  - easily remembered, easily applied with modest effort

- **discount usability engineering**
  - cheap and fast way to inspect a system
  - can be done by usability experts

#### Disadvantages:

- principles can’t be treated as a simple checklist
- subtleties involved in their use

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**Discount Usability Engineering**

**Cheap**

- no special labs or equipment needed
- the more careful you are, the better it gets

**Fast**

- on order of 1 day to apply
- standard usability testing may take weeks

**Easy to use**
Heuristic Evaluation

Developed by Jakob Nielsen

Helps find usability problems in a UI design

Small set (3-5) of evaluators examine UI
  • independently check for compliance with usability principles
    (“heuristics”)
  • different evaluators will find different problems
  • evaluators only communicate afterwards
    - findings are then aggregated

Can perform on working UI or on sketches

Heuristic Evaluation Process

Evaluators go through UI several times
  • inspects various dialogue elements
  • compares with list of usability principles
  • consider other principles/results that come to mind

Usability principles
  • Nielsen’s “heuristics”
  • supplementary list of category-specific heuristics
    - competitive analysis & user testing of existing products

Use violations to redesign/fix problems
### Phases of Heuristic Evaluation

1) **Pre-evaluation training**  
   • give evaluators needed domain knowledge and information on the scenario

2) **Evaluation**  
   • individuals evaluate and then aggregate results

3) **Severity rating**  
   • determine how severe each problem is (priority)

4) **Debriefing**  
   • discuss the outcome with design team

### How to Perform Evaluation

At least two passes for each evaluator  
• first to get feel for flow and scope of system  
• second to focus on specific elements

If system is walk-up-and-use or evaluators are domain experts, then no assistance needed  
• otherwise might supply evaluators with scenarios

Each evaluator produces list of problems  
• explain why with reference to heuristic or other info.  
• be specific and list each problem separately
**Examples**

**Can’t copy info from one window to another**  
• violates “Minimize the users’ memory load”  
• fix: allow copying

**Typography uses mix of upper/lower case formats and fonts**  
• violates “Consistency and standards”  
• slows users down  
• probably wouldn’t be found by user testing  
• fix: pick a single format for entire interface

**Severity Rating**

*Used to allocate resources to fix problems*

*Estimates of need for more usability efforts*

*Combination of*  
• frequency  
• impact  
• persistence (one time or repeating)

*Should be calculated after all evaluations are in*

*Should be done independently by all judges*
Severity Ratings (cont.)

1 - cosmetic problem
2 - minor usability problem
3 - major usability problem; important to fix
4 - usability catastrophe; imperative to fix

Debriefing

Conduct with evaluators, observers, and development team members

Discuss general characteristics of UI

Suggest potential improvements to address major usability problems

Development team rates how hard things are to fix

Make it a brainstorming session
  * little criticism until end of session
Results of Using HE

Discount: benefit-cost ratio of 48 [Nielsen94]
- cost was $10,500 for benefit of $500,000
- value of each problem ~15K (Nielsen & Landauer)
- how might we calculate this value?
  - in-house → productivity
  - open market → sales

Correlation between severity & finding w/ HE

Why Multiple Evaluators?

Single evaluator achieves poor results
- only finds 35% of usability problems
- 5 evaluators find ~ 75% of usability problems
- why not more evaluators???? 10? 20?
  - adding evaluators costs more
  - many evaluators won’t find many more problems
Why Multiple Evaluators (cont)?

- Problems found
- Benefits / cost

(Graphs for a specific example)

Three Evaluation Methods:

- Usability analysis with users (previously discussed)
  - Interviews
  - Questionnaires
  - Silent observation
  - Think aloud
  - Constructive interaction

- Discount methods such as Heuristic Evaluation
  - Discussion of the technique (this set of notes)
  - 9 heuristics (associated set of notes)

- Controlled studies (touched on previously, continued soon)