I214 Heuristics

September 23, 2008

Heuristic evaluation

Heuristics = Rules of thumb

providing aid or direction in the solution of a problem but otherwise unjustified or incapable of justification

– Webster's 3rd

Inspection methods

"Experts," not users

Expert in evaluation (and/or design)

"Inspection" not use

Uses of heuristics and guidelines

Competitive testing

Design guidance

Evaluation criteria

Summarize lessons learned for future design guidance

The *process* of developing and applying heuristics can help design/evaluation group(s) to define and agree on goals, priorities, evaluation criteria

Detailed method

1) Develop/**identify** short list of 10-15 **heuristics** [weighted by importance]

2) **Assign multiple evaluators**
   Design and domain experts (who are *not* the designers)
   Representative users if possible
   How many? 3 to 5 (Nielsen) – assuming homogeneous user population

3) **Step through** the use of the system/site
   Using a *set of heuristics* as evaluation criteria
   May simulate users' activities (ie, using scenarios and personas)

4) **Apply heuristics**
   Individually at first
   Collective debriefing

5) **Determine severity** of violations

6) **Make recommendations** for improvement

The Online Computer Library Center (OCLC) has a good **how-to**

One example: Nielsen's heuristics

Visibility of system status

Match between system and the real world

User control and freedom

Consistency and standards

Error prevention

Recognition rather than recall

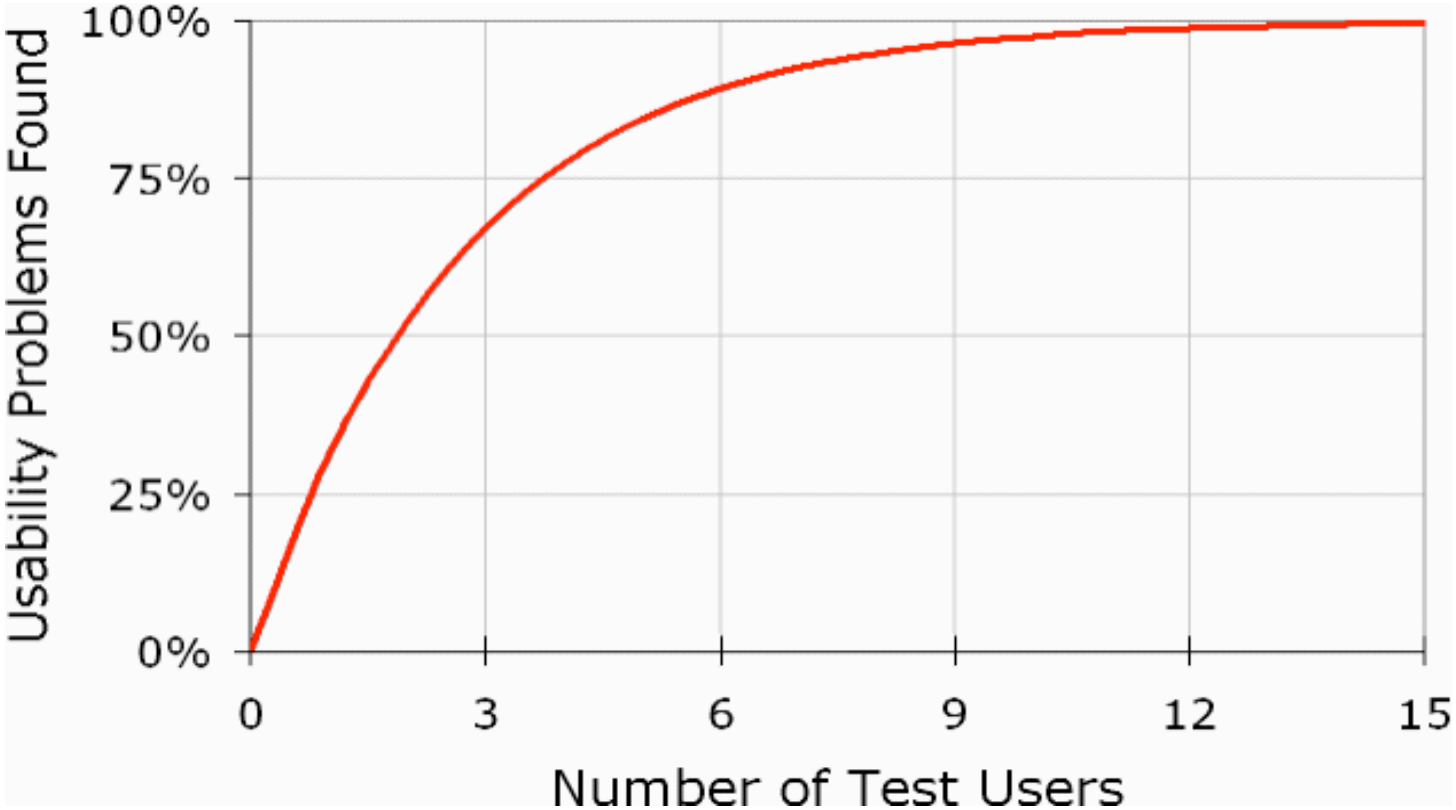
Flexibility and efficiency of use

Aesthetic and minimalist design

Help and documentation

more in Appendix A

Nielsen's basis - # of evaluators



Three types of heuristics

General (e.g., Nielsen's)

- Adapted/defined for this kind of app e.g.
  - http://www.stcsig.org/usability/resources/toolkit/he_cklst.doc

For specific applications (web, homepages, e-commerce)

- From similar efforts
- From research, guidelines (see Appendices)

For *this* specific application

- Developed through consensus of design/evaluation team(s)
- Company-wide guidelines

1) **Assign multiple evaluators**
2) **Step through use**

Multiple evaluators

When relevant, evaluate for *each major kind of use and/or user*

Keep going until you don't find much that's new and critical

1. Visibility of System Status

The system should always keep user informed about what is going on, through appropriate feedback within reasonable time.

#	Review Checklist	Yes	No	N/A	Comments
1 1	Does every display begin with a title or header that describes screen contents?	○	○	○	
1 2	Is there a consistent icon design scheme and stylistic treatment across the system?	○	○	○	
1 3	Is a single, selected icon clearly visible when surrounded by unselected icons?	○	○	○	
1 4	Do menu instructions, prompts, and error messages appear in the same place(s) on each menu?	○	○	○	
1 5	In multipage data entry screens, is each page labeled to show its relation to others?	○	○	○	
1 6	If several input modes are both available, is there a visible indication of which one the user is in?	○	○	○	
1 7	If pop-up windows are used to display error messages, do they allow the user to see the field in error?	○	○	○	
1 8	Is there some form of system feedback for every operator action?	○	○	○	
1 9	After the user completes an action (or group of actions), does the feedback indicate that the next group of actions can be started?	○	○	○	
1 10	Is there visual feedback in menus or dialog boxes about which choices are selectable?	○	○	○	
1 11	Is there visual feedback in menus or dialog boxes about which choice the cursor is on now?	○	○	○	
1 12	If multiple options can be selected in a menu or dialog box, is there visual feedback about which options are already selected?	○	○	○	
1 13	Is there visual feedback when objects are selected or moved?	○	○	○	
1 14	Is the current status of an icon clearly indicated?	○	○	○	

http://www.stcsig.org/usability/resources/toolkit/he_cklst.doc

Severity ratings

Goal: prioritize recommendations

Nielsen's metrics

Frequency: how often does this happen?
Impact: how hard is it to overcome?
Persistence: how long will this be a problem?

Possible severity rating scale:

0	not a problem
Cosmetic	need not be fixed unless time available
Minor	low priority
Major	high priority
Catastrophe	fix before release

Reporting Heuristic Evaluation Results

Tell a story

Put problems and recommendations at the center, not the heuristics.

- "Follow the user" – by task or operation, report problems and identify heuristics violated
- Thematic
- Priorities – group violations by urgency
- By heuristic – least useful?

Need to **be concise**!

Reporting example: By task/activity

Task	Problem	Heuristics violated	Severity
Search for plant by name	Requires Latin name, with genus capitalized	H2: match with real world; H15, use users' language	4 (catastrophe) 90% of searches will fail

Reporting example: themes x heuristic

Sidebar #6: Thematic Problems Identified

Heuristic	UI Experts	Developers
1: Speak users' language	Use of jargon Uninformative ordering of lists	Not enough information Misleading titles
2: Consistency	Terminology Link term *vs.* Page header Formatting (typeface, header, graphics, layout) Button labels ('go', 'run', etc.)	Formatting (typeface, header, graphics, layout)
3: Memory load	No theme	No theme
4: Flexibility and efficiency	Need instructions Difficulties finding desired material Insufficient short cuts	Need instructions Optimize 'applications'
5: Aesthetic and minimalist design	Visual appeal Redundant objects on screen Missing information	Visual appeal Position elements for visibility
6: Chunking	Separate topics merged Same topic split	Separate topics merged
7: Progressive levels of detail	No theme	Insufficient detail Inconsistent granularity
8: Navigation	Insufficient navigation aids (titles, headers, etc.) Inaccurate or unclear links	Missing links

http://www.bls.gov/ore/htm_papers/st960160.htm#Sidebar%201

Reporting example: by heuristic, with mean severity ratings

Sidebar #5: Severity Ratings by Group

	UI Experts	Developers	
Speak users' language	Avg. Severity	3.17	2.91
	Std Deviation	1.16	.68
	% Total Violations	19	17
Consistency	Avg. Severity	3.08	2.89
	Std Deviation	.99	.79
	% Total Violations	21	11
Memory load	Avg. Severity	2.92	3.00
	Std Deviation	.90	.74
	% Total Violations	3	5
Flexibility and efficiency	Avg. Severity	3.18	3.01
	Std Deviation	.77	.92
	% Total Violations	15	20
Aesthetic and minimalist design	Avg. Severity	2.25	1.92
	Std Deviation	1.52	1.12
	% Total Violations	17	19
Chunking	Avg. Severity	3.40	3.50
	Std Deviation	.68	.58
	% Total Violations	5	1
Progressive levels of detail	Avg. Severity	3.71	3.08
	Std Deviation	.55	.56
	% Total Violations	6	13
Navigation	Avg. Severity	3.32	3.22
	Std Deviation	.84	.67
	% Total Violations	15	14

What's the scale?

http://www.bls.gov/ore/htm_papers/st960160.htm#Sidebar%201

Reporting example: by heuristic

Problem: this shows fixes, not violations

User Control and Freedom

- Add site map to HTC home page.
- To offer the user more control, make navigational links of each word in the unordered list that repeats in the link button frame.
- Add navigational options so the user does not rely on the back button.
- Add more internal links to the course description page to take users back to the top.
- If a user goes to the HTC home page and bypasses the SPSU links, the user does not know that this department is part of Southern Polytechnic nor can the user go to SPSU's home page, other department pages, or other information such as fees and registration.

Consistency and Standards

- Site identification is really important, as is the repetition of frames (and how the frames look), colors, and fonts. Why aren't frames used on the HTC home page?
- Make Peers and Professionals consistent with the others. The faculty bios do not have a link back to HTC.

http://www.ablongman.com/barnum/pdf/inertiaheuristics.PDF

Heuristic evaluation: benefits

Low resource requirements

Usually find many problems fairly quickly, and get them in front of developers fast

Easy to repeat in iterative design

Easy to communicate

Usually easy to get agreement on a basic set of heuristics

Face validity

Heuristic evaluation: Limits

Can be superficial

Tends toward a short list of heuristics

Focuses on easily-seen problems; may miss problems associated with in-depth/repeated use

Can be deceptive –evaluation may appear been more complete and thorough than it was

How similar to users are experts? How expert are users?

How appropriate are the heuristics to THIS site?

Trade-offs among heuristics, the fixes needed?

Some key points

We need to **differentiate** among official standards, how people generally do things, and expert opinion

Usability in a changing environment: what people are used to, their technology and expectations, are **continually evolving**

Heuristics need to be **customized** to goals, context

Most guidelines are solutions to problems; have to ask what is the **underlying rationale**, goal

Trade-offs among different goals, heuristics often have to be mad [deliberate sic]

Heuristics - observations

Heuristics shape what we see

What we think the problems may be help shape decisions about heuristics

As a practical matter, heuristics tend to focus on problems, not what a site/system does well

CONTENT is not addressed by most heuristics and guidelines

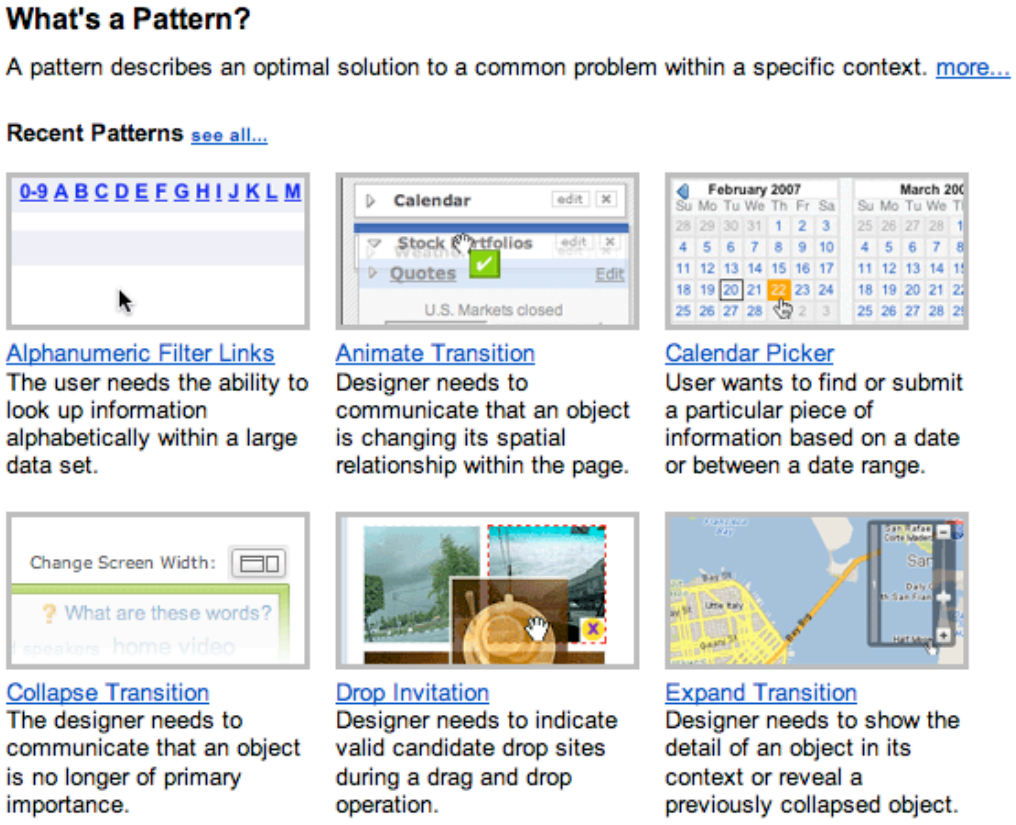
Appendix A
other heuristics

What others do: design patterns

"best practices" for interaction design can also furnish material

Examples

- Yahoo! Design Pattern Library
- Designing Interfaces (Tidwell)
- The Design of Sites (Van Duyne, Landay, Hong)



http://developer.yahoo.com/ypatterns/

What others do:
Nielsen's 113 Design Guidelines for *Homepages (2002)*

Determining Homepage Content
Vertical Industry Segments
Communicating the Site's Purpose
Communicating Information About Your Company
Content Writing
Revealing Content Through Examples
Archives and Accessing Past Content
Links
Navigation
Search
Tools and Task Shortcuts
Graphics and Animation
Graphic Design
UI Widgets

Window Titles
URLs
News and Press Releases
Popup Windows and Staging Pages
Advertising
Welcomes
Communicating Technical Problems and Handling Emergencies
Credits
Page Reload and Refresh
Customization
Gathering Customer Data
Fostering Community
Dates and Times
Stock Quotes and Displaying Numbers

Bruce Tognazzini's principles

Anticipation
Autonomy
Color Blindness
Consistency
Defaults
Efficiency of the User
Explorable Interfaces
Fitts's Law – size and distance
Human-Interface Objects
Latency Reduction
Learnability
Limit Tradeoffs
Metaphors
Protect the User's Work
Readability
Track State
Visible Interfaces

Specialized Heuristics: e-Commerce and Order Forms

From http://www.weinschenk.com/tools/online_checklist.asp

Shows total cost
Shows itemized costs
Shows product names and/or descriptions
Allows the user to change the quantity easily
Provides an option to save an order and complete it later
Provides details on any other charges on the order
Provides details on shipping options and charges
Provides shortcuts for repeat visitors to make transactions faster
Allows users to easily move from the order form to shopping and back again
Provides security information
Provides users with an alternate offline way of ordering
Allows users to view and/or change previous orders
Does not require users to register before a purchase

E-commerce II

http://www-3.ibm.com/ibm/easy/eou_ext.nsf/Publish/611

Customer support: Supporting users before, during, and after a purchase.

Trust: Establishing trustworthiness.

Product Navigation: Enabling users to browse products easily.

Product Information: Providing the product information that users want, need, and expect.

Purchase transaction: Providing easy means for users to purchase products.

Other Heuristics

heuristics OCLC's Heuristics – slight variations on Nielsen's

Heuristics operationalized:

http://www.stcsig.org/usability/resources/toolkit/he_cklst.doc

Gerhardt-Powals (1996) proposed a set of research-based heuristics:

- Automate unwanted workload:
  - Free cognitive resources for high-level tasks.
  - Eliminate mental calculations, estimations, comparisons, and unnecessary thinking.
- Reduce uncertainty; display data in a manner that is clear and obvious.
- Fuse data; reduce cognitive load by bringing together lower level data into a higher-level summation.
- Present new information with meaningful aids to interpretation:
  - Use a familiar framework, making it easier to absorb.
  - Use everyday terms, metaphors, etc.
- Use names that are conceptually related to function.
  - Context-dependent.
  - Attempt to improve recall and recognition.
- Group data in consistently meaningful ways to decrease search time.
- Limit data-driven tasks:
  - Reduce the time spent assimilating raw data.
  - Make appropriate use of color and graphics.
- Include in the displays only that information needed by the user at a given time.
- Provide multiple coding of data when appropriate.
- Practice judicious redundancy.

http://www.usability.gov/methods/heuristiceval.html

Appendix B
guidelines and recommendations

Guidelines and checklists

Research-based web guidelines from

http://www.usability.gov/pdfs/

See specifically:

http://www.usability.gov/pdfs/chapter7.pdf

http://www.usability.gov/pdfs/chapter11.pdf

http://www.usability.gov/pdfs/chapter4.pdf :

user connection speeds and screen resolutions

What others do (cont):
Nielsen's Homepage Design Statistics
(what people are used to; what others have found useful)

Download Time
Basic Page Layout
- Page Width
- Liquid Versus Frozen Layout
- Page Length
- Frames

Fundamental Page Design Elements
- Logo
- Search

Navigation
- Footer Navigation
- Site Map
- Routing Pages
- Splash Pages

Frequent Features

Sign In, About Us, Contact Info, Privacy Policy, Job Openings, Help

Graphics and Multimedia

Pictures, ALT Text , Music, Animation

Advertising

Typography

Body Text and Background Colors

Link Formatting