MAKING YOUR GATEWAY EASY AND PLEASANT TO USE

AN INTRODUCTION TO USABILITY AND USER-CENTERED DESIGN

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SGCI Webinar
Background
PhD, Computer Science
  Specialty: Human-Computer Interaction (HCI)
BS, Computer Science & Cognitive Science

Teaching
Previous (2011-2014)
  HCI for computer science students
Current
  User Experience (UX) for undergrad and grad
OBJECTIVES

1. **value** the importance of usability and user-centered design

2. be able to **identify** some common usability problems

3. **appreciate** various strategies for identifying and fixing common usability problems

4. be able to **communicate** with usability experts in an informed way
Interface design was system-centric

Users had to adapt to the technology
  Focus was on training users

Design was concerned with:
  What can we build with such-and-such a platform?
  How efficient is the code? How can resources be optimized?

Most users don’t care about these unless they impact usability and the user experience
SYSTEM-CENTERED DESIGN

View of the user?
A person who should **adapt to your system**
View of the user?
The user is just like me!
Need to shift the focus from system-centered design to user-centered design
Corollary: if you think you know thy users, think again!

First Rule

Know Thy Users!

And you are not thy users…
USER-CENTERED DESIGN

Image courtesy of Nikki Roda
http://nikkiroda.com/user-centered-design-process/
USER-CENTERED DESIGN

Learn how the user thinks

User Research

Build

Design

Specification documents and technical constraints
User Interviews and Contextual Inquiry
Notes and User Stories
Workflow Diagrams

Image courtesy of Nikki Roda
http://nikkiroda.com/user-centered-design-process/

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USER-CENTERED DESIGN

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Learnability: How easy is it for users to accomplish basic tasks the first time they encounter the design?

Efficiency: Once users have learned the design, how quickly can they perform tasks?

Memorability: When users return to the design after a period of not using it, how easily can they re-establish proficiency?

Errors: How many errors do users make, how severe are these errors, and how easily can they recover from the errors?

Satisfaction: How pleasant is it to use the design?
Some reasons for poor usability

- not understanding users
- solving the wrong problem

- violating visual design principles
- violating interaction design principles
PRINCIPLES

- 80/20 rule
- affordances
- alignment
- chunking
- closure
- common fate
- consistency
- constraint

- control
- convergence
- errors
- feedback
- figure-ground
- Fitts’ law
- Hick’s law
- interference

- layering
- mapping
- navigation
- progressive disclosure
- proximity
- recognition over recall
- similarity
- visual hierarchy

...
arrangement and styling of elements in a way that implies importance

visual hierarchy influences the order in which the human eye perceives what it sees
1. value the importance of usability and user-centered design
2. be able to identify common usability problems
3. appreciate various strategies for identifying and fixing common usability problems
4. be able to communicate with usability experts in an informed way
Imagine that you are sitting in a cozy neighborhood restaurant in Naples, drinking wine and enjoying delicious Italian food. Picture big portions of homemade ravioli, sumptuous lasagna, chicken parmagiana and heaping plates of spaghetti and hand-rolled meatballs. Feast at our Salad Bar with 26 delicious items to choose from. Sample the Minestrone Soup, five different kinds of Pizza, baked chicken, sausage, and pasta.

Can you see it? That's what it's like to visit Joe's Place. Except, well... Joe's is just down the street from your house. We have two locations in Washington Metro area. Click on the "Restaurant Locator" button to see which is nearest to your house...
An example of a web server written in Node which responds with "Hello World" for every request:

```javascript
var http = require("http");

http.createServer(function (req, res) {
  res.writeHead(200, {"content-type": "text/plain"});
  res.end("Hello World!");
}).listen(3000, "127.0.0.1");

console.log("Server running at http://127.0.0.1:3000/");
```

To run the server, put the code into a file example.js and execute it with the node program:

```
node example.js
Server running at http://127.0.0.1:3000/
```

Here is an example of a simple TCP server which listens on port 1337 and echoes whatever you send it:

```javascript
var net = require("net");

var server = net.createServer(function (socket) {
  socket.write("Hello from the server!");
  socket.pipe(socket);
});
```
VISUAL HIERARCHY
VISUAL HIERARCHY

CREATE A VISUAL HIERARCHY {5 TOOLS}

SCALE

COLOR & CONTRAST

TYPE

SPACING

COMPOSITION

Image courtesy of Canva
we tend to **order our experience** in a manner that is regular, orderly, symmetrical, and simple

*proximity*
*similarity*
*closure*
*symmetry*
*continuity*
...

**GESTALT PERCEPTION**
PROXIMITY
PROXIMITY
PROXIMITY
Built for developers

GitHub is a development platform inspired by the way you work. From open source to business, you can host and review code, manage projects, and build software alongside millions of other developers.
1. Where am I?

2. Where have I been?

3. Where can I go?
NAVIGATION
METHODS

- a/b testing
- affinity diagramming
- bodystorming
- card sorting
- case studies
- cognitive walkthrough
- contextual inquiry
- cultural probes
- experience prototyping
- eye tracking
- focus groups
- heuristic evaluation
- interviews
- mental model diagramming
- participatory design
- personas
- questionnaires
- scenarios
- simulation
- storyboards
- surveys
- task analysis
- usability testing
- user journey mapping
METHODS

EMPIRICAL:
- **with users**: example: usability testing

ANALYTICAL:
- **no users**: example: heuristic evaluation
USABILITY TEST

Demo Usability Test

for readers of Rocket Surgery Made Easy by Steve Krug
HEURISTIC EVALUATION
# Heuristic Evaluation

## 1. Visibility of System Status

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

<table>
<thead>
<tr>
<th>#</th>
<th>Review Checklist</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Does every display begin with a title or header that describes screen contents?</td>
<td></td>
<td></td>
<td></td>
<td>No meaningful page headings.</td>
</tr>
<tr>
<td>1.2</td>
<td>Is there a consistent icon design scheme and stylistic treatment across the system?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.3</td>
<td>Is a single, selected icon clearly visible when surrounded by unselected icons?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.4</td>
<td>Do menu instructions, prompts, and error messages appear in the same place(s) on each menu?</td>
<td></td>
<td></td>
<td></td>
<td>Embedded error messages appear in different locations on the page</td>
</tr>
<tr>
<td>1.5</td>
<td>In multpage data entry screens, is each page labeled to show its relation to others?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.6</td>
<td>If overtype and insert mode are both available, is there a visible indication of which one the user is in?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.7</td>
<td>If pop-up windows are used to display error messages, do they allow the user to see the field in error?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.8</td>
<td>Is there some form of system feedback for every operator action?</td>
<td></td>
<td></td>
<td></td>
<td>Some feedback is too subtle</td>
</tr>
<tr>
<td>1.9</td>
<td>After the user completes an action (or group of actions), does the feedback indicate that the next group of actions can be started?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.10</td>
<td>Is there visual feedback in menus or dialog boxes about which choices are selectable?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.11</td>
<td>Is there visual feedback in menus or dialog boxes about which choice the cursor is on now?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.12</td>
<td>If multiple options can be selected in a menu or dialog box, is there visual feedback about which options are already selected?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.13</td>
<td>Is there visual feedback when objects are selected or moved?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.14</td>
<td>Is the current status of an icon clearly indicated?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.15</td>
<td>Is there feedback when function keys are pressed?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 5. Help Users Recognize, Diagnose, and Recover From Errors

Error messages should be expressed in plain language (NO CODES).

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<tr>
<th>#</th>
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<th>Yes</th>
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<th>N/A</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1</td>
<td>Is sound used to signal an error?</td>
<td>O</td>
<td>O</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>5.2</td>
<td>Are prompts stated constructively, without overt or implied criticism of the user?</td>
<td>●</td>
<td>O</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>5.3</td>
<td>Do prompts imply that the user is in control?</td>
<td>●</td>
<td>O</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>5.4</td>
<td>Are prompts brief and unambiguous.</td>
<td>●</td>
<td>O</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>5.5</td>
<td>Are error messages worded so that the system, not the user, takes the blame?</td>
<td>O</td>
<td>O</td>
<td>●</td>
<td>Example: &quot;You must enter a name for this order form&quot;.</td>
</tr>
<tr>
<td>5.6</td>
<td>If humorous error messages are used, are they appropriate and inoffensive to the user population?</td>
<td>O</td>
<td>O</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>5.7</td>
<td>Are error messages grammatically correct?</td>
<td>●</td>
<td>O</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>5.8</td>
<td>Do error messages avoid the use of exclamation points?</td>
<td>●</td>
<td>O</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>5.9</td>
<td>Do error messages avoid the use of violent or hostile words?</td>
<td>●</td>
<td>O</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>5.10</td>
<td>Do error messages avoid an anthropomorphic tone?</td>
<td>●</td>
<td>O</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>5.11</td>
<td>Do all error messages in the system use consistent grammatical style, form, terminology, and abbreviations?</td>
<td>●</td>
<td>O</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>5.12</td>
<td>Do messages place users in control of the system?</td>
<td>O</td>
<td>O</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>5.13</td>
<td>Does the command language use normal action-object syntax?</td>
<td>O</td>
<td>●</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>5.14</td>
<td>Does the command language avoid arbitrary, non-English use of punctuation, except for symbols that users already know?</td>
<td>O</td>
<td>●</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>5.15</td>
<td>If an error is detected in a data entry field, does the system place the cursor in that field or highlight the error?</td>
<td>O</td>
<td>O</td>
<td>●</td>
<td>Instances where users must hunt for the offending field.</td>
</tr>
<tr>
<td>5.16</td>
<td>Do error messages inform the user of the error’s severity?</td>
<td>●</td>
<td>O</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>5.17</td>
<td>Do error messages suggest the cause of the problem?</td>
<td>●</td>
<td>O</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>5.18</td>
<td>Do error messages provide appropriate semantic information?</td>
<td>O</td>
<td>O</td>
<td>●</td>
<td></td>
</tr>
</tbody>
</table>
# HEURISTIC EVALUATION

<table>
<thead>
<tr>
<th>Problem</th>
<th>Heuristic broken</th>
<th>Recommendations</th>
<th>Severity rating (1-4)</th>
<th>Number of evaluators that found issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is no one consistent method used for editing. This increases the learning curve for the user.</td>
<td>Consistency Efficiency</td>
<td>Revisit the editing layout and maintain consistency in all the editing layouts.</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>There is no way for the user to know that Identity Page is a Folioseck product because of the lack of branding.</td>
<td>Consistency</td>
<td>Include elements of Folioseck brand in the form of colors and logo.</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>The clickable area for editing and adding content is very small. This makes it harder for the user to click on it.</td>
<td>Feedback Efficiency</td>
<td>Increase the target area clickable area for “EDIT/ADD” option during editing.</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>There are no keyboard shortcuts for an expert user.</td>
<td>Memory Efficiency</td>
<td>Provide keyboard shortcuts to edit content on Identity Page. This change is required only if the users are highly skilled in using Identity Page.</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Image courtesy of kruthis
USER-CENTERED DESIGN

Image courtesy of Nikki Roda
http://nikkiroda.com/user-centered-design-process/
USER RESEARCH
USER RESEARCH
PROTOTYPING
PROTOTYPING

Image courtesy of Parinistha
EVALUATION

Image courtesy of Rodolphe Courtier
https://www.flickr.com/photos/courtie/3499308053
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