User Interface Design

COMS 4170 · Spring 2018

Part 1 Build websites that suit the needs and abilities of users.
Part 2 When the needs and abilities of users are uncertain, design systems by learning from iteration and experimentation.

INSTRUCTOR
Prof. Lydia Chilton
OH: Tuesday 3-4 pm, CEPSR 612
Please contact staff through Piazza only

TAS
Tessa Hurr
Eleanor Murguia
Lucille Sui

WEEKLY SCHEDULE
Lecture
Mon, Wed 4:10–5:25pm, 413 Kent Hall
4170 Staff

• Prof. Lydia Chilton
  • Office hours: Tuesdays 3-4 in CEPSR 612
• IAs:
  • Tessa Hurr
  • Eleanor Murguia
  • Lucille Sui
• http://coms4170.cs.columbia.edu/2018-spring/
Why are user interfaces important?
Computers: people who performed calculations
1940s – 1960s

Computers: Tools for Calculation and Symbolic Manipulation
Computers: tools to augment human cognition

Vannevar Bush’s vision of computers
1963: First Graphical User Interface
Ivan Sutherland’s CAD software, Sketchpad
1968: Interaction devices for computer use. Douglas Engelbart’s mouse

Computers: Tools to augment human intelligence.

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Computers augment human intelligence best when they suit the needs and abilities of people.

MEMEX in the form of a desk would instantly bring files and material on any subject to the operator’s fingertips. Slanting translucent viewing screens magnify superimposed film filed by code numbers. At left is a mechanism which automatically photographs longhand notes, pictures and letters, then files them in the desk for future reference.
The Internet: The Rise of Usability

For physical products, users did not get to experience the usability of the product until after they bought it.

For desktop software, users call expensive support centers, but the costs aren’t “charged” to the software engineers, so they have no motivation to ship great UIs.

On the Web, users experience the usability of a site before they have committed to using it and before they buy it.

Goals of COMS 4170

1. Build websites that suit the **needs** and **abilities** of users.

2. When the needs and abilities of users are unclear, design systems by **learning from iteration** and experimentation.
Grade breakdown

• HW 1: Theory 5%
• HW 2: Practice 10%
• HW 3: Theory 5%
• HW 4: Practice 10%
• Final Project 35%
  • Brainstorming
  • 3 designs
  • Paper Prototype
  • Implementation
  • Final presentation
• Final Exam 20%
• Participation 15%
Your commitments

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<thead>
<tr>
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<th>Portion of grade</th>
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<tr>
<td>Four individual assignments</td>
<td>30%</td>
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<tr>
<td>Team Project with 4 intermediate deliverables</td>
<td>35%</td>
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Attendance is crucial. No Screens.

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Why is participation 15% of my grade?
Human memory is tree-structured
New knowledge gets appended to the tree.
Where does new knowledge get appended? To where nodes of tree are currently active.
By guessing about new knowledge before it is presented, you warm up the right place for it in memory.

Generation: Guessing before you hear the answer
Once you hear the new knowledge, you want to connect it to connect other to other knowledge so it will trigger when relevant.

**Elaboration**: Relating new knowledge to old topics.
Generation & Elaboration

**Generation**

- Guess about the new knowledge.
- Must take risks, you will probably be (partially) wrong.

**Elaboration**

- Relate new knowledge to old topics.
- This aspect of participation is about providing insights.
Learning from mistakes is good

Tell us about a time that you were wrong about something and learned something from it.

Long answer text

_______________________________
Learning from mistakes is good

Tell us about a time that you were wrong about something and learned something from it.

You are here because you expressed an insight about a time you learned from a mistake.

You were admitted to the this class because you were able to express an insight from a time you made a mistake.
Lecture 1: 10 Usability Heuristics
1. Visibility of system status

The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.
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![Reset User Password](image)
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1. Visibility of the system status

What user need does this UI serve?
2. Match between system and the real world
The system should 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.
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CREAT - create a new file or rewrite an old one.

(Compatible with UNIX System V C)

Usage:

```
#include <fildes.h>
fd = creat( name, mode );
```

"I'd spell creat with an e."
3. User control and freedom (Navigation)

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. Support undo and redo.
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3. User control and freedom (Navigation)
cmd + opt + Z

ctrl + alt + z

NEW

HELLO!
4. Consistency and standards

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

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Everything We Know About Facebook's Secret Mood Manipulation Experiment

It was probably legal. But was it ethical?
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5. Error prevention

Even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.
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Processing Payment... Do not refresh this page.
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6. 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.
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7. Flexibility and efficiency of use

Accelerators — unseen by the novice user — may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.
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8. Aesthetic and minimalist design

Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.
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Tightest Job Market in Years Aids Applicants Once Shunned

By BEN CASSELMAN 11:56 AM ET

- A shortage of candidates is providing opportunities to people long shunned by employers, such as those with criminal records, disabilities or prolonged bouts of joblessness.
- The American economy hasn’t experienced this kind of fierce competition for workers since the late 1990s and early 2000s.

13 Comments

Alert About Missile Bound for Hawaii Was Sent in Error

By ADAM MAGOURNEY, DAVID E. SANGER and JOHANNA BARKER 59 minutes ago

The alert appeared on cellphones warning people to “seek immediate shelter,” and said, “This is not a drill.” The authorities said it was a false alarm. More than 30 minutes

14 Comments

Male Models Claim Sexual Exploitation

By JACOB BERNSTEIN, MATTHEW SCHNEIDER and VANESSA FRIEDMAN 12:13 PM ET

Models and assistants said Mario Testino and Bruce Weber, two prominent fashion photographers, used their authority to engage in unwanted sexual behavior. Representatives for both said they were dismayed and surprised by the allegations.

SMARTER LIVING

Ways to Save on Travel in 2018

How to Make Soup

6h Firebombs exploded outside three churches in Santiago, Chile, an act of violence aimed at Pope Francis over the plight of an indigenous group and the issue of sex abuse.

7h Megan Ganz, a television writer, explained why she forgave her former boss, Dan Harmon, for harassing her while they were working on the sitcom “Community.”
9. Help users recognize, diagnose, and recover from errors

Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.
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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.
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Assignment 1

• Due Wednesday Jan 24th @ 11:59 PM.
• For each of the 10 usability heuristics:
  • Find one positive example
  • Find one negative example
• They must be qualitatively different than mine.
• Take a screen shot
• Answer 3 questions:
  • What is the interface?
  • How does it meet (or fail) the heuristic?
  • What needs or abilities does it serve (or fail to serve)?
Nielsen’s 10 Usability Heuristics

1. Visibility of system status
2. Match the real world
3. User control and freedom
4. Consistency and Standards
5. Error prevention
6. Recognition rather than recall
7. Flexibility and efficiency of use
8. Aesthetic and minimalist design
9. Recover from Errors
10. Help and documentation
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