Cogsci 120:
Human Computer Interaction
Fall Quarter 2010
Today

Announcement: No office hour this week

Assignment II

Assignment I and Writing Advice

Go Over Exam I

Return Exam I and Assignment I
  ▪ Check addition
  ▪ Write a short argument for any change of grade and give it to us today along with your answer sheet
Assignment II: Contextual Interview

For this project you will form teams of 3-4 students and interview (6-8 people) while they are using an interface (it doesn't necessarily need to be a computer-based interface). Your team should jointly write a short paper (4-5 pages) describing what you learned about the interface from your interviews. You should mention both the positive and negative aspects of the interface as well as ideas you have for design improvements.

The printed paper is due in class Tuesday 11/09

- Describe the interface and context of use (5 points)
- Describe how you conducted the interview (5 points)
- Report the significant data from your interview (both positive and negative aspects of the interface) and the conclusions the data supports. Be especially careful to use your data to ground your conclusions (10 points)
- Describe design changes motivated by your data (10 points)
- Overall clarity of presentation and style (5 point)
- Informed consent forms must be attached to your paper
The Pill Bottle

- Standard-issue amber-cast pharmacy pill bottle has remained virtually unchanged since it was pressed into service after the second World War.
- A child-safety cap was added in the seventies.
- Deborah Adler
  - Young graphic designer
  - Grew up in a family of doctors but took a different path: MFA
  - Her grandmother accidentally took her grandfather’s meds
  - Her ClearRx prescription-packaging system debuted at Target pharmacies recently
  - Also in a MoMA exhibit
- **Inconsistent labeling.** Every pharmacy’s bottle has a different style and placement of information.

- **Branding trumps all.** The first and largest piece of type on a label is often the drugstore’s logo and address—not the name of the drug and instructions on how to take it, which should be given priority.

- **Confusing numbers.** Numerals are often printed without explanation. The number 10 floating in empty space, for example, could be read as “ten pills” or “take ten times a day.”

- **Poor color combinations.** Color-coded warning stickers don’t contrast strongly enough with either bottles or text.

- **Curved shape is hard to read.** Existing pill bottles have no flat surfaces and are too narrow for an entire label to be visible at once. In order for all pertinent information to be observed, the bottle must be rotated.

- **Tiny type.** The FDA requires a separate information sheet to be included with all medication. The long lines of tightly spaced type mean it’s usually discarded unread.
Adler’s Design Ideas

Function over form.
Adler’s initial sketches had an antique apothecary design. She eventually realized that this approach sacrificed clarity for aesthetics. “People want to know the name of the drug first,” she says, “then how they should take it. But it’s never presented that way.”

Color coding.
To avoid confusion, the label on each family member’s medication was given a different color. This concept was later modified owing to the expense of supplying pharmacies with color printers.

Intelligent expiration.
A Condé Nast security badge that develops a large red X after 24 hours gave Adler the idea to add a similar marker to the label. A version that works over months, not hours, may be possible.
Adler’s Design Ideas

Shaping the bottle.
After rejecting triangles and squares as too extreme, Adler decided on a D-shape—a wider front and a flat back would be easier to read. It was abandoned owing to the time required to certify the unusual semi-circle cap for child safety.

Info attached.
Full medication details are normally thrown away. Adler created grooves on the bottle that would hold a paper card with text set in columns. This plan was altered when the shape changed.

Reading.
In case the type was too small to read, Adler included a thin magnifying lens. Further consideration removed this.
Early Version

Take 1 capsule 3 times a day for one week.
1) **Easy I.D.**
   The name of the drug is printed on the top of the bottle, so it’s visible if kept in a drawer.

2) **Code red.**
   The red color of the bottle is Target’s signature—and a universal symbol for caution.

3) **Information hierarchy.**
   Adler divided the label into primary and secondary positions, separated by a horizontal line. The most important information (drug name, dosage, intake instructions) is placed above the line, and less important data (quantity, expiration date, doctor’s name) is positioned below.
(4) Upside down. Klaus Rosburg, a Brooklyn-based industrial designer hired by Target, came up with an upside-down version that stands on its cap, so that the label can be wrapped around the top.

(5) Green is for Grandma. Adler and Rosburg developed a system of six colored rubber rings that attach to the neck of the bottle. Family members choose their own identifying shade, so medications in a shared bathroom will never get mixed up.
6) An info card that’s hard to lose. A card with more detailed information on a drug (common uses, side effects) is now tucked behind the label. A separate, expanded patient-education sheet, designed by Adler, comes with three holes so it can be saved in a binder for reference.

(7) Take “daily.” Adler avoided using the word “once” on the label, since it means eleven in Spanish.

(8) Clear warnings. Adler decided that many of the existing warning symbols stuck on pill bottles don’t make much sense—the sign for “take on an empty stomach,” for instance, looked like a gas tank to her—so together with graphic designer Milton Glaser, for whom she now works, she revamped the 25 most important of these
What would improve your paper:

- Specific evidence for nomination
- Balanced assessment
- Linkage to topics in textbook/lecture
- Less opinion
- Less like an advertisement
- Structure to help reader
- Better use of images
- Evidence of careful editing, rewriting, and proof reading

Few skills as valuable as clear effective writing

Writing Advice
Clear Writing Goes Hand in Hand with Clear Thinking
Improving One Will Improve the Other

Purpose is not mere presentation of information, but rather it is communication

If the reader is to grasp what the writer means, the writer must understand what the reader needs

What matters is that your audience accurately perceives what you had in mind

Write with the reader in mind. Make the reader’s job easy and interesting.
Writing Advice

Expectation and Context

- Readers do not simply read; they interpret
  - We cannot succeed in making even a single sentence (even a single word) mean one and only one thing; we can only increase the odds that our readers will tend to interpret our discourse according to our intentions.

- Structure is important in helping manage interpretation
  - Interplay between substance and structure
  - Information is interpreted more easily and more uniformly if it is placed where most readers expect to find it.

- Take care with the different levels of the units of discourse
  - Every unit has a purpose and a structure (at least a beginning and an end)
  - article - section - paragraph - sentence - clause - word
  - spend time thinking about each level

- Part of learning to write (and read) scientific papers is learning the genre
At each level there is a topic position

- For example, the information that begins a sentence establishes for the reader a perspective for viewing the sentence
  - readers expect a unit of discourse to be a story about what shows up first
  - readers also expect the material occupying the topic position to provide them with linkage (looking backward) and context (looking forward)
  - In reading, as in most experiences, we appreciate the opportunity to become familiar with a new environment before having to function in it.

Conflicts between writing and reading

- One of the many reasons rewriting is important is that on initial writing you are often trying to get out new thoughts and you naturally focus on the new information. This is the need of you as a writer. The reader needs this new information to be tied to old and for a context to be built up to help them interpret it.
Writing Advice

Read and reread good books on writing

Read good writers: notice effective techniques

Writing is a skill and thus practice is required

Heuristics

- Provide a context for the “new information” you want the reader to emphasize
- Place appropriate “old information” (material already stated in the discourse) in the topic position for linkage backward and contextualization forward
- Articulate the action of every clause or sentence in its verb
- Provide context for the reader before asking the reader to consider anything new
- Try to ensure that the relative emphases of the substance coincide with the relative expectations for emphasis by the structure
- and many, many more heuristics
Writing Advice

Before You Write
- Put time and thought into the project before you start a first draft
- For your writing to be interesting and effectively communicate, you need to
  - Have something to say
  - Present a point of view
  - Interpret rather than merely summarize
  - Argue your position logically

Outlines
- For many a good idea
- Useful when you get stuck

Writing from the Inside Out
- What are the main points you want to make?
- What does the reader need to know to understand those points?

One Metaphor: Taking your readers on a trip
- Keep them from getting lost
- Make the journey interesting

Know Your Audience
Writing Advice

Stages: Thinking, Drafting, Revising and Editing (multiple passes; many, many)

Thinking: Write to think and think to write

Drafting
- Draft is writer-centered; you are telling yourself what you know and think
- This is often the most creative part
- Concentrate on explaining and supporting your ideas
- Don’t focus on low level details (spelling, word choice, …) at this point

Revising
- This is where most of your time should be spent
- Become reader-centered; focus should be on the readers’ needs and expectations.
  - What do you need to say to convince the reader?
  - Is the organization effective?
  - Do readers need to know X before they can understand Y?
  - Your job is to make the reader’s job easy
- Focus on structure at each level; from overall argument structure, to section and paragraph structure, to sentence structure, to word choice
- Make connections between ideas explicit and clear

Final Editing
- Check for grammar, mechanics, and spelling. Don’t forget to spell check your paper as the very last thing you do. Do have a final read too.
Revising

Takes Time
- Multiple sessions. Putting it aside is important

Get Feedback
- You are often not the best judge of whether your draft is clear
- Discuss what you are trying to achieve
- Read your paper aloud. Ears can pick up what your eyes miss

Construct a Backward-Outline
- Identify the main idea(s) in each paragraph. Examine their order and importance in advancing your thesis. Consider connections between and among ideas
Revising

Rethink Your Thesis
- Consider how your argument can be restructured, how points might be reordered, how you can cut irrelevancies or redundancies, how you can add complications and implications

Be Willing to Delete

Be Willing to Revise at the End
- Now you know what you want to say
- Be sure paragraphs begin with topic sentences
- Link ideas in each paragraph to your thesis
- Work on introduction and conclusion

Proofread
- Aim for precision and economy of language
- Sometimes good way to get back into a paper but be careful
Assignment 1

While the paper should give an overview of the interface (images and figures are useful), who the users are, and what the tasks are that the interface is designed to support, the focus should be on characterizing as clearly as you can the specific reasons the interface is particularly effective or ineffective and thus deserving of entry into the Hall of Fame or Hall of Shame.

Should not be unsupported opinion. Support your arguments and convince the reader. Provide a balanced substantive assessment.
Assignment 1: Nomination for Interface Hall of Fame or Hall of Shame

Focus on Usability Factors
- Learning
- Visibility of system status
- Match between system and tasks
- Using existing knowledge
- Control and freedom
- Consistency with other interfaces and standards
- Error prevention
- Errors: Recognize, diagnose, and recover
- Recognition/recall
- Flexibility and efficiency of use
- Aesthetic design

Make use of the textbook (Chapters 1 – 4) and lectures

Provide a balanced assessment

Think about and discuss the tradeoffs involved

Be careful about your choice.

**Goal is for you to start thinking critically about interfaces**

We will judge the arguments you advance. Good to focus on an interface you know.

Should be a balanced presentation. Not only positive aspects for Hall of Fame or negative for Hall of Shame. Think about and discuss the tradeoffs involved.

Difficult to adequately discuss a complex interface in a short paper. Fine to focus on a part.
Overview of Interface (5 points possible)
Describe interface, users, and tasks interface supports
Figures often useful for clarity

Arguments for Selection (15 points possible)
Provides and justifies reasons for nomination
Makes use of material from textbook and lectures
Fairly presents positive and negative aspects
Arguments are balanced, substantive, and compelling

Style (5 points possible)
Structure of presentation
Quality of writing
Overall clarity
Grading Assignment I

Anne Marie
Mean = 17.6
Standard Deviation = 3.0

Me
Mean = 18.4
Standard Deviation = 2.9
I want you to send me the latest draft of your paper.

Um, ok, but... it's still in draft form. It's missing some figures, there's lots of typos and it needs more references.

Yes, yes. I understand.


What's wrong with you??

[Side note: He keeps writing through the text.]
Assignment I Raw Scores

Histogram showing the distribution of assignment scores.
Z and T Standard Scores

\[
\bar{X} = \frac{1}{n} \sum_{i=1}^{n} X_i
\]

\[
\sigma = \sqrt{\frac{1}{N} \sum_{i=1}^{N} (x_i - \bar{x})^2}
\]

\[
T = 10z + 50
\]
Assignment I Standard Scores
Exam I

Mean = 95.4  SD = 20.6
Exam I Standard Scores
Assignment I and Exam I
Section 1. True/False

Each true/false question is worth one point. Be sure to record your answers on the answer sheet.

False 1. One limitation of the DiamondTouch table is that it cannot distinguish between different people's touches.

False 2. In “The Myth of the Paperless Office” Sellen and Harper suggest that paper will become obsolete because of the growing presence of digital media.

True 3. Anoto pen technology has enough pattern space to cover all of Europe and Asia.

False 4. The only effective interface metaphor are those in which the look and feel of the interface is derived directly from the look and behavior of physical entities.

True 5. The information processing model is concerned only with cognition that happens inside the head.

True 6. Collaborative technologies designed to support communication are known collectively as computer-mediated communication.

True 7. Augmented reality interfaces involve virtual representations being superimposed on physical devices and objects.

False 8. Interaction design focuses exclusively on the practical aspects of HCI and is rarely concerned with theory.

False 9. Distributed cognition is concerned with explaining only the cognitive processes involved when we interact with external representations.

False 10. An aesthetically pleasing interface is always easier to use.

True 11. The SIDES game presented in an early lecture encourages cooperative group work among adolescents with Asperger’s Syndrome.

True 12. Professor Hollan argues that what is special about computers is that they provide a new kind of stuff out of which to fashion dynamic interactive systems to assist thought, communication, collaboration, and action.

False 13. Rekimoto's Augmented Surfaces system allows one to move a window off a laptop display and onto a desk surface but the system does not allow one to interact via the laptop with physical objects placed on the desk surface.

True 14. Neal McCurdy’s RealityFlythrough system employs a mixture of wireless video and photos to support remote exploration.

False 15. The machine Bush described in the As We May Think article was constructed shortly after the article was published.

False 16. According to lecture only language-based interfaces rather than graphical interfaces have an interface language.

False 17. When the inventor of the World Wide Web first started describing what was to become the World Wide Web, he found it particularly easy to convince researchers working on hypertext of its value.
Today

Planning Ahead

- Assignment II
- Optional Assignment III
- Graduate School and Jobs

Contextual Interviews
Assignment II: Contextual Interview

For this project you will form teams of 3-4 students and interview (6-8 people) while they are using an interface (it doesn't necessarily need to be a computer-based interface). Your team should jointly write a short paper (4-5 pages) describing what you learned about the interface from your interviews. You should mention both the positive and negative aspects of the interface as well as ideas you have for design improvements.

The printed paper is due in class Tuesday 11/09

- Describe the interface and context of use (5 points)
- Describe how you conducted the interview (5 points)
- Report the significant data from your interview (both positive and negative aspects of the interface) and the conclusions the data supports. Be especially careful to use your data to ground your conclusions (10 points)
- Describe design changes motivated by your data (10 points)
- Overall clarity of presentation and style (5 point)
- Informed consent forms must be attached to your paper
Often interest is about a general problem but there are many aspects to it. Need to scale the problem to a specific aspect that is manageable.

Example: Passwords
Passwords

One past project focused on problems with passwords

• Interviewed people as they logged into various sites they used
• Some privacy challenges but handled nicely
• Got interesting information about number of sites and techniques people used for managing passwords
• Proposed an interesting visual password system
Optional Assignment III: Create a Prototype or Design a Visualization with Processing

(Due at Final Exam 12/9 3-6PM)

If you receive a T score > 50 on the first and second exam, you will have the option of completing an optional third project rather than taking the section of the final that covers material from the first two exams. The project can be done individually or in a group. The scale of the project should reflect the size of the group. For group projects each person will provide a separate description of the specific contributions of each group member (including their own). There are three options.

- **Option I:** You can do a paper or video prototype of an interface. In addition to the prototype you will turn in a short paper documenting the prototype and the process of creating it.

- **Option II:** Use the *Processing* programming language to design a visualization. Processing is a language for exploring electronic media. You can download the *Processing* software at processing.org. In addition to turning in your processing code, you should document the design and development of your visualization in a short paper.

- **Option III:** Build or evaluate an interface device such as a soap mouse. Document in a short paper.
Prototyping Example
Casey Reas
Ben Fry

Processing is an open source programming language and environment for people who want to create images, animations, and interactions. Initially developed to serve as a software sketchbook and to teach fundamentals of computer programming within a visual context, Processing also has evolved into a tool for generating finished professional work. Today, there are tens of thousands of students, artists, designers, researchers, and hobbyists who use Processing for learning, prototyping, and production.

- Free to download and open source
- Interactive programs using 2D, 3D or PDF output
- OpenGL integration for accelerated 3D
- For GNU/Linux, Mac OS X, and Windows
- Projects run online or as double-clickable applications
- Over 100 libraries extend the software into sound, video, computer vision, and more...
- Well documented, with many books available

We're excited to announce the release of Getting Started with Processing. This informal, short book is an introduction to Processing and interactive computer graphics. Please have a closer look.

A range of books for different skill levels are featured on the Books page.
Video Prototyping

Notes from Wendy Mackay

"Do you have a KeyLess phone?"
Processing Examples

State of the Union

State of the Union (SOTU) provides access to the corpus of all the State of the Union addresses from 1790 to 2007. SOTU allows you to explore how specific words gain and lose prominence over time, and to link to information on the historical context for their use. SOTU focuses on the relationship between individual addresses as compared to the

How to Navigate the Interface

To move between State of the Union addresses, click or drag on the graph below the word cloud, the president who delivered each address and the date of delivery will appear at the bottom of the screen and in the center. The current date will appear in white and the previous one in red.

You can also use the right and left arrow keys to move one year at a time.

The words from the previous address viewed will appear in red when your mouse is over the cloud window so you can compare them. Mouse out to make them fade into the background.

Click on a word to view the full State of the Union address in the window to the right, the selected word will be highlighted.

Click below the graph or on a blank area of the word cloud to view the Wikipedia U.S. History Timeline describing events that happened in and around the year of the address.

Words automatically move to avoid overlapping. On mouseover, a line and dot
Nike Commercial
Martin Wattenberg

Map of the market

Thinking machine 4
Person of Week: Patrick Baudisch
Halo: the problem
aura visible from distance
aura is round
overlapping auras aggregate
fading of aura indicates distance
what was changed
smooth transition $\rightarrow$ sharp edge
disks $\rightarrow$ rings
dark background $\rightarrow$ light background
Interacting with wall displays and display devices at a distance

**soap**

*a pointing device that works in mid-air*

patrick baudisch, mike sinclair, andy wilson

microsoft research
Arduino is an open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. It's intended for artists, designers, hobbyists, and anyone interested in creating interactive objects or environments.

Arduino can sense the environment by receiving input from a variety of sensors and can affect its surroundings by controlling lights, motors, and other devices.
Graduate School and Jobs

Our students interested in HCI go to graduate school in a number of areas

- Cognitive Science Departments and Computer Science Departments (CMU, MIT, Stanford, Berkeley, Georgia Tech, UCI, ...)
  - Some have special programs in HCI (CMU HCII, Georgia Tech HCC, MIT Media Lab, Indiana, ...) or in related areas
  - Some have special research centers like Calit² or programs (CMU ETC, Johns Hopkins Computer Assisted Surgery, ...)
- Schools of Education (Northwestern, Stanford SCIL, ...)
- Design Schools and Programs (new d.school at Stanford, ...)
- Schools of Information (Michigan, Berkeley, Pittsburgh, ...)
- Philosophy, Medical School, Business School, ...

Issues: how to select, M.S. and PhD programs, advice about applying, letters of recommendation, working or taking time off before applying, ...

Advice about Jobs
Contextual Interviews

**Context:** Go where the work is and watch it happen

**Partnership:** Talk about the work while it happens

**Interpretation:** Find the meaning behind the user’s words and actions

**Focus:** Challenge your entering assumptions
Master/Apprentice Model

- Effective model for collecting data, since the best time to unravel the vital from the irrelevant and explain the difference is while in the middle of the work.

- Not natural to stop work to think and talk about it: the apprentice relationship provides the opportunity to do so.

- People depend on the environment and things in it to tell them what to do.

- Talking about work while doing it protects one from the human propensity to talk in generalizations that omit the details designers need.
Contextual Interview

• Taking on the role of apprentice encourages humility, inquisitiveness, and the attention to detail needed to collect good data

• Using the real artifacts grounds the user in specific instances. Return the user to the work in front of them whenever possible

• Periods of watching work unfold, interspersed with discussions of how the work is structured

• Followed by interpretation: chain of reasoning that turns a fact into an action relevant to the designer’s intent

• From the fact, the observable event, the designer makes a hypothesis, an initial interpretation about what the fact means or the intent behind the fact. The hypothesis has an implication for the design, which can be realized as a particular design idea for the system
Contextual Interview

• Take the attitude
  • That nothing any person does is done for no reason; if you think it’s for no reason, you don’t understand the point of view from which it makes sense
  • That nothing any person does is unique to them; it always represents an important class of users whose needs will not be met if you don’t figure out what’s going on
  • That everything is new, as if you had never seen it before

• Probe the thing that is unexpected and see what you find

• Look for ways that what they are doing differs from what you the designer think they should be doing
Contextual Interview

- Begin as a conventional interview
  - Introduce yourself and your focus. The user should know from the outset what you care about and can start with work relevant to the focus
  - Promise and be sure to ensure confidentiality
  - Explain that the user and their work is primary and that you depend on them to teach you the work and correct your misunderstandings
- Get informed consent
  - Forms on web site.
  - Essential you turn in along with your Project II paper
Contextual Interview

• Transition to Master/Apprentice
  • State the new rules: the user will do their work while you watch, you will interrupt when you see something interesting, and the user can tell you if it is a bad time to interrupt
  • Anytime you want to break social norms, it’s best to define the new rules for the social interaction so everyone knows how to behave appropriately
Contextual Interview

- Interview
  - User starts doing her work task and you observe and interpret. This is the bulk of the interview
  - You are the apprentice, observing, asking questions, suggesting interpretations of behavior
  - You are examining artifacts and eliciting accounts
  - You should keep the user concrete, getting back to real instances. Use the actual artifacts to help keep things concrete.
  - You should take copious notes by hand; don’t depend on a recorder to catch everything. You have to be nosy
Contextual Interview

• **Wrap-up**
  - Wrap up your understanding of the work
  - Skim back over your notes to summarize what you have learned
  - Try not to just repeat verbatim what happened, but say what is important about the work
  - This is your last chance to correct and elaborate your understanding. All the user to help
  - Thank them for their time
Contextual Interview

- Description of users’ work
  - Context
  - Flow/structure of the work
  - Problems in their work
  - Problems with tools and other contextual elements that influence the work
- Design ideas that emerge from understanding the work
- Importance of group interpretation sessions