Interfaces: Life at the Screen

Goals of this module

- Defining interfaces as
  - points of entry
  - controlled gateways
  - cultural/epistemological boundaries between different ways of seeing

Elements of good interface design

- Good interfaces form junctions between worlds
- Probably dependent on “closure” (defined as an interim, socially-broad agreement on the shape, purpose, and utility of a designed object or system)
- Note well: design doesn’t just present what is there, it inherently directs how the viewer makes sense of things within

Problems in human-computer interfaces

- Pre-GUI modes of representing information
- With interfaces as [implicitly] cultural divides, an unrecognized problem for computer scientists
Interfacings

Goals of this module (continued…)

- Basics of Usability
  - feedback loops
  - “naturalness”
  - [see readings: Norman & Tog in particular]
- Interfaces as cultural boundaries (recap)
- What IT interface designers need to know
  - “user-centered” design
  - strive for “seamlessness” and flow across modes of work, applications, tasks
  - seek a transparent mapping between gestures, thoughts, and what’s on the screen (ie, facilitate “closure”)
- Local vs general cultures and meanings
- Problems of virtuality
- Clarifying who is who, what is what: authentication and warranting
- “Featuritis” and the plague of mature markets
Interfaces to Information

What is the field called human-computer interaction (HCI)?
- Rooted in “human factors” research in WW2
- A cousin to ergonomics: does for the mind what ergonomics does for the body

General examples of interfaces
- Usuals: daily life, bureaucracies, old “industrial-era” systems
  - punch-in clocks,
  - next phase, thanks to mechanical engineering: “inherently safe” machines
- Cultural: from the “primitive” to the “modern”
  - problems of cinema, TV, etc.: localities of meaning—*The Gods Must be Crazy*
- Architects and planners: architects as disciplinarians
  - Importance of the Americans with Disabilities Act
- Computing and network: [simplest] CLIs and GUls
Everyday-Life Interfaces

- Doors, telephones, appliances
  - What’s the “learning curve” on a rental car, a cell phone?
  - Why are the labels on stereo + TV controls impossible to read?
  - How about those icons on appliances? Braille on a drive-up ATM?
- Tasks can be “delegated” from humans to things
  - the “sleeping policeman”
  - adds an extra wrinkle to interface design
- Bureaucracies public and private: the queue
  - Lester Thurow and the “job queue”—interfaces as barriers to social mobility for those without the proper “tickets”
  - The politics of gate-keeping
  - Traffic
Easy Lessons from Everyday Life

- Which side of the door—“Push” or “Pull”?—lessons from Donald Norman
  - Does it “come naturally”?
  - Does it need a text to explain its basic mode of use?
  - Does it have useable “affordances”?
- Where’s the power?
- Critical concept: the inventor also invents the user—or, at least her gestures and modes of access, and her ways of understanding the new object
- The need for a sign is a bad sign… and the bad configurations are sometimes too obvious!
Caution
The Semantics of Interfaces

Innovation and the problem of closure: can interfaces be "routinized" when a technology is not yet "closed"?

Cory Knobel sees the emergence of a standard as emblematic of closure

perhaps making a standard does reflect consensus

Modernism and the alienness of the primitive or simply different

local/"primitive"/different fosters innovation

working or leisuring in real and IT environments should help make meanings—we need a feedback loop

Cabinets of curiosities, museums, libraries, and freak shows: content and arrangement makes meanings
Interfaces are Inherently Based on Symbolic Representations or “Codings”

- Not so complicated initially: words represent things or actions
- Icons function similarly—perhaps they are deep, psychologically elemental
- At the same time, there are limits to symbolic representation
  - domains where we lack common or rigorous “languages:” smell
  - things that cannot be made explicit: tacit knowledge (craft knowledge vs. engineering)
Information Interfaces

- Lead guru is Edward Tufte, and Norman (of course)

  - Breakthrough book: *The Visual Display of Quantitative Information*; ironically, couldn’t find a publisher, so self-published

  - Similar notions to those in HCI: cognitive mapping, simplicity, etc.

  - Very good critique of “chart junk,” the visual noise that confuses readers

  - Also good on maps, and how they should easily orient the viewer

- More examples of poor representational schemes…
CARTE FIGURATIVE des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812-1813.

Dressée par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite.

TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro

Source: http://it.coe.uga.edu/studio/seminars/visualization/minardmap.html
An Information Interface to Span a Language Barrier…

Source: http://iws.ccccd.edu/acano/lectures/ARTC1305_Logos_Files/image024.jpg
This is a Map??

Source: University of Michigan
Unnecessary Redesign…

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Four Physical-Space, Work-Flow Cases

- Redesigning the reading room in the French National Archives
  - work flow, and who was consulted
  - stairs that make you fall (Gehry’s Guggenheim Bilbao as well)
- The new Italian caffé on East University
  - information flows
  - tasking and work flows
- Retail check-out lines and end caps
- Patient care on the hospital floor
  - The residents’ info system and the problem of hand-offs
  - HIPPA and flow issues
- Info flows must match work flows
Computer and Network Interfaces

- Early
  - Paper, tape, and cards (keyboard clicks as feedback elements)
  - Monitors
- CLIs and GUIs
  - How geeky, how silly?
    - CLIs and geek discipline: extraordinary demand for visualization
    - Bob, Clippy and other idiocies; “lickable” MacOS X
      <http://toastytech.com/guis/bob.html>
  - What metaphors?
    - File systems, trash cans (the Mac’s trashcan?!), touch-screens (note McDonald’s)
    - Space and shopping malls
    - They must make sense, often inherited from older technologies:
      Volume/folder/document metaphor inherited from old paper filing systems.
    - others?
Basics of IT Usability

- Necessity for feedback & minimal time lag from system to user
  - Mouse-tracking at minimum, but other ways as well
  - Aural (sound), haptic (touch)
- Ideally, interfaces should minimize user effort to figure things out
  - things should come “naturally”
  - obvious value here of cognitive & experimental psychology
Interfaces as Cultural Divides

The two sides of the screen:

Computer scientists, engineers, and tech types, for whom sheer technical functionality, “technical sweetness” and elegance of code are socially-rewarded subcultural norms—not unlike elegant buildings that don’t work well

versus

Users, who have myriad different needs and priorities and need devices to work for them
Bridging the CS-User Divide

“User-centered design”
- Go beyond user-testing of interfaces by using the user’s perspective as a starting point of design
- Involve users at the front end of the design cycle

Seek a seamless user experience
- Stop forcing users from having to think about which app is needed to do what task (reduce task- and mode-switching)
- Improve inter-application communications so that assets in one application can be dropped into another (Apple’s Cyberdog, ca. 1992)

Make the computer an “invisible” tool, allowing users to focus on goals, not tools
- Keep in mind that every socially successful technology “disappears” into the infrastructure of everyday life
- Background the technology, foreground the social side

This page inspired by Ben Schneiderman, *Leonardo's Laptop* (Cambridge, MA: MIT Press, 2002)
The Dilemmas of Local Meaning

According to anthropologists, people make meanings locally and “build out and up”

Implication for HCI is that branching scenarios from any given location in an information space have to start from a notion of meeting the user where she is

Thus, a problem: if all “localities” are different how to assure accessibility?

Too local: who will “get it”?—reflects too much of a local subculture

Too general: vacuous beyond belief, like network news—lots of bland niceities, but no way to get depth or control over the user experience

Solution: deft negotiation between very local and very specific, a compromise

Too local: the Linux dilemma

Too general: Microsoft’s Bob

Frederick Taylor’s error: there’s not “one best way”

Akin to developing a political or advertising message
Real vs. Virtual: Distance Issues

- First-level: Social and semantic
  - Trust & Attribution
  - Gestures
  - Eye contact
  - Authenticity and meaning

- Second level: symbolic and tacit
  - The unsaid
  - Power, camera angles, and perspective
  - Time lags: inattention or “pregnant pauses”?
Authentication

Who is who?

Early modes of authentication
- Words of honor & oaths
- Signatures

Modern methods
- Passwords & SSH mechanisms
- Kerberos & PKIs/PGP, now shibboleth
- VPNs and closed systems
- Biometrics: linking bodies and information
  - Flaky fingerprints and DNA as the “gold standard” (?)
  - 146 legal exonerations by DNA as of August 2004
Warranting

- Definitions: making trust
- Trademarks, licenses, seals, stamps, and notaries: the public official & process
- Reputation and private means; whom do you trust…? (Branding, Goebbels, & Enron)
- Spam, Ponzi schemes, and the perils of modern computing: the ephemeral scammer.
- Mistaking mind-share for honesty
Conclusion: What Makes Good Interfaces?

- Good “cognitive mapping:” interactions should seem transparent and natural
  - conforming to a sense of appropriate workflow
  - mapped to metaphors we’re more accustomed to
- Minimize complexity & avoid featuritis
- Provide feedback, perhaps in a multisensory way (operating room example)
- Minimal lag between action and machine response
- Make systems multi-modal, as people normally multitask