Usability Engineering in Practice

- What kind of job might a usability expert encounter?
- In 1970’s, it was common to schedule user tests at end of development for client acceptance. Results of tests:
  - Cosmetic improvements
  - Calls for additional training
  - Requirements for future versions

Usability Engineering in 1980s

- In 1980’s, competition and faster product cycles pushed usability testing earlier into development. Two approaches.
- Separate usability groups that act as general resource to multiple development teams
  + Resource sharing, cross-product insights, organizational learning
  - Communication overhead, time-sharing, prioritization
- Integrate usability specialist as part of each development team
  + Tightly integrated, focused work, appreciation of project-specific constraints
  - Less objectivity, hard to generalize
  + Increases likelihood that right use-related questions will be raised and addressed, immersion in problem domain
  - Many companies cannot or will not afford to employ enough specialists to cover each project

Usability Engineering Now

- Usability engineers work with requirements specification along with marketing as well as in design.
- HCI identified as a core area within CS, so most CS graduates have some exposure to HCI concepts
- HCI research and graduate programs. PhD: CMU, Georgia Tech, Stanford, MIT Media Lab; Master’s: DePaul, IU

Cost-Benefit Analysis

- Costs - enumerate usability activities
  - Writing development scenarios, includes field work, interviews, surveys, etc., and analysis
  - Refining and reviewing scenarios
  - Developing prototypes: paper, running walkthroughs, analysis
  - Formative evaluation and analysis
  - Test lab
  - Travel, if not co-located with developers
CS 350: Computer/Human Interaction

Cost-Benefit Analysis

- In addition, generally will delay development
- Benefits - hard to estimate, some usually attributed to usability engineering
  - fewer downstream changes; studies estimate that a change at prototype stage is 25% of cost of a change after installation. E.g., if assume 5 design changes of 4-8 hours to effect, then saves a week of effort.
  - reduced training and customer support
- Benefits - hard to estimate, some usually attributed to usability engineering
  - increased user productivity; e.g., predict typical user performance if save .5 minute per 20 interactions per day, every day of product life; similarly with error recovery
  - customer loyalty, both repeat purchase and referrals
  - increased sales
- Example in textbook (Table 10.1, p 348): $68K cost, $6.8M projected savings

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Internationalization and Localization

- Company can minimize costs by providing only one interface, but not a good idea
  - World is less interesting if all the same
  - Culture is like workplace environment and should be one of the contexts of use. E.g., terms like “kill” might be offensive; using picture of dog for fetch; date and currency formats; colors
- Interface standards can help with this
- Localization is a design strategy that supports systematic variation among regions and cultures

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Ethical/Social Issues

- Safety - e.g., Therac-25 radiation therapy machine
  - Bad engineering with bad interface
  - Safety interlock was removed because assumed can find all software errors
  - Added complexity without documentation
  - Interface was not synchronized with internal state; error messages were not specific (same one for both too high and too low)
- No separate testing before put into use
- 6 people died of massive radiation burns
- Early Airbus accidents/incidents
  - All CRT instruments, no mechanical dials
  - Similar display format for different indicators
- Digital Divide
  - Haves vs. have nots; functional illiteracy now includes computer use
CS 350: Computer/Human Interaction
Ethical/Social Issues

- Special needs can drive improvements for all users
  - Head-mounted pointing device for hands-free operation
  - Visual enlargement for elderly
  - Audio enhancements for noisy environments

Elderly are the fastest growing segment of users, need more robust, simpler designs

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CS 350: Computer/Human Interaction
Homework 6

- In textbook: Exercise 2 on page 301, Exercise 1 on page 339, Exercise 1 on page 360
- Due at beginning of class next Tuesday as part of Exam 2 review