ICS 105: Project in HCI

Engineering for Usability

administrative

- adds and drops
  - list on web page (http://www.ics.uci.edu/~jpd/105)
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    - Ghani, Zohaib
    - Kim, Meari
    - Kuo, David
    - Le, Hung
    - Luong, Ivy
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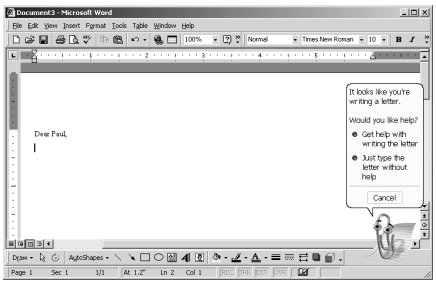
    - Nguyen, Anh
    - Nguyen, Brandon
    - Nguyen, Tho
    - On, Perry
    - Pang, Henry
    - Sanchez, Sam
    - Singh, Meena
    - Song, Chan-Young
    - Tran, Vu

administrative

- project
  - project groups by the end of the week
    - email me and Doshi
    - tell me who are the coordinators
      - team, design, implementation, testing
- meetings

bye-bye, clippy…



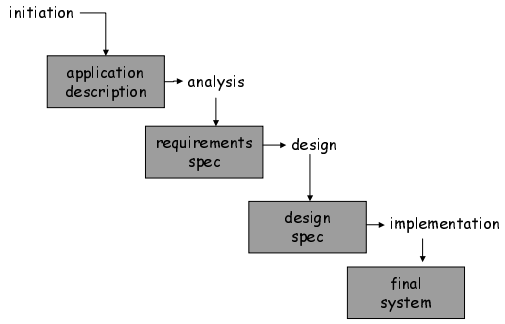
engineering for usability

- usability doesn't just happen by accident
- usability as a feature of the engineering process
  - design process to ensure usable software
  - take usability as central, not tacked-on
    - remember, usability != interface

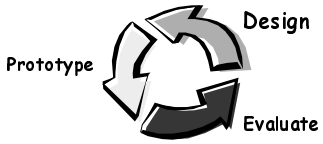
usability

- ease of learning
  - do it faster the second time around…
- recall
  - remember how to do things from one session to next
- productivity
  - perform tasks quickly and efficiently
- minimal error rates
  - reduce number
  - if they occur, good feedback for better recovery
- high user satisfaction
  - users confident of success

waterfall model



user-centered design



comparing the approaches

- waterfall
  - structured
  - customers, not users
  - limited feedback
    - errors carry forward
    - expensive to fix
- iterative
  - focused on users
  - continual evaluation
    - finds errors sooner

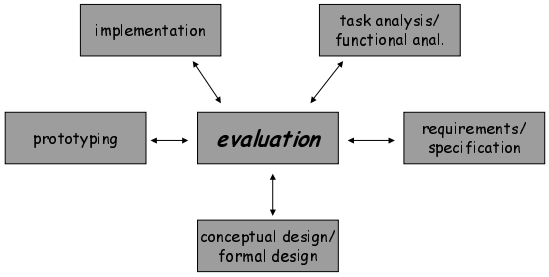
user-centered design

- two key principles
  - any component that hasn't been evaluated is potentially flawed
  - user experience is the best evaluation metric
- test early, test often
  - test *before you've built*
  - test *prototypes that barely work*
  - test *with an eye towards redesign*
- the key is *direct engagement with users*

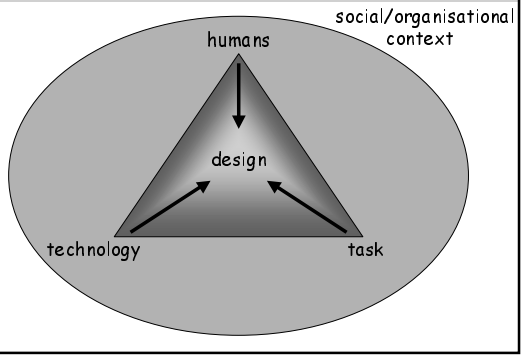
cooperative design

- participative design
  - origins in Scandinavia in the 1970s
  - users have a right to be involved in the design of systems they'll use
    - working in cooperative teams
    - "future workshops"
- sociotechnical design
  - system designs are socially embedded
  - need to design social processes along with tech.
  - aim is coherent human-machine systems

hci design approach



what is HCI?



task analysis

- starting point is the task to be carried out
  - who is going to use this?
  - when, why and how often?
  - how do they learn how to do it?
  - what do they do now? what is needed?
  - how do they get the information they need?
  - what are the time constraints?
  - what are their alternatives?
  - what if it goes wrong?
- e.g. controlling a digital VCR

understanding users

- need to understand the users
  - what are their motivations?
  - skills? background? work habits?
  - any special requirements?
- e.g. elderly users
  - regular PCs
  - PDAs?

why do we do this?

- basic motivation is to avoid product failure
  - systems fail because users reject them
    - too complex to use
    - don't fit end-user needs
  - user-centered design avoids these failures
    - early and frequent engagements with users
    - design grounded in understanding of users and tasks
    - easier to keep product design on schedule
    - ease of use improves product uptake
    - reduces training costs

scenarios & storyboards

- the user is at the center of the design process
  - how to do this in the very early stages
  - we don't even have a design yet!
- scenarios
  - personalised, fictitious story about
    - users
    - occasions of use

scenarios

- Professor Dourish is on his way to Washington DC (again). As usual, he's running late, and loaded down with bags carrying clothes, laptop, books and papers… he has a lot of work to do on the plane. He's flustered, because his flight will depart soon, and he's just had his inevitable brush with the security staff. He gets to the gate and sees an electronic check-in system…

scenarios

- scenarios make things *concrete*
  - draw a rich picture of the setting of use
    - where does the system get used? when? how often?
  - give people names, backgrounds, *motivations*
    - you're going to use scenarios to justify design
    - need features to draw on
- scenarios as part of a user-centered design
  - in some situations, you can't use real users
    - no prototype available, product too sensitive…
  - scenarios aren't a replacement, but they're a start
  - need to use *multiple* scenarios

prototyping approaches

- rapid prototyping
  - build, test, throw it away
  - key focus: collecting requirements information
- incremental prototyping
  - building large systems in stages
  - key focus: reducing delays
- evolutionary prototyping
  - "design in place"
  - key focus: balancing prototyping with development
- the problems of premature commitment

prototyping

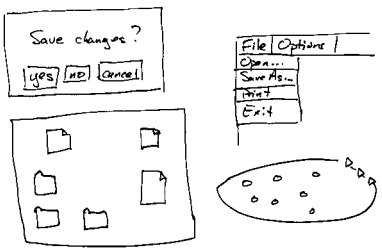
- the central problems of prototyping
  - the system is incomplete
    - what parts to build and use?
    - how to make them "work"?
  - getting to real user experience
    - creating a persuasive situation

prototyping

- degree of integration
  - horizontal prototype
  - vertical prototype
- interaction style
  - chauffeurred prototype
  - wizard-of-oz
- how polished?
  - low-fi prototype
  - high-fi prototype

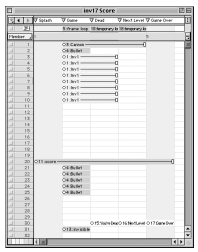
prototyping

- "low-fi" prototypes



prototyping

- high-fi prototypes
  - computer-based prototypes
  - Macromind Director
    - commonly used at Apple
    - basic metaphor
      - stage
      - actors
      - score



prototypes

- trade-offs
  - "high-fi" prototypes can be more impressive
    - getting customer buy-in
      - note – this is NOT the purpose of UI prototypes!
    - more persuasive
      - good: users don't need to suspend belief
      - bad: too "polished" can make people less critical
  - "low-fi" prototypes are easier to build
    - faster iteration

evaluation

- harnessing user experience – *evaluation*
- evaluation is about answering questions
  - so you have to know what the questions are
    - "what sorts of tasks do people need to perform?"
    - "how quickly can users understand our interface?"
    - "how do people typically use our system?"
    - "how much do people remember between trials?"
    - "does this technique work better than the old one?"
    - "what interaction problems do we need to address?"

what do you want to know?

- formative evaluation
  - early stages of design
  - information on users, tasks, problems
  - forming a set of requirements and expectations
- summative evaluation
  - final stages
  - did the product meet its goals?

why?

- formative evaluation
- summative evaluation
- new designs
- comparing designs
- checking conformance

techniques

- observation (interpretive evaluation)
  - want to find out what people do – go and see!
  - ethnographic techniques and contextual enquiry
  - key features
    - looking for the whole detail of what people do
    - looking at the context in which action takes place
- collecting opinions
  - surveys and questionnaires
  - faster, larger numbers
  - limited by questions, out of context, social pressures

techniques

- experiments & benchmarking
  - fixed tasks in laboratory settings
  - measure specific features
    - time taken to compete task
    - errors made
    - sequences of action
  - generally, comparing between conditions
    - different interface designs or techniques
      - e.g. two different techniques for selection
    - impacts of variables
      - e.g. delay and jitter in collaborative interfaces

techniques

- predictive evaluation
  - no users involved at all!
  - analysis of interfaces against predictive models
  - advantages
    - it's a lot faster, cheaper and easier!
  - disadvantages
    - it's only as good as the model
    - models are hard to verify
- useful as part of a larger strategy
  - combine with user-based evaluations

user-centered iterative design

- developers working with target users
- think of the world in users' terms
- understanding work process
- driven by usability needs, not technology
- iterate at every stage
- toolbox of techniques

for next time

- project groups by Friday if possible
  - by email to jpd@ics.uci.edu and doshi@acm.org
  - I'll start to do random assignments after that
- next time, start on techniques
  - cognitive walkthroughs and paper prototypes
  - ch 19.3, ch 19.4, ch 33