

6.S196 / PPAT: Principles and Practice of Assistive Technology

Today: User Testing & Ethics

Monday, 28 Nov. 2011
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Today's Topics

- Ethics of human subject research
- User testing

Kinds of User Tests

- Formative evaluation
 - Find problems for next iteration of design
 - Evaluates prototype or implementation, in lab, on chosen tasks
 - Qualitative observations (usability problems)
- Field study
 - Find problems in context
 - Evaluates working implementation, in real context, on real tasks
 - Mostly qualitative observations
- Controlled experiment
 - Tests a hypothesis (e.g., interface X is faster than interface Y)
 - Evaluates working implementation, in controlled lab environment, on chosen tasks
 - Mostly quantitative observations (time, error rate, satisfaction)

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Ethics of User Testing

- Users are **human beings**
 - Human subjects have been seriously abused in the past
 - Nazi concentration camps
 - Tuskegee syphilis study
 - MIT Fernald School study: feeding radioactive isotopes to mentally retarded children
 - Yale electric shock study

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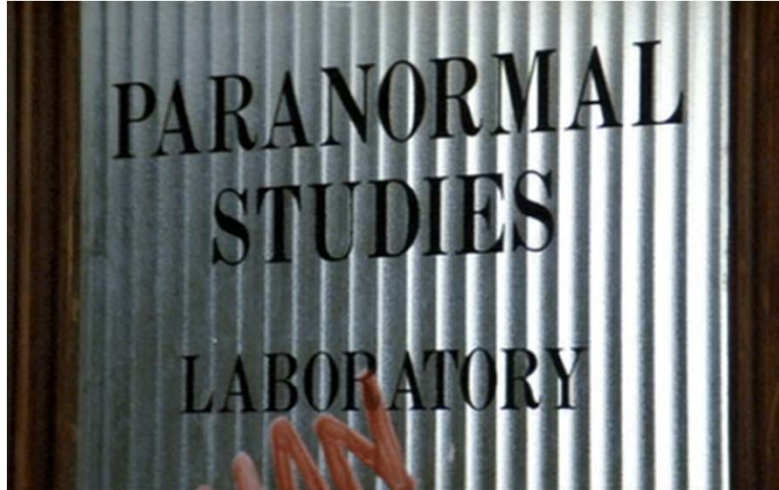
Basic Principles (Belmont Report)

- Respect for persons
 - voluntary participation
 - informed consent
 - protection of vulnerable populations (children, prisoners, people with disabilities, esp. cognitive)
- Beneficence
 - do no harm
 - risks vs. benefits: risks to subjects should be commensurate with benefits of the work to the subjects or society
- Justice
 - fair selection of subjects

Institutional Review Boards

- Research with people is subject to scrutiny
 - All federally-funded institutions have an *institutional review board* (IRB) that approves research-related user tests
 - MIT's IRB is called the Committee on Use of Humans as Experimental Subjects (COUHES)
- IRB oversight is confined to research
 - "Research" is work leading to generalizable knowledge
 - "Practice" (clinical medicine, product development, class projects) does not require IRB approval
 - but all work with human beings should follow the IRB ethical guidelines, even if it doesn't need to do IRB paperwork

A Case Study of Ethics in User Studies



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Treat the User With Respect

- Time
 - Don't waste it
- Comfort
 - Make the user comfortable
- Informed consent
 - Inform the user as fully as possible
- Privacy
 - Preserve the user's privacy
- Control
 - The user can stop at any time

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Before a Test

- Time
 - Pilot-test all materials and tasks
- Comfort
 - “We’re testing the system; we’re not testing you.”
 - “Any difficulties you encounter are the system’s fault. We need your help to find these problems.”
- Privacy
 - “Your test results will be completely confidential.”
- Information
 - Brief about purpose of study
 - Inform about audiotaping, videotaping, other observers
 - Answer any questions beforehand (unless biasing)
- Control
 - “You can stop at any time.”

During the Test

- Time
 - Eliminate unnecessary tasks
- Comfort
 - Calm, relaxed atmosphere
 - Take breaks in long session
 - Never act disappointed
 - Give tasks one at a time
 - First task should be easy, for an early success experience
- Privacy
 - User’s boss shouldn’t be watching
- Information
 - Answer questions (again, where they won’t bias)
- Control
 - User can give up a task and go on to the next
 - User can quit entirely

After the Test

- Comfort
 - Say what they've helped you do
- Information
 - Answer questions that you had to defer to avoid biasing the experiment
- Privacy
 - Don't publish user-identifying information
 - Don't show video or audio without user's permission

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Formative Evaluation

- Find some users
 - Should be representative of the target user class(es), based on user analysis
- Give each user some tasks
 - Should be representative of important tasks, based on task analysis
- Watch user do the tasks

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Challenges for Assistive Technology

- Finding users
 - “representative” users? Disabilities vary too much
 - one approach: recruit users by the kinds of AT they already use (or can’t use)
 - often need more than 3-5 users for good results
- Recruiting
 - helps to develop contacts and relationships
 - fosters trust, and word-of-mouth and viral marketing
 - sometimes easy to recruit: PWD are often more willing to participate in studies
 - sometimes very hard: people with “hidden disabilities” (e.g. learning disabilities) are more reluctant

Challenges for Assistive Technology

- Location
 - make sure the testing location is accessible
 - meet & escort
 - offer to pay transportation expenses
 - sometimes necessary to go to homes or workplaces
- Setup
 - user’s existing AT may be specific, personal, and customized – find out what it is
 - “Uh... this isn’t the assistive technology I’m used to...”

Challenges for Assistive Technology

- Energy & fatigue
 - build in extra time for users who need breaks because of the disability, medication, inefficiency of AT, etc.
 - though many will have unusual reserves of energy and patience (since learning AT requires so much of it!)
- Use a screening questionnaire when recruiting subjects
 - e.g. http://www.uiaccess.com/accessucd/ut_ppt-screen.html

Recruiting Screening

Roles in Formative Evaluation

- User
- Facilitator
- Observers

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User's Role

- User should think aloud
 - What they think is happening
 - What they're trying to do
 - Why they took an action
- Problems
 - Feels weird
 - Thinking aloud may alter behavior
 - Disrupts concentration
- Another approach: pairs of users
 - Two users working together are more likely to converse naturally
 - Also called co-discovery, constructive interaction

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Facilitator's Role

- Does the briefing
- Provides the tasks
- Coaches the user to think aloud by asking questions
 - “What are you thinking?”
 - “Why did you try that?”
- Controls the session and prevents interruptions by observers

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Observer's Role

- Be quiet!
 - Don't help, don't explain, don't point out mistakes
 - Sit on your hands if it helps
- Take notes
 - Watch for critical incidents: events that strongly affect task performance or satisfaction
 - Usually negative
 - Errors
 - Repeated attempts
 - Curses
 - May be positive
 - “Cool!”
 - “Oh, now I see.”

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Example: Think Aloud



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Example: Watching for Critical



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Recording Observations

- Pen & paper notes
 - Prepared forms can help
- Audio recording
 - For think-aloud
- Video recording
 - Usability labs often set up with two cameras, one for user's face, one for screen
 - User may be self-conscious
 - Good for closed-circuit view by observers in another room
 - Generates too much data
 - Retrospective testing: go back through the video with the user, discussing critical incidents
- Screen capture & event logging
 - Cheap and unobtrusive
 - Camtasia, CamStudio

Summary

- Formative user testing tries to uncover usability problems to fix in next iteration
- Treat users with respect, beneficence, justice
- Facilitator and observers should play their roles correctly to maximize the value of the test