Usability Studies

SWE 632
Fall 2015

Administrivia

- HW 3 due today
- HW 4 due 11/5
- In-class midterm next week
- No class on 10/29, video-recorded lecture will be posted online

HW 4

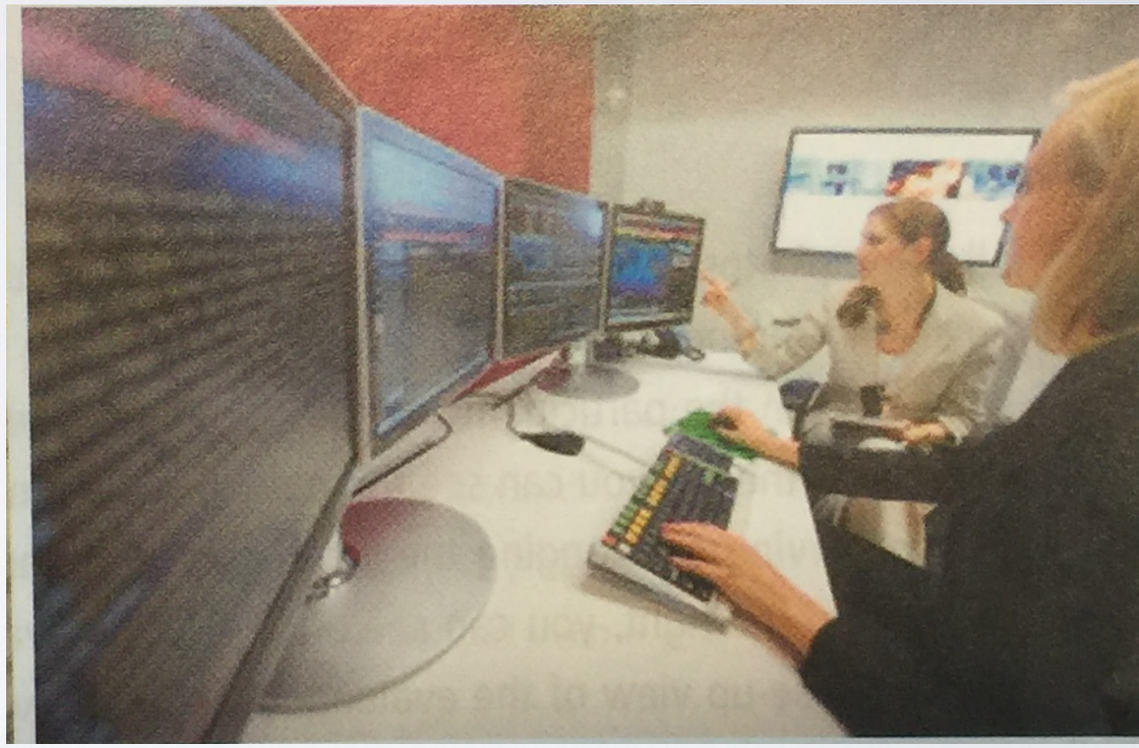
- Conduct a usability evaluation of your group's app w/ 4 participants
- Design task & study materials
  - Tasks should be 10 - 20 mins long and must be at least 5 mins
  - Pilot test study tasks and materials
- Conduct study, collecting think aloud and screencast
- Conduct open ended post task interview
- Analyze data to report findings and identify at least 5 usability issues

Midterm review

Usability Studies

Why conduct usability studies

- Evaluate interaction design with **real** empirical data, gathering ground truth of user performance



- Identify **usability issues**

Usability studies in design process

Need finding contextual inquiry

analytical

heuristic evaluation

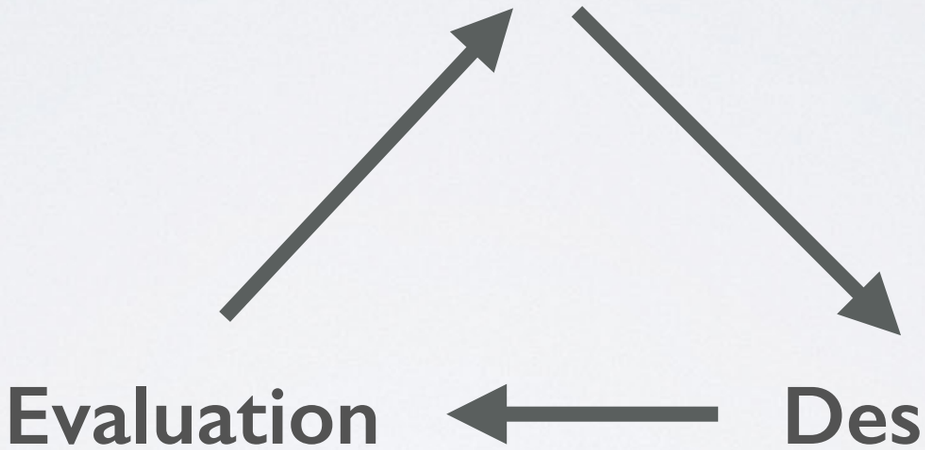
design guidelines

empirical

paper prototype study

Wizard of Oz study

usability studies



sketching

prototypes

storyboards

Steps in a usability evaluation study

- Formulate **goals** of study
- Design study protocol, tasks, materials, data collection, …
  - Pilot study design
- **Conduct** study
- **Analyze** data to assess task performance and identify usability issues

Formulate study goals

Study goals

- What usability feedback do you seek?
  - Exploring new design idea
  - Validating high-level approach
  - Identifying important usability issues
  - Evaluating a new feature just added or a particular corner case
  - Studying performance by specific users (e.g., expert users familiar with old version)
  - Comparing performance against competitors

Study design

Selecting participant population

- Who will be the users?
- Goal: users representative of system's **target users**
- Are there multiple **classes** of users (e.g., data analysts, site administrators)?
  - If so, which are appropriate given goals?
  - May choose several classes
- System **novices** or **experts**?
- Might choose to include **UX experts** to help flag potential issues

Number of participants

- More participants —> different participant interactions, more data
- Fewer participants —> faster, cheaper
- No right answer, as depends on potential diversity of interactions and users
- Nielsen & Morlich (1990) found that 80% of problems could be detected w/ **4-5** participants
  - Most serious usually detected with first few

Consent

- Important for participants to be told up front what they will do and provide affirmative consent

- Helps allay potential participant fears

- Make clear purpose of study

- Make clear that you are evaluating your design, **not** the user

- (Institutional Review Board only applicable for US government funded organizations).

Elements of an Informed Consent Form

- Names & contact info for you and other experimenters
- **Purpose** of the study
- Brief (one or two sentence) high-level description of the types of **work** participants will be asked to do
- Expected **length** of the study
- A statement of any possible **benefits** or compensation
- A statement of any possible **risks** or discomforts
- Overview of the data you will collect (thinkaloud, screencast, survey questions, etc.)
- Clear statement on confidentiality of data (who will have access?)

Informed Consent for Participant of Development Project

<Name of your development organization> <Date or version number of form>

Title of Project: *<Project title>*
Project team member(s) directly involved: *<Team member names>*
Project manager: *<Project manager name>*

I. THE PURPOSE OF YOUR PARTICIPATION IN THIS PROJECT

As part of the *<project title>* project, you are invited to participate in evaluating and improving various designs of *<name of system or product>*, *<description of system or product>*.

II. PROCEDURES

You will be asked to perform a set of tasks using the *<name of system or product>*. These tasks consist of *<description of range of tasks>*. Your role in these tests is to help us evaluate the designs. We are not evaluating you or your performance in any way. As you perform various tasks with the system, your actions and comments will be noted and you will be asked to describe verbally your learning process. You may be asked questions during and after the evaluation, in order to clarify our understanding of your evaluation. You may also be asked to fill out a questionnaire relating to your usage of the system.

The evaluation session will last no more than four hours, with the typical session being about two hours. The tasks are not very tiring, but you are welcome to take rest breaks as needed. If you prefer, the session may be divided into two shorter sessions.

III. RISKS

There are no known risks to the participants of this study.

IV. BENEFITS OF THIS PROJECT

Your participation in this project will provide information that may be used to improve our designs for *<name of system or product>*. No guarantee of further benefits has been made to encourage you to participate. (Change this, if a benefit such as payment or a gift is offered.) You are requested to refrain from discussing the evaluation with other people who might be in the candidate pool from which other participants might be drawn.

V. EXTENT OF ANONYMITY AND CONFIDENTIALITY

The results of this study will be kept strictly confidential. Your written consent is required for the researchers to release any data identified with you as an individual to anyone other than personnel working on the project. The information you provide will have your name removed and only a subject number will identify you during analyses and any written reports of the research.

The experiment may be videotaped. If it is taped, the tapes will be stored securely, viewed only by the experimenters and erased after 3 months. If the experimenters wish to use a portion of your videotape for any other purpose, they will get your written permission before using it. Your signature on this form does not give them permission to show your videotape to anyone else.

VI. COMPENSATION

Your participation is voluntary and unpaid. (Change this, if a benefit such as payment or a gift is offered.)

VII. FREEDOM TO WITHDRAW

You are free to withdraw from this study at any time for any reason.

VIII. APPROVAL OF RESEARCH

This research has been approved, as required, by the Institutional Review Board *<or the name of your review committee>* for projects involving human subjects at *<your organization>*.

IX. PARTICIPANT RESPONSIBILITIES AND PERMISSION

I voluntarily agree to participate in this study, and I know of no reason I cannot participate. I have read and understand the informed consent and conditions of this project. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent for participation in this project. If I participate, I may withdraw at any time without penalty. I agree to abide by the rules of this project

Study information sheets

- More informal version of informed consent
- Does not ask participants to agree in writing to conduct study
- Still provides key elements describing the study
- Appropriate for more short and informal studies

Tasks

- What will users do?
- Goals for task design:
  - Provide specific goal: something that the user should accomplish
  - Comprehensive enough to exercise key features of your app
  - Short enough to minimize participant time commitments

Communicating tasks

- Provide a scenario explaining the background of what users will be doing
- Provide a specific goal that the user should accomplish
  - But **not** how they should accomplish it
  - Don't give away how you hope users will accomplish goal
- Communicate **end criterion** for task - how do they know they're done?
- Provide maximum time limit after which they will be stopped

Recruiting participants

- Many potential sources
  - Co-workers, colleagues, friends, family
  - Email, mailing lists, online forums
  - Announcement at related user groups
- Important to select sources that best match the background & knowledge of target users

Incentives for participants

- Often (but not always) helpful to pay participants
- Most applicable when seeking participants with specialized expertise with whom you do not already have a personal or professional relationship
- Can also offer other incentives, such as gifts, coffee mugs, gift certificate; or free consulting, training, or software
- In some cases, just learning about future product can be incentive

Managing participants

- Participants are valuable resource
  - Often finite resource
- Think carefully about how participants will be used
- Devise mechanisms for scheduling participants & reminders

Training

- Goal: **avoid** unless really necessary
- Training necessary when
- Participants require specialized knowledge to act as target users
- Target users will have access to specialized training materials before they begin study

Data collection

- Think aloud
- Screencast
- Questionnaires interview questions to gather participant feedback

Questionnaires and interviews

- Gather background or demographics about participants (if important)
- Supplement task performance data with subjective reactions
  - Perceptions of design, comments on potential issues, ideas for features
- Questionnaire - pre-defined questions, focused, less bias
- Interviews - more open ended, longer responses

Example open-ended questions

- What did you like best about the UI?
- What did you find most difficult or challenging?
- How might the UI better support what you're trying to do?

Piloting study design

- Dress rehearsal for conducting actual study
- Goals
  - Ensure software / prototype won't "blow up"
  - Test tasks - ensure right length & difficulty
  - Test that materials are comprehensive and comprehensible
  - Test data collection protocol and methods
- As-needed piloting
  - Use first study session as pilot only if issues arise and must be addressed

Conducting the study

Introduction (1)

- Greet participants, introduce yourself, thank them
- Build rapport, socialize
- Introduce them to the setup

Introduction (2)

- Give participant Informed Consent / Study Information Sheet
- Answer any questions about study design
- Relieve anxiety and curiosity as much as possible
- Make clear evaluating design, not participant
- Let participants know you can't answer questions about how to do task

Starting session

- Give participants description of task
- Start any video recording
- Start encouraging participant to think aloud
- Begin observing participants work on task

Interactions during the task

- Goal: listen, not talk
- Prompt participants to think aloud when necessary
  - e.g., What are you trying to do? What did you expect to happen?
- If show signs of stress / fatigue, let them take a break
- Keep participants at ease
  - If participants frustrated, reassure & calm participants
  - If so frustrated they want to quit, let them

Giving help

- If participants totally off track, small reminder of goal might help

- Should **not** give participants information about how to complete the task

- What if user asks for help?

  - Direct them to think through it or work it out for themselves

Collecting critical incidents

- *Any action that does not lead to progress in performing the desired task*
- May sometimes be related to a gulf of execution or gulf of evaluation
- Generally does not include
  - accessing help
  - random acts of curiosity or exploration
  - slips

Understanding a critical incident

- Important to understand in the moment what users goal is and what actions they are taking
- When a critical incident occurs, jot down
  - The time
  - What user was trying to do
  - What user did

Wrapping up the study session

- Provide questionnaire (if applicable) / conduct interview (if applicable)
- Answer any lingering questions the participant may have
- Thank the participant!!
- Provide any incentives (if applicable)

Reset study environment

- Make sure study environment is in the same state for all participants

- Reset browser history / cache (if applicable)

- Delete any user created content or materials

Analyzing data

Quantitative data

- Time on task
- Can pull out task times from screencast
- Or even breakout subtasks

Critical incident analysis

- Identify critical incidents where something went wrong

- Easiest to catch in the moment - important to take good notes

- Going back and looking at screencast can help you study context of issue in more detail

Reporting a critical incident

- Problem statement: summary of problem and effect on user (but not a solution!)
- User goals: what was user trying to do?
- Immediate intention: at the moment in time when problem occurred, what was the user trying to do
- Possible causes: speculate on what might have led user to take action they did

Consolidating critical incidents

- Match similar critical incidents within and across study sessions
- Identify underlying cause
- Brainstorm potential fixes

In class activity

Group activity

- Form groups of two (not anyone you've worked with before)
- Take turns conducting a usability study of your project app
- 5 mins to brainstorm 5-10 min task
- 15 mins to conduct study
- Identify critical incidents (if any)