Think-Aloud Usability Evaluations

SWE 632
Fall 2023

Administrivia

- Midterm exam next week
  - Covers all lectures & readings before exam
- No class in 2 weeks (10/10) - Fall Break
- HW4 out today. But recommend starting after Midterm Exam.
  - Think-aloud usability eval of project app
  - Due in 4 weeks (10/24)

Midterm Exam

- Mix of multiple choice, short essay
- In-class, closed book
- Content review

Think-Aloud Usability Studies

Iterative Model of User-Centered Design

Observation

(Re)Define the Problem

Understand User Needs

Idea Generation

Brainstorm
what to build

Prototype

Build

Test

Evaluate what
you have built

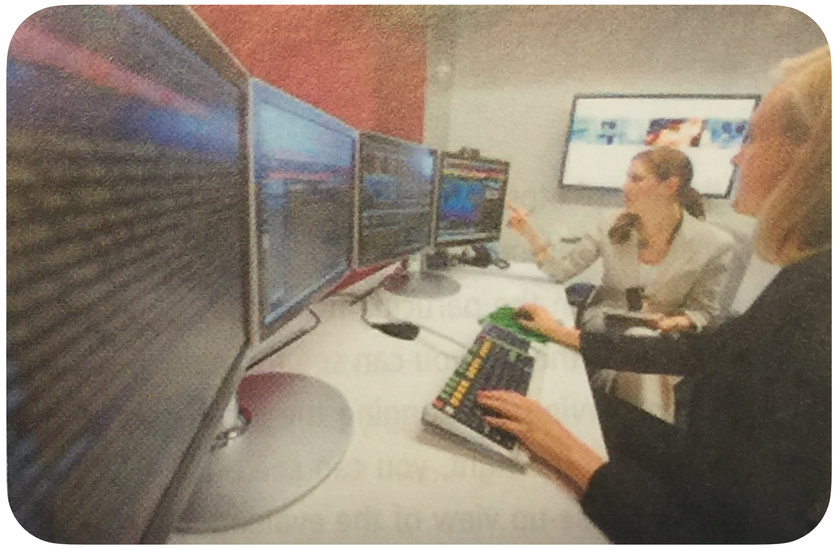
Iterative Model of User-Centered Design

Test

Evaluate what
you have built

Why Conduct Usability Studies?

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



Think-aloud Usability Study

- Goal: observe users using app, identify usability issues
- Can use with
  - paper prototype
  - HTML prototype
  - Wizard of Oz study
  - actual app

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

- Where are you in the design process? What 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
  - Krug suggests 3

Informed 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

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 and 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
- 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
- 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*
- Often related to a gulf of execution or gulf of evaluation
- Generally does not include
  - accessing help
  - random acts of curiosity or exploration

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)
  - Probing into causes of behavior
- 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

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

Critical Incidents --> Usability Issues

- Group together similar incidents to form ***usability issue***
  - Match similar critical incidents within and across study sessions
  - Identify underlying cause

- Brainstorm potential fixes

Usability Study vs. Contextual Inquiry

Usability Study

- Used for evaluation
- Generally conducted via observation
- Identification and analysis of “critical incidents”
- Intended to identify usability issues

Contextual Inquiry

- Used primarily for “needfinding”
- Conducted more like a conversation
- Obtain data about users in their context
- Intended to help in the design phase of a project

10 Minute Break

In-Class Activity

Group Activity

- In groups of two or three
- Conducting a usability study of a web app of your choice
  - 5 mins to brainstorm 5-10 min task for each app
  - 10-15 mins to conduct each study
  - Identify critical incidents (if any)
- Deliverables (due 6:25pm today)
  - Your name
  - Name of app your evaluating / short description
  - Description of critical incidents