SWE 432 -Web Application Development

Fall 2022

George Mason University

Dr. Kevin Moran

Week 12: Think-aloud Usability Evaluation

Administrivia

- *HW Assignment 3* - Grades and comments posted
- *HW Assignment 4 -* Out now, Due next week (November 22nd)!
  - Extra Credit Opportunity!

Class Overview

- ***Lecture:*** Think-Aloud Usability Evaluations
  - Quick Lecture
  - Usability Study Activity

Usability Studies

Iterative Model of User-Centered Design

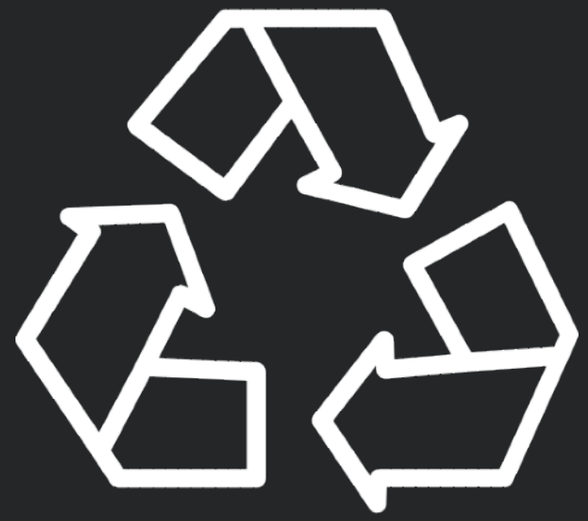
Observation

(Re)Define the Problem

Understand User Needs

Idea Generation

Brainstorm
what to build



Prototype

Build

Test

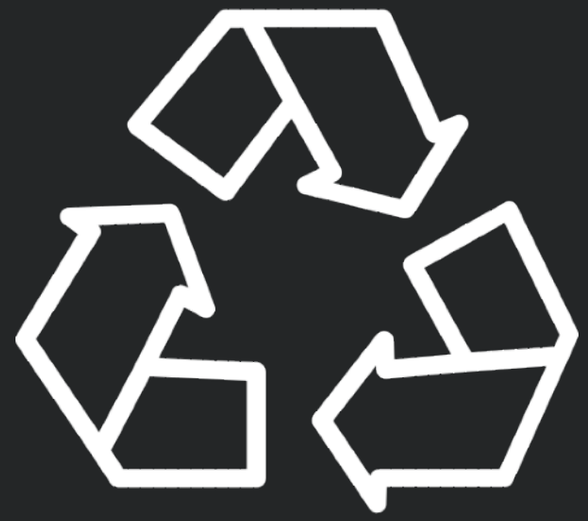
Evaluate what
you have built

Iterative Model of User-Centered Design

Observation

(Re)Define the Problem

Understand User Needs



Idea Generation

Brainstorm
what to build

Prototype

Build

Test

Evaluate what
you have built

Empirical

Usability Evaluation (Now)

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 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

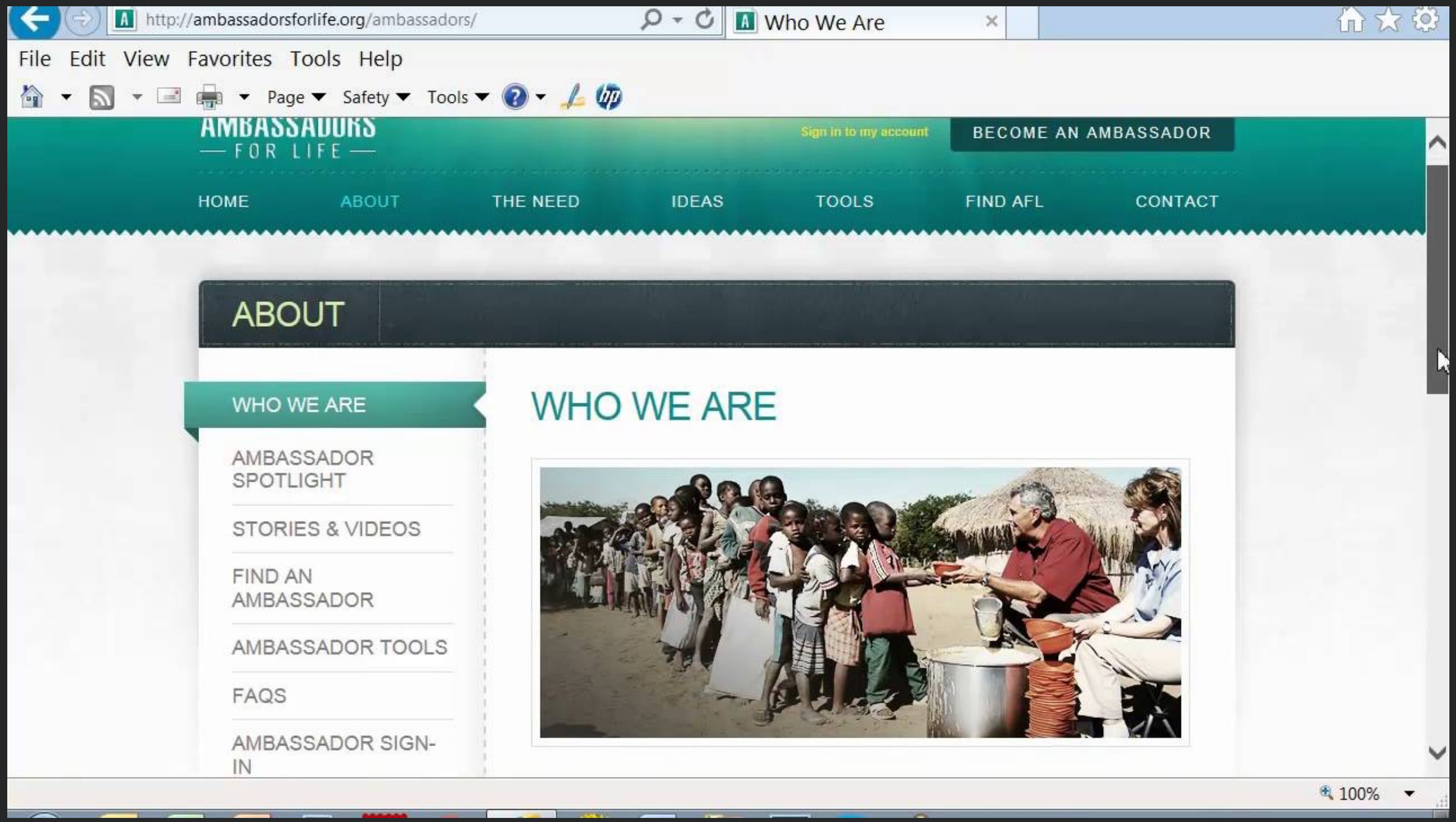
Reporting a Critical Incident

- 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

Example of Thinking Aloud



In-Class Activity

Group Activity

- In groups of two
- Take turns conducting a usability study of an app of your choice
  - Try to think of a semi-difficult task that you might be able to improve
  - 5 mins to brainstorm 5-10 min task for each app
  - ~10 mins to conduct each study
  - Identify critical incidents (if any)

Acknowledgements

- Slides adapted from Dr. Thomas Latoza's SWE 432 course