Human-Computer Interaction

CS 449 | 649 – F26

Week 8: Nov 2 – Nov 6

Guest Lectures from Waterloo HCI PhD Candidates
Brandon Lit and Anchit Mishra

Prep for E1 Low-Fidelity Prototype Evaluation (Week 9)

* Updated Nov 2 2026

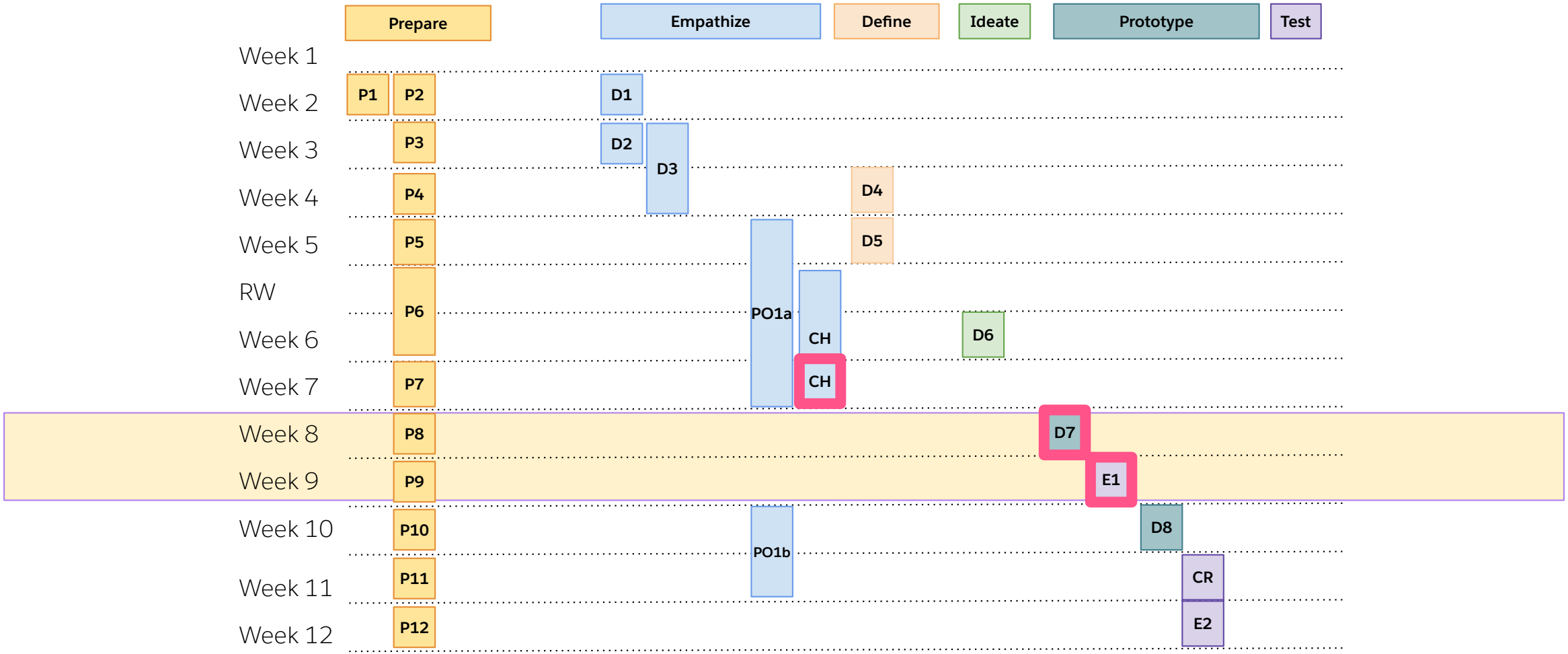
UNIVERSITY OF WATERLOO | DAVID R. CHERITON SCHOOL OF COMPUTER SCIENCE

WATERLOO HCI

Week 7 Recap

UX Prototyping, Models & Design principles for interaction, ~~Evaluating low fidelity prototypes~~ (deferred)

Project Deliverables Build on Each Other



Week 8 To-Dos

✅ Submit your CH1 Challenge Report

✅ P8: Prepare for Low-Fidelity Prototyping

Low-Fidelity Prototyping

P8: Week 8 Studio

D7: Low-Fidelity Prototyping (Week 8 Studio)

Choose 2 features and create flows to prototype

... choose most important, most risky, most uncertain flows

Create 1 paper prototype for one user flow

... no Figma, all hand drawn sketches on paper

... interaction with a "human computer"

Create 1 low-fidelity wireframe prototype for the other flow

... draw low-fidelity wireframes in Figma or use photos of sketches

... interaction uses Figma "Prototype" animations

See full **D7** instructions on course website

P8: Prep for Low-Fidelity Prototyping

Each team member produces one screen sketch for one feature. Cut out this sketch, and bring it to the Week 8 studio class.

For Week 8 Prep writeup (P8), include photos of these sketches in the design notebook.

IMPORTANT: for the studio, you will need pencils, pens, highlighters, erasers, rulers, glue, scissors, tape. Acquire these materials and bring them to the Week 8 Studio. We will provide paper and sticky notes; though if you have some at home, bring them as well.

See full **P8** instructions on course website

Evaluating Low-Fidelity Prototypes

P9: Week 9 Studio

Evaluating Low-Fidelity Prototypes

A participant performs predefined tasks using one or more specific interfaces while being observed.

... In UX, often referred to as "**usability testing**" or "**user testing**"

Reasons to test:

... identify problems with the interface design
... discover opportunities to improve or extend an interface
... learn about the target audience for the interface

📖 Kate Moran (Nielsen Norman Group): Usability (User) Testing 101 (2026)

Team Roles in Evaluation

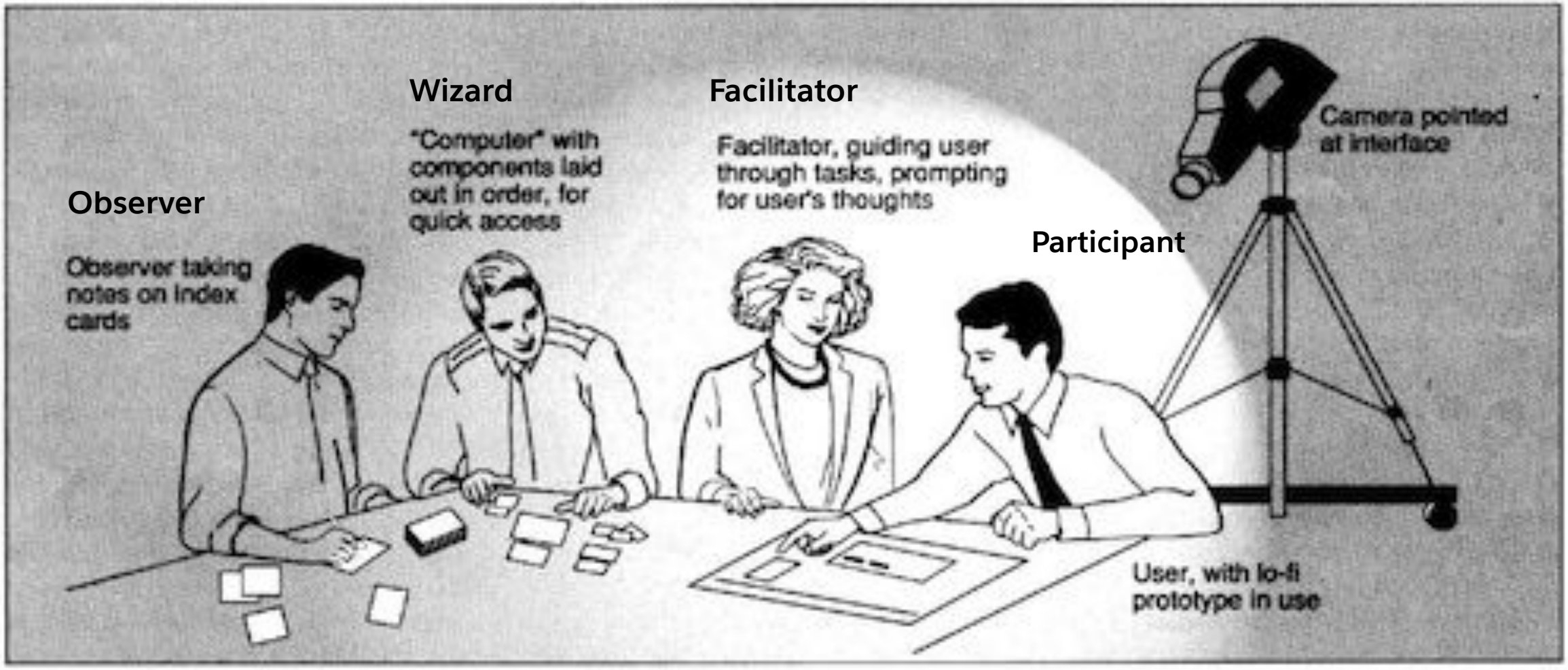
Facilitator: guides participant through process

Participant: representative of target demographics of the system being tested; completes tasks (and provides data)

Observer: takes notes, records participant actions and behaviour

“Computer”/Technician: sets up and monitors prototype to be tested, for paper prototypes, they are a Wizard who simulates system actions

Flow of Information in a Usability Testing



📖 Kate Moran (Nielsen Norman Group): Usability (User) Testing 101 (2026)

Evaluating Low-Fidelity Prototypes: Step by Step

1. Identify goals
2. Identify what to test
3. Prepare materials
4. Assign team roles
5. Recruit participants
6. Conduct evaluation

Evaluating Low-Fidelity Prototypes: Step 1

1. **Identify goals**
2. Identify what to test
3. Prepare materials
4. Assign team roles
5. Recruit participants
6. Conduct evaluation

What do you want to know?

What goals are most important?

Evaluating Low-Fidelity Prototypes: Step 2

1. Identify goals
2. **Identify what to test**
3. Prepare materials
4. Assign team roles
5. Recruit participants
6. Conduct evaluation

Which features or flows to test?

How “deep” to test each feature?

What are the tasks?

Evaluating Low-Fidelity Prototypes: Step 3

1. Identify goals
2. Identify what to test
3. **Prepare materials**
4. Assign team roles
5. Recruit participants
6. Conduct evaluation

Create prototype to test.

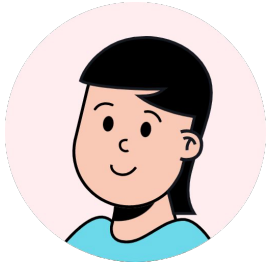
Develop your study protocol

Evaluating Low-Fidelity Prototypes: Step 4

1. Identify goals
2. Identify what to test
3. Prepare materials
4. **Assign team roles**
5. Recruit participants
6. Conduct evaluation



Facilitator



Observer



Wizard

Evaluating Low-Fidelity Prototypes: Step 5

1. Identify goals
2. Identify what to test
3. Prepare materials
4. Assign team roles
5. **Recruit participants**
6. Conduct evaluation

Which personas?

What skill level?
... e.g. novice or expert

How many?
... typically ~ 5 for usability test

Evaluating Low-Fidelity Prototypes: Step 6

1. Identify goals
2. Identify what to test
3. Prepare materials
4. Assign team roles
5. Recruit participants
6. **Conduct evaluation**

Evaluation Protocol

A detailed plan for a study / experiment / user study … includes:

Session preparation checklist:

- … **Consent materials**
- … **Facilitator scripts**: introduction, debriefing
- … **Interview** and/or questionnaire questions
- … **Tasks**: the interface(s) to test and the participant prompts
- … **Procedure**: how the tasks are introduced and ordered, …
- … **Observational methods**: think-aloud, video, audio, logs, …

Facilitator Script

Very important to write down exactly what facilitator will say

... necessary for consistency (called "internal validity")

Typical script parts:

Introduce the experiment and make participant comfortable

... "Thank you for coming, today we are testing an interface for ... "

... "Remember we are testing the interface and not you ... "

..."We want to understand what you do, there is no right or wrong answer ..."

Introduce the prototype:

"This is just a prototype. Please don't focus on how it looks. "

"Not every screen or interaction will be shown."

"This is a paper prototype with my assistant playing the role of a computer. This means ..."

Introduce the testing procedure:

... "We want you to think-aloud, which means ... "

Procedure

During the test session

... Facilitator reads a description of the task goal
... Participant performs the tasks, while "**thinking aloud**"
... Computer (or Wizard technician) responds to the participant's actions
... Observer notes success, errors, reactions, etc.
... Facilitator asks clarifying questions

Don't teach participants how to use your interface, observe them trying to figure it out.

Don't tell participants what to do step-by-step. Only give high-level goals.

Remember to **ask why**

Think Aloud Protocol

Study participants continuously say out loud what they are thinking verbalize their thoughts for data gathering

Benefits

... cheap, robust, flexible, convincing, easy to learn, produces useful data

... some approximation of "reading the participant's mind"

Drawbacks

... unnatural, likely filtered, can bias behaviour



📖 Jakob Nielsen (Nielsen Norman Group): Thinking Aloud: The #1 Usability Tool (2012)

Think Aloud Protocol

Study participants continuously say out loud what they are thinking verbalize their thoughts for data gathering

Show participant a short video to demonstrate how think-aloud works

Most participants need some prompting / reminding from facilitator



📖 Jakob Nielsen (Nielsen Norman Group): Demonstrate Thinking Aloud by Showing Users a Video (2014)

Low-Fidelity Prototype Study Protocol (E1)

Like standard study protocol with some additions.

Instructions in script about nature of paper prototype, e.g.:

- ...imagine it's a real interface
- ... don't consider time for Wizard to setup screen
- ... how to enter text (e.g. write on paper with pen, pretend to type)

Make defined area on table for currently active prototype screen

Wizard guide/script specifying how to respond to user actions, e.g.:

- ... if button X is clicked, show screen Y to participant
- ... if element X is used, then show this overlay Y to participant
- ... if participant interacts with element that has no prototyped action, do this ...

📺 Nielsen Norman Group: Paper Prototyping: How to Create & Usability-Test Simple UI Prototypes (2021)

E1: Low-Fidelity Prototype Evaluation (Week 9 Studio)

As a team pick 2 user flows that you developed in the design session - you will use these to conduct evaluations with your classes.

You will be conducting 2 rounds of evaluation with your paper prototype (20-25 minutes each) with your classmates.

Come up with a test plan, what tasks will you ask people to do with your prototype? Why these tasks?

See full **E1** instructions on course website

P9: Prep for Low-Fidelity Prototype Evaluation

As a team pick 2 flows that you developed in the design session.

Create script for the facilitator, wizard, participants.

Write down the procedure.

Assign roles.

Run a mock evaluation within the team (20 – 25 min), document changes.

Document planning in design notebook.

See full **P9** instructions on course website

Looking Ahead to Week 9

Guest lectures: HCI Research PhD candidates **Delara Forghani** and **Lucas Gomez Tobin**
Studio: E1 Low fidelity prototyping evaluation