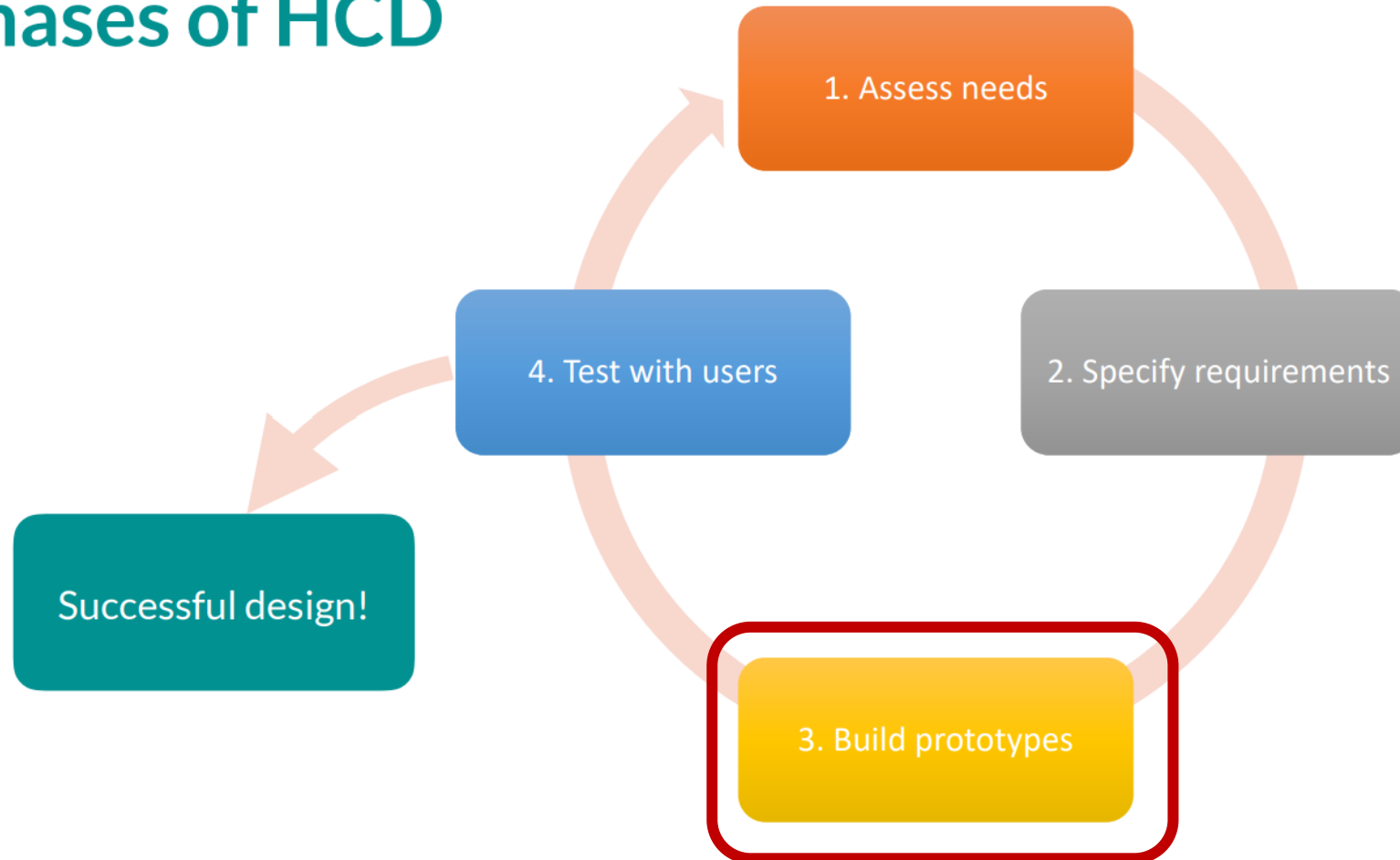


CSE 4451: HUMAN- COMPUTER INTERACTION

Class 13: Paper Prototyping and
Usability evaluation

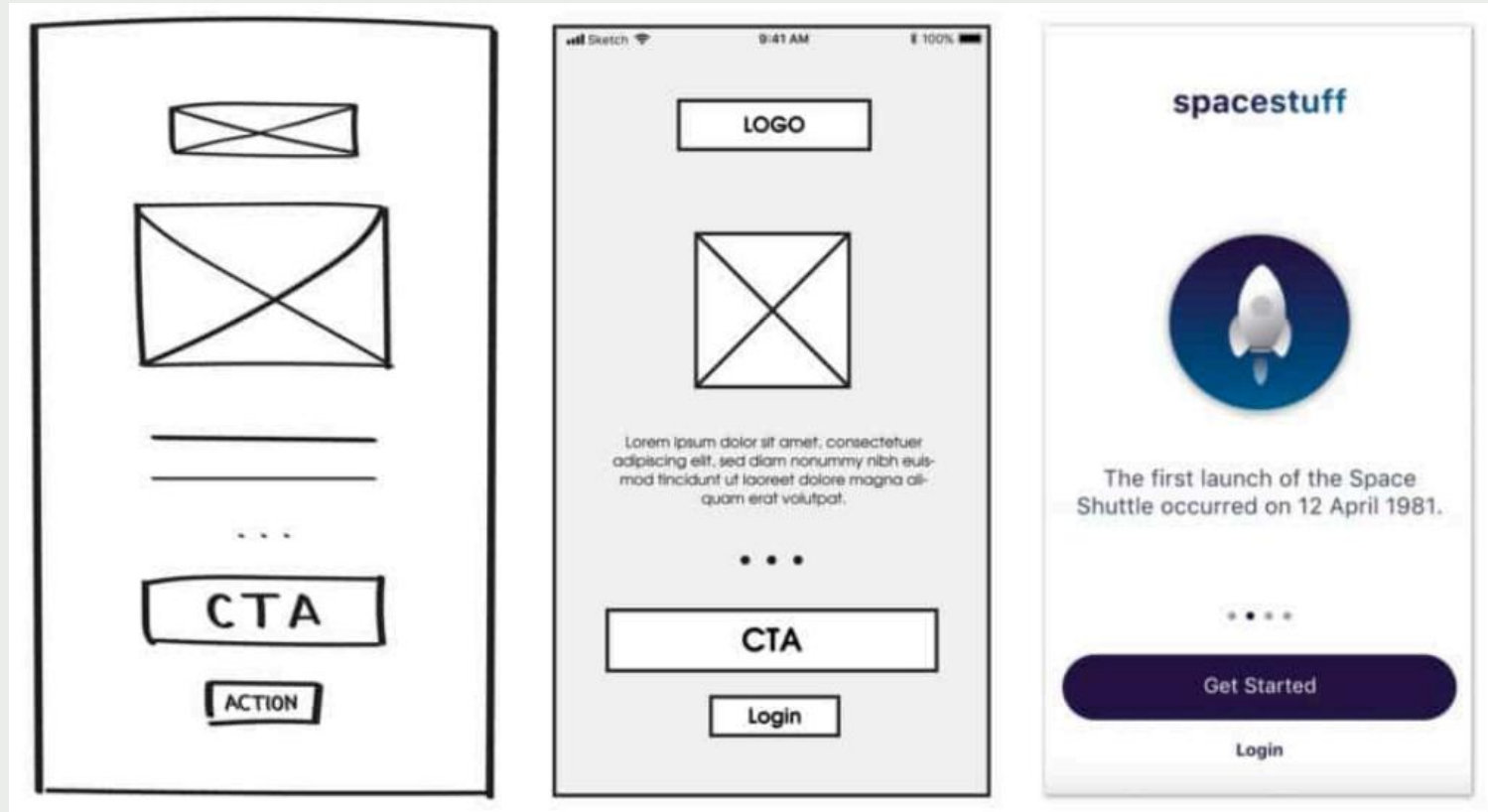
Phases of HCD

Phases of HCD



Fidelity in Prototyping

- **High Fidelity (Hi-Fi)**
 - Prototypes which look like the final product
- **Low Fidelity (Lo-Fi)**
 - Designer sketches with many details missing



Two Types of Prototypes

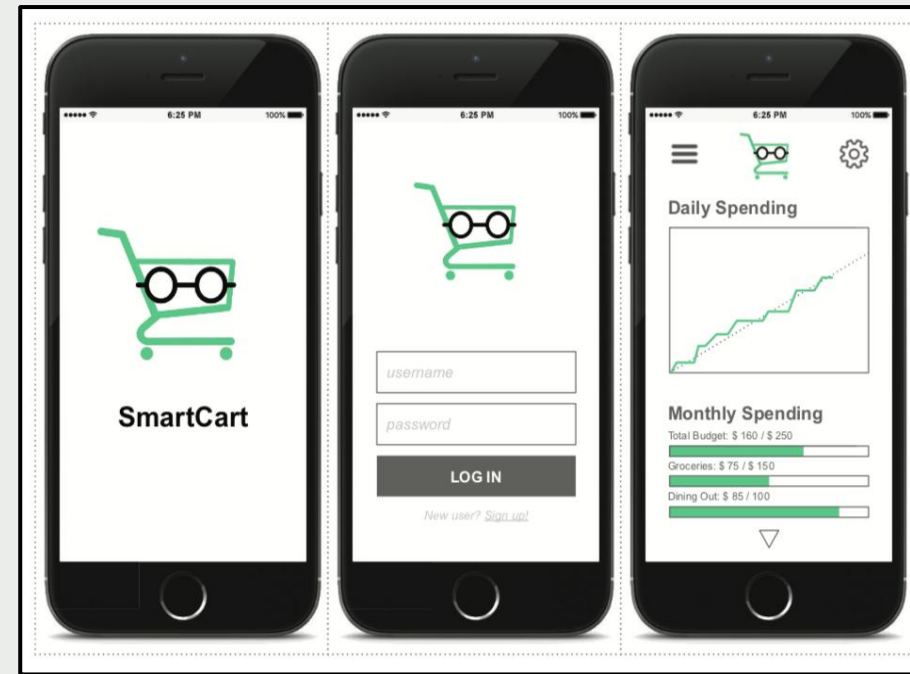
Low-Fidelity

vs.

High Fidelity



Simple screens are drawn on paper, switching the sketches around according to user choices.



Interactive prototype created in FluidUI, mirrored on an iPhone.

HI-FI VS. LO-FI

	Lo-Fi	Hi-Fi
Advantages	<ul style="list-style-type: none">• Fast• Cheap• Easy• Can simulate actual product	<ul style="list-style-type: none">• Better sense of finished product• Can judge aesthetic appeal• More realistic experience• Can evaluate experience
Disadvantages	<ul style="list-style-type: none">• Slow response time• Can't get feedback about aesthetic• User may question design quality	<ul style="list-style-type: none">• User may focus on unnecessary details• Takes a lot of time to make• Users may lose track of big picture

Hi-Fi Prototype

- Time and creativity
 - Require precision (e.g., must choose a font)
 - Specifying details takes time
 - Can lose track of the big picture
- Perceptions of a person reviewing or testing
 - Representation communicates “finished”
 - Comments often focus on color, fonts, and alignment

Lo-Fi: Paper Prototype



Simple screens are drawn on paper, switching the sketches around according to user choices.

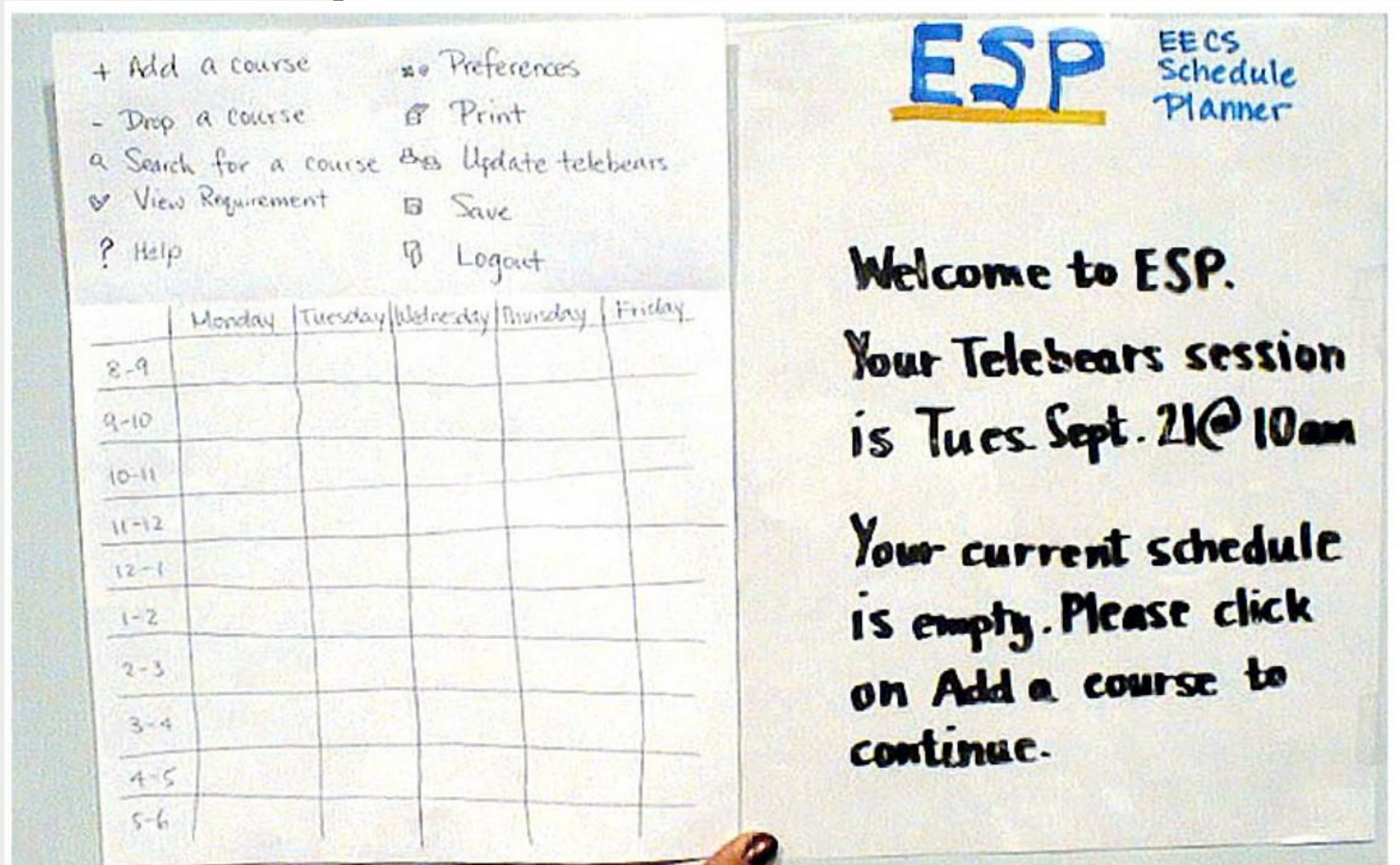
Avoid Figma or other digital tools aside of digital pens / drawing solutions.

We want you to:

- Explore design ideas
- Stay Low-Fidelity
- Be scrappy and understand designs might change

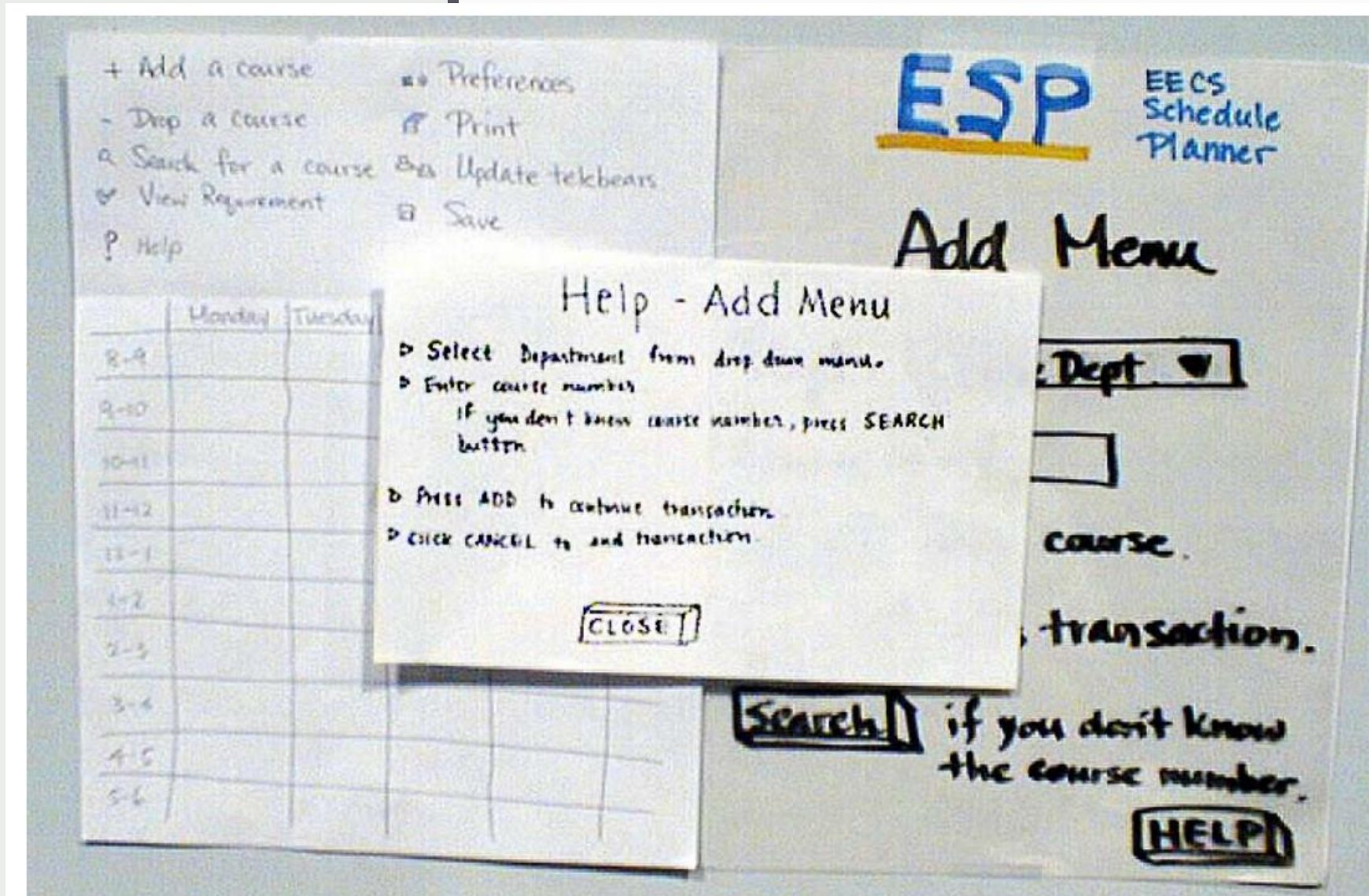
Paper Prototype

- Screen faked with pre-constructed pieces



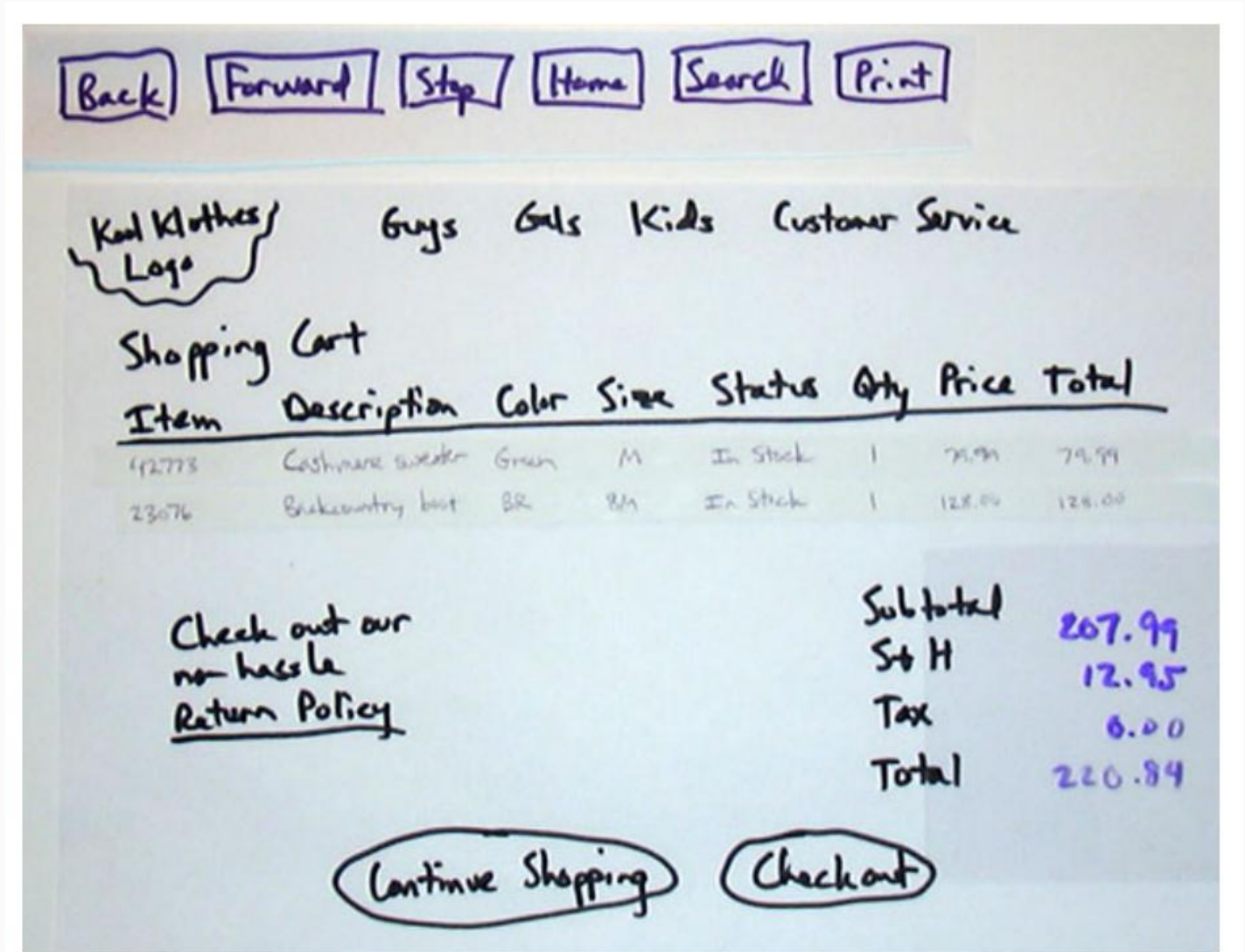
Paper Prototype

- New pieces added in response to interaction

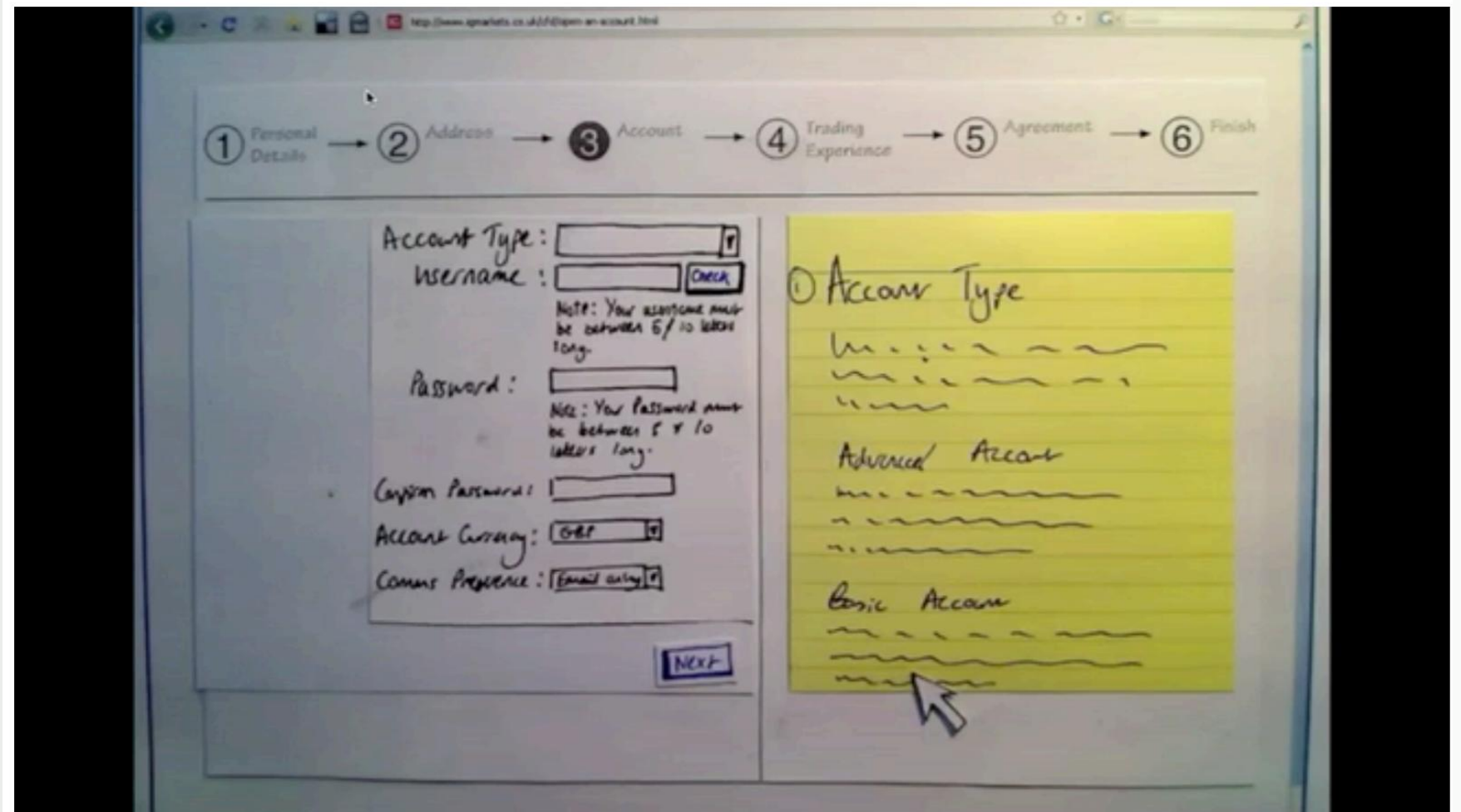


Paper Prototype

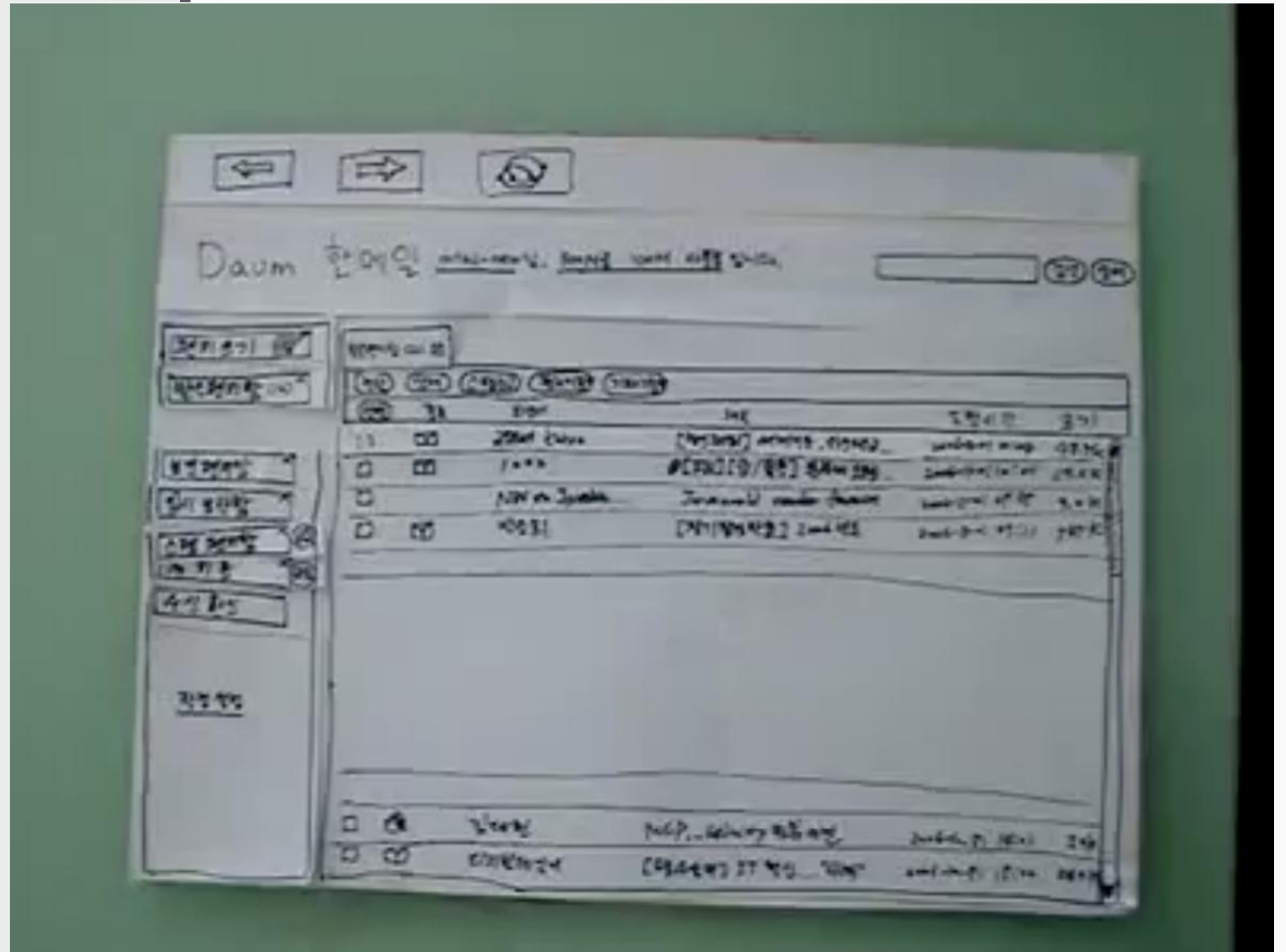
- Transparencies allow flexible use of text



Paper Prototype as communication



Paper Prototype as evaluation



Constructing the prototype

- Set a deadline
 - Do not think too long
 - Instead, build it, then learn and iterate as you go
- Put different screen regions on cards
 - Anything that moves, changes, appears/disappears
- Ready responses for actions
 - Have pull-down menus already made
 - Planned tasks can guide this
- Use a photocopier to make many versions

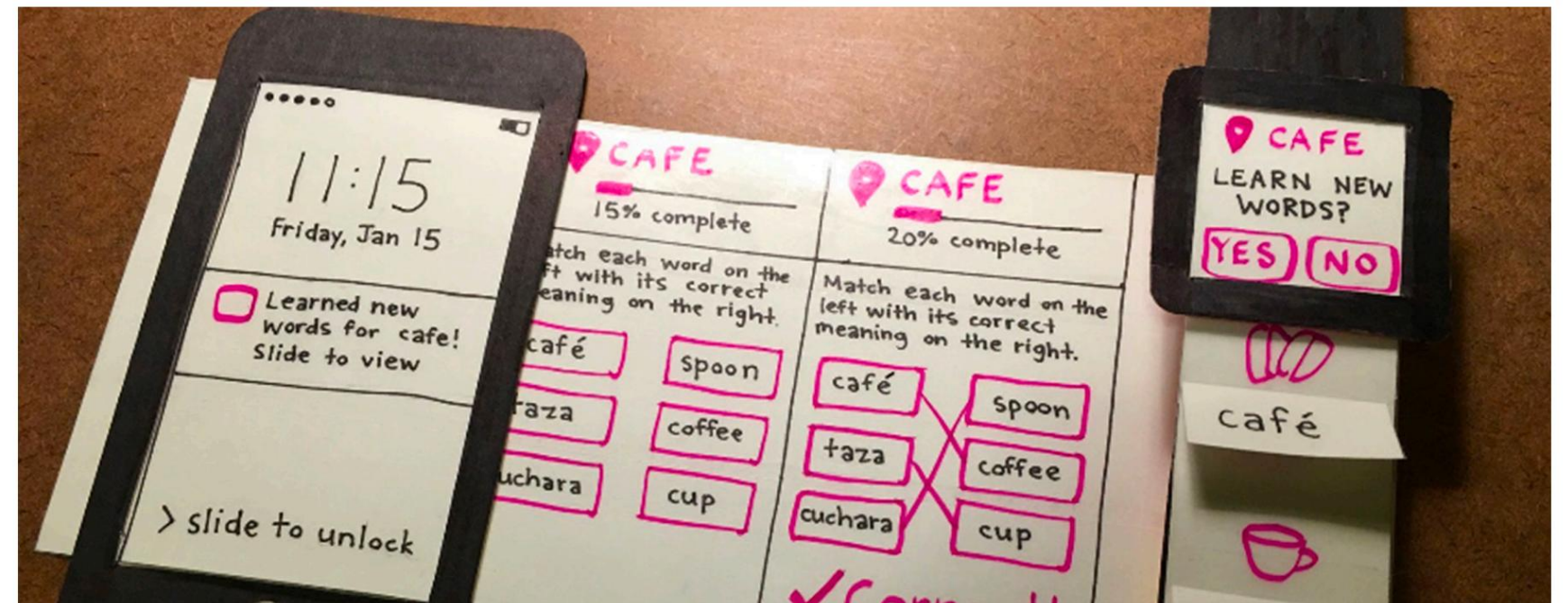
Constructing the prototype

- Plan what is needed given the task



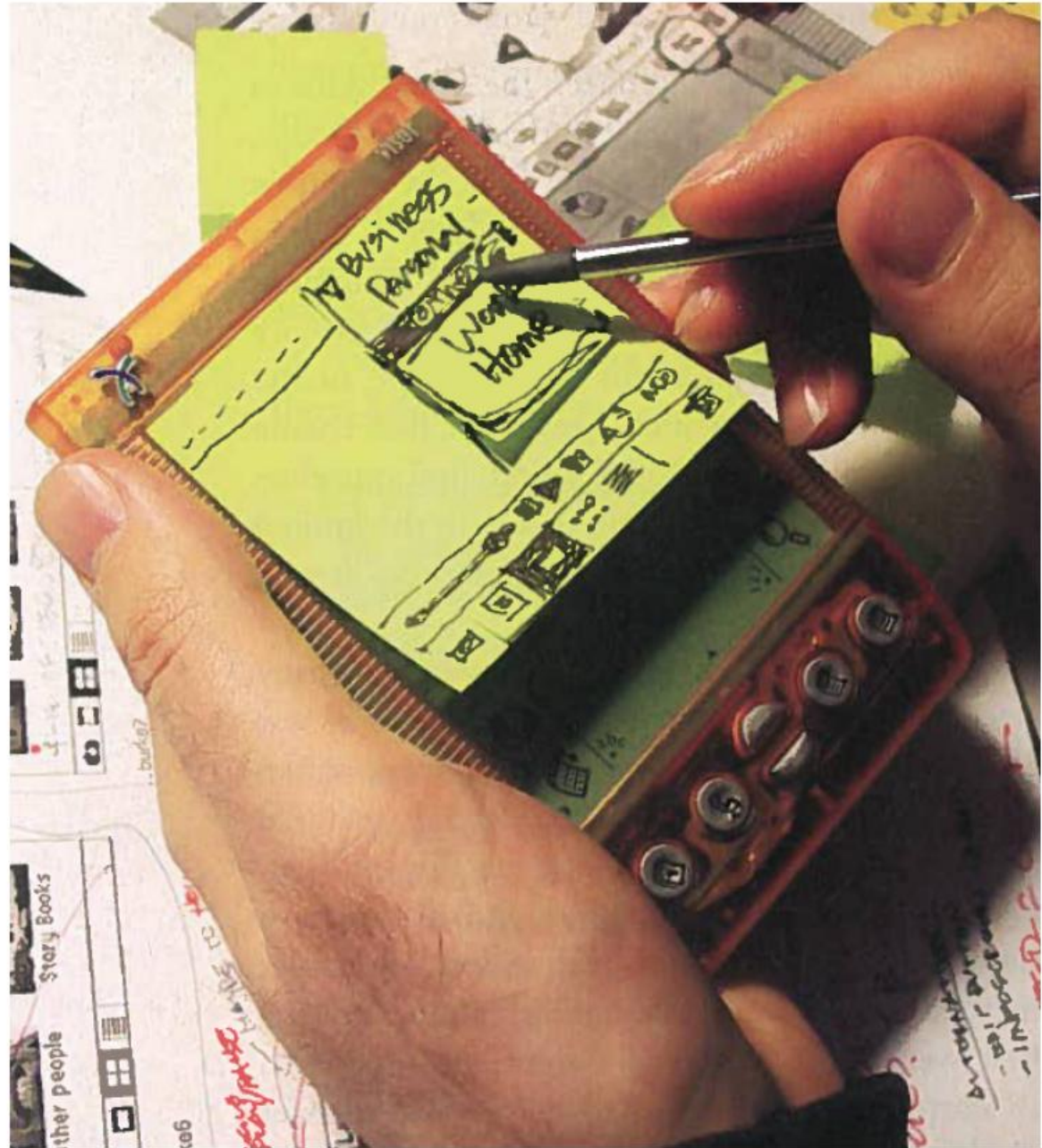
Constructing the prototype

- Remember your target platform constraints



Constructing the prototype

- Remember your target platform constraints



Constructing the prototype: Example



<https://www.youtube.com/watch?v=y20E3qBmHpg>

In-class Activity: Constructing a paper prototype

- Form a group of 4 to sketch a paper prototype for ordering a drink:
- A vending machine allows you to buy the following drinks:
 - Coffee: drip coffee, latte, or cappuccino
 - Tea: earl grey or chamomile
 - Hot chocolate
- Sugar and/or milk may be added to any drink at no extra charge. Drinks come in 3 sizes (12oz, 16oz, 20oz for \$2, \$3, and \$3.50 respectively. Payment is by cash or credit card. Change is provided for cash transactions

Usability Testing

- Find and fix problems in a design
 - Removes the expert blind spot
 - Obtain data to unify the team around changes
 - Uncover unexpected behaviors
- Results drive changes, sometimes innovation
- In the long run, this is a win-win
 - Both improve design and save money

Usability Testing: Not a Scientific Experiment

- Focus is on improving the design
 - Experimental control is not necessary
 - Data measurement is not as precise
 - Number of participants is fairly small
- Changes can be made in between participants
 - Fix the obviously broken parts of the design
 - Quickly explore alternatives
 - Modify the focus of testing between participants

Task-based Usability

- Set up an overall context
 - “We are interested in improving people’s ability to save, update, and use contacts in their phones”
- Then prescribe tasks
 - Try to find the contacts list in the phone
 - View the contact information for X
 - Change X’s phone number to 949-867-5309
- Tasks can be changed to naturally lead to the next

Task-based Usability

Scenario?

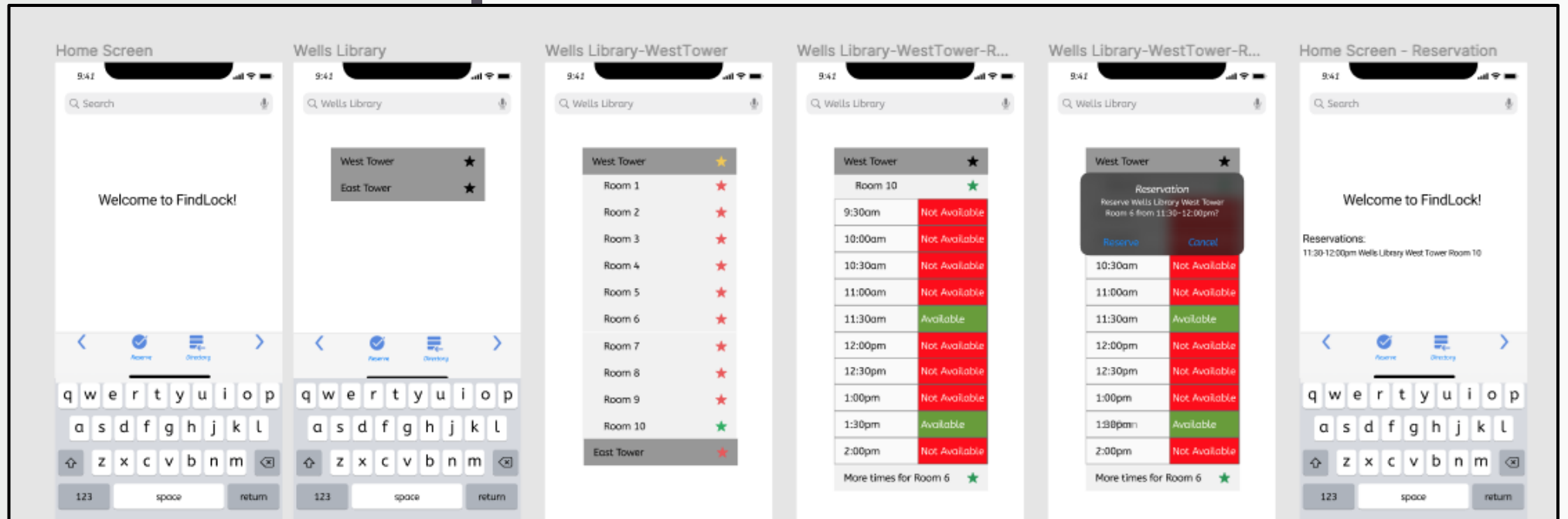
A scenario provides context, via a short story. It tells why someone is using your interface, app or site. It “sets up” or “tees up” the task for the participant.

Task? The actual instruction of “telling the user what to do, without how to do it”

Task-based Usability

Scenario: You are an CSE Student at UIU and you need to take a Final Exam at noon in the auditorium today. Upon arrival, you realize you are a bit early and want to find a quiet place for last-minute cramming. You pull out your phone and open up Findlock to book a room to study.

Task: Can you search and schedule a room in Wells Library from 11:30AM to noon?



Task-based Usability

Good Scenario

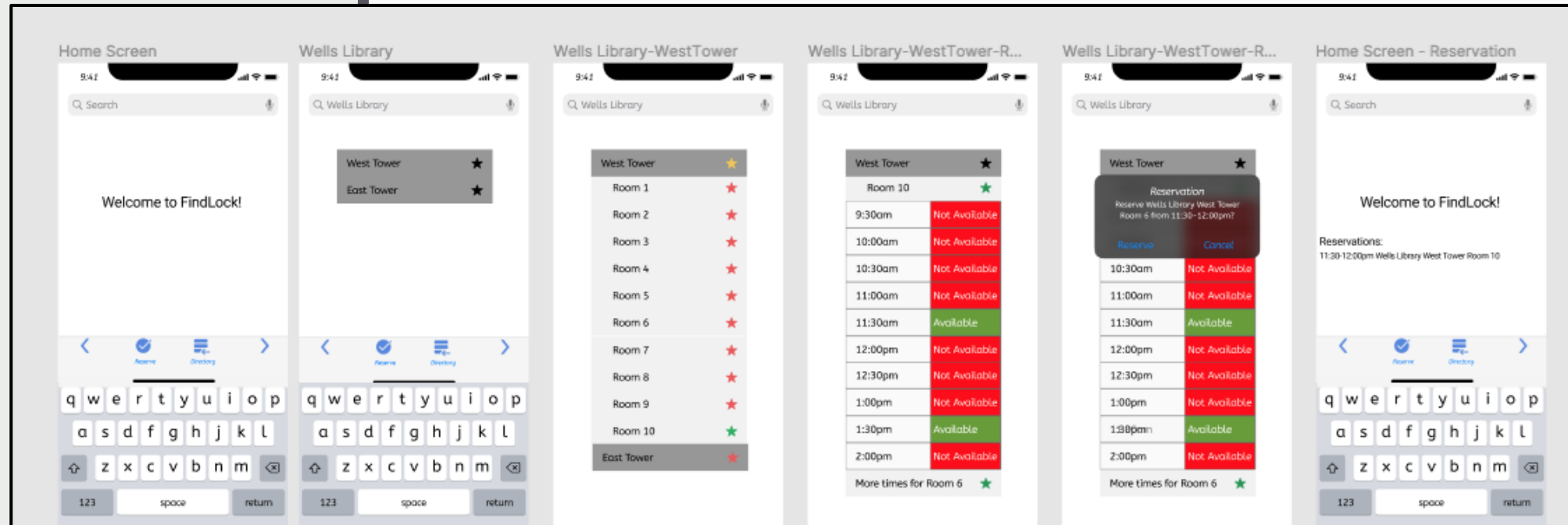
but

the word “search” in the task can influence the participants.

Looks Good?

Scenario: You are an CSE Student at UIU and you need to take a Final Exam at noon in the auditorium today. Upon arrival, you realize you are a bit early and want to find a quiet place for last-minute cramming. You pull out your phone and open up Findlock to book a room to study.

Task: Can you ~~search~~ and schedule a room in Wells Library from 11:30AM to noon?



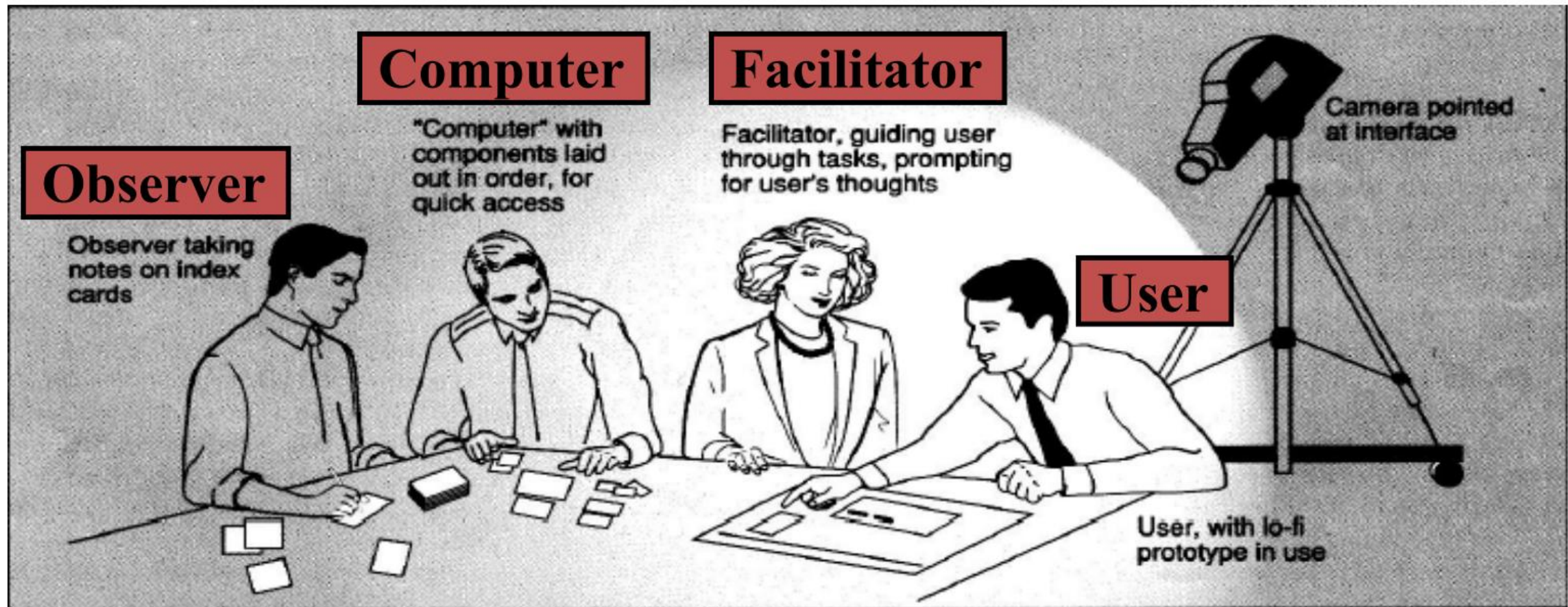
Preparing for a test

- Select your participants
 - Friends and family may not be your design targets
 - Understand background, consider a recruiting questionnaire
- Prepare tasks and paper prototype
- Practice to avoid “bugs” in your prototype
- Address feelings of judgment
 - “Today we are interested in learning about X. That’s where you come in!”
 - “I did not develop X. I just want to know what the problems are with X.”
 - “It is X being tested here, not you.”

Introducing the test

- Set expectations for process
 - “It would be helpful for me if you think out loud while working with X. Tell me constantly what you are thinking, looking for, wondering, confused about, surprised, etc. If you stop talking, I might prompt you to talk.”
 - “I will not be able to answer your questions when you start using X. Do you have any questions now?”

Conducting a test



Insight Problems

- When people are trying to figure something out, talking aloud can prevent needed “insight”
- If your participant is really baffled, it might not be the best time to prompt them to keep talking
 - Wait for a natural break, and then ask “what were you thinking just there?”
- Retrospective talk-aloud
 - Record session, talk through immediately afterward

Answering Questions

- Remember the purpose of the test
 - You would not be there “in real life”
 - You want to see if they can figure it out
 - You want to see how hard it is
 - You want to see how catastrophic the outcome is
- But you do not want to punish the person or completely undermine the rest of the session
 - Note any help you provide as a major failure
 - Do not allow observing engineers to help

Debriefing

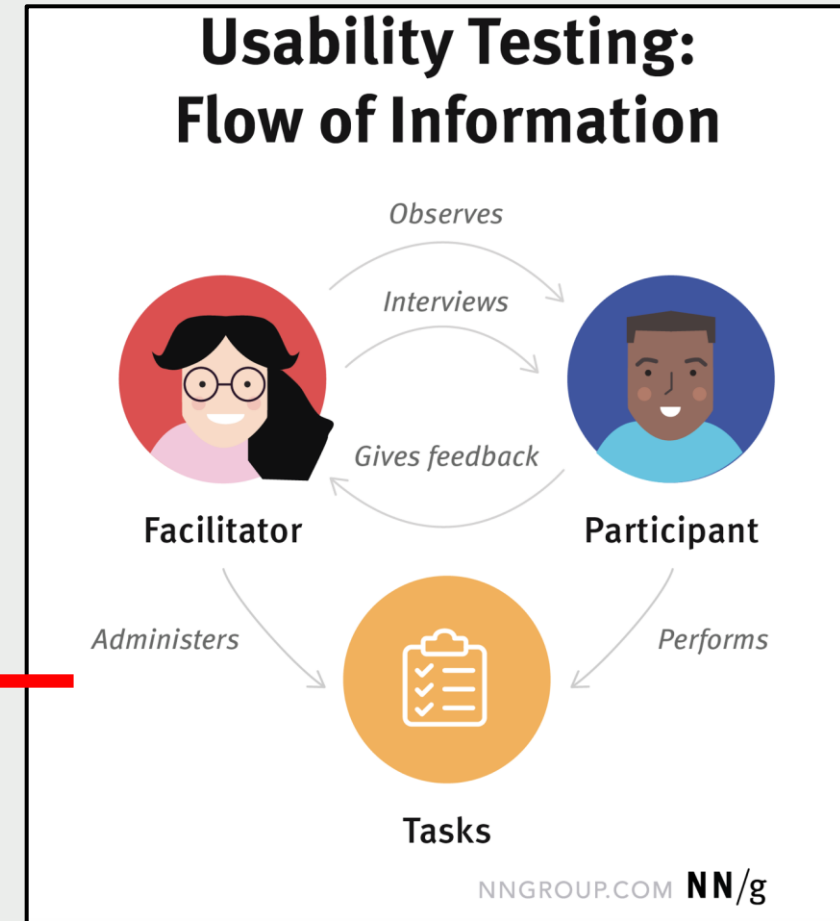
- Give them more details about what you were interested in discovering, with their help
- Answer any questions they have
- Now you can show them how to accomplish the tasks, and talk about what you learned from the test
- Thank them for their time
- Appropriate to give some compensation

How to conduct user testing?

Facilitator guides the participant through the test process.

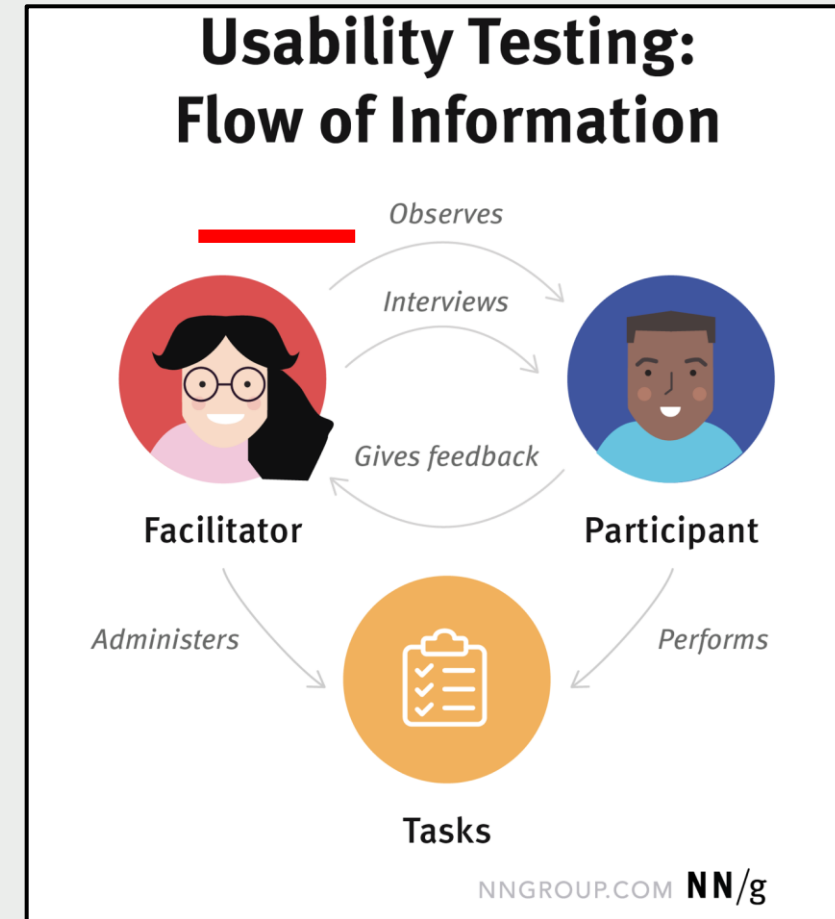
You may:

- Tell the participant that you are testing the product, not them.
- Tell the participant that it is OK to quit at any time.
- Explain that you will not provide help.
- Ask the participant to think aloud, saying what comes to mind as he or she works.
- Describe the scenario(s) and task(s)



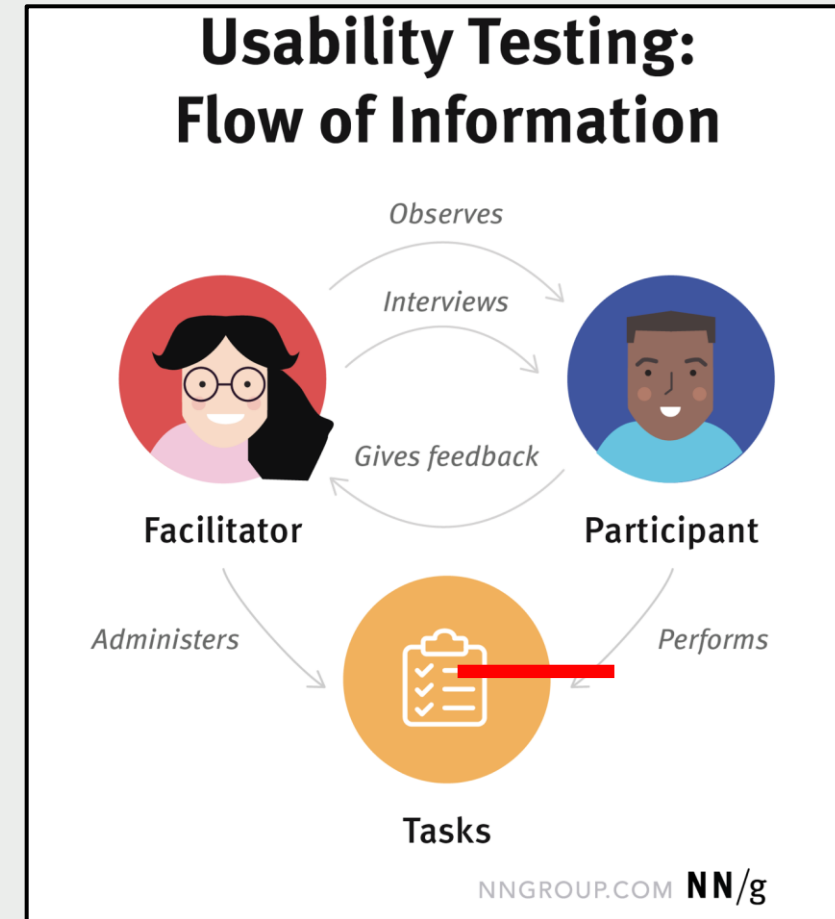
How to conduct user testing?

- Facilitator observes the participant during the test.
- You may:
 - Record the time it takes for the participant to complete a certain task.
 - Record whether the participant can complete a task or not complete a task, as well as if they struggle at times.
 - Record interesting quotes from the participant (e.g., expressing satisfaction, frustration, suggestion)
 - Record nonverbal cues (e.g., facial expression, body language)
- Videotape/Screenrecord the session
- Audio-record the session, maintain confidentiality and anonymity



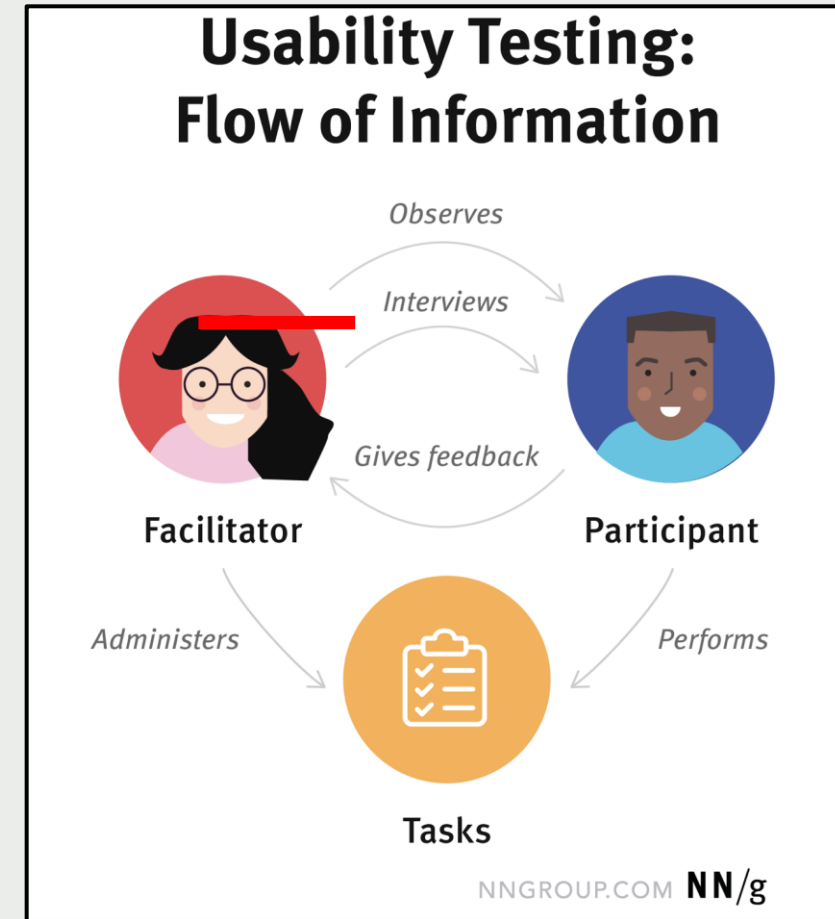
How to conduct user testing?

- Participant performs task.
- Focus on:
 - Realistic users
 - In a controlled environment
 - Feel at ease
 - Think aloud
- If they are stuck, wait and be quiet. If they can't figure it out, let them explain you why. Eventually, you may move to the next task, but give the **participant**—design a chance to fail.



How to conduct user testing?

- Facilitator often interviews the participant after the test (follow-up questions).
- What was your first impression?
- Was there anything you liked?
- Was there anything you did not like?
- If there would be one thing you could change, what would it be?



In-class Activity: Evaluating a paper prototype

- **Trade** 1 person from your group to another group to be that group's "user"
- The rest of you will fill the role of observer, computer, and facilitator
- Task:
 - Buy a 16oz latte with a little bit of sugar with a \$5 bill
 - Buy a 12oz chamomile tea with a credit card