

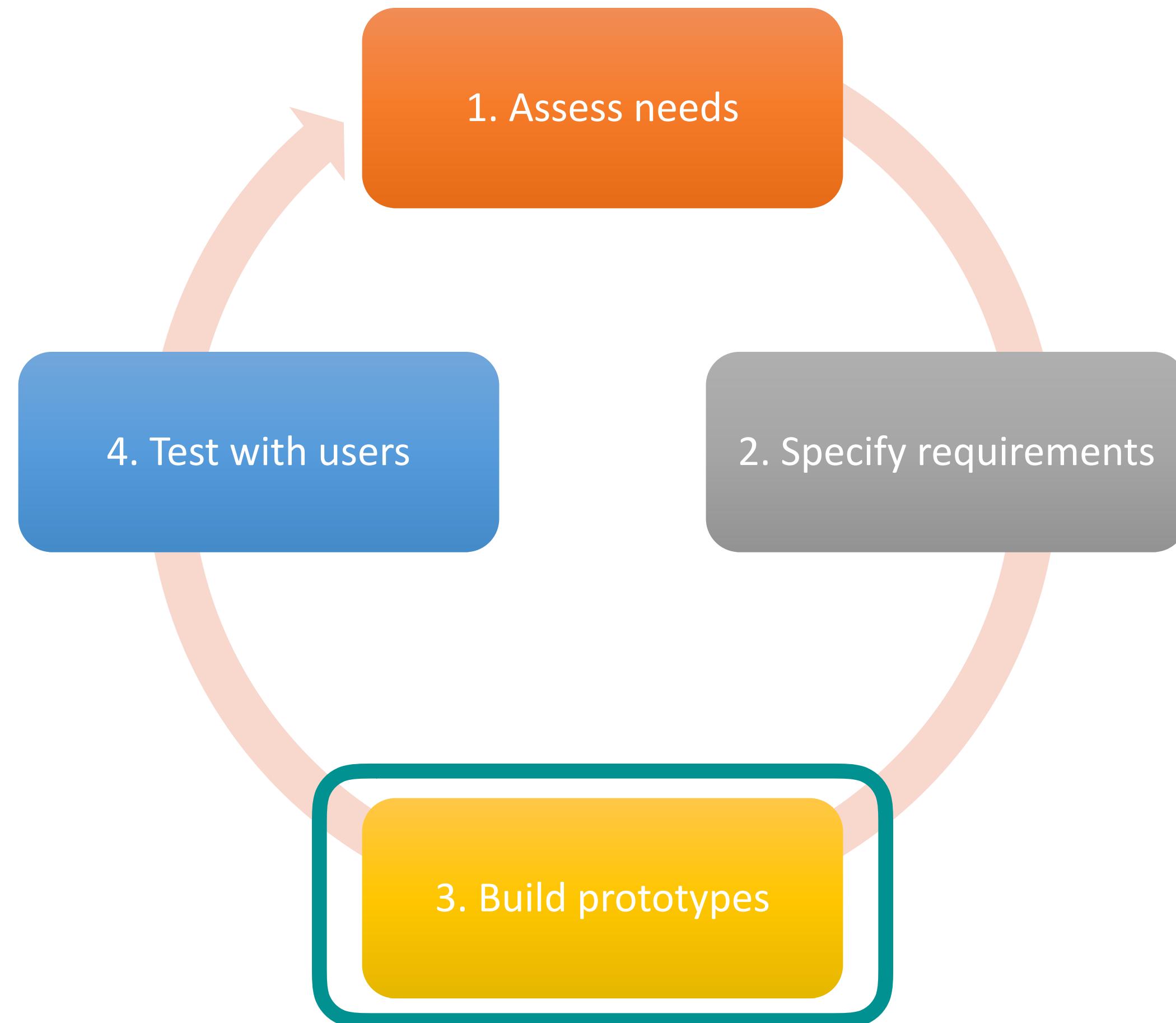
# **IN4MATX 231:**

# **User Interface Design & Evaluation**

**Class 10:  
Paper Prototyping &  
Usability Evaluation**

Daniel Epstein

# We are here(ish)



# Today's goals

**By the end of today, you should be able to...**

- Design a paper prototype
- Set up and conduct a usability test
- Use a usability test to evaluate a paper prototype and improve its design

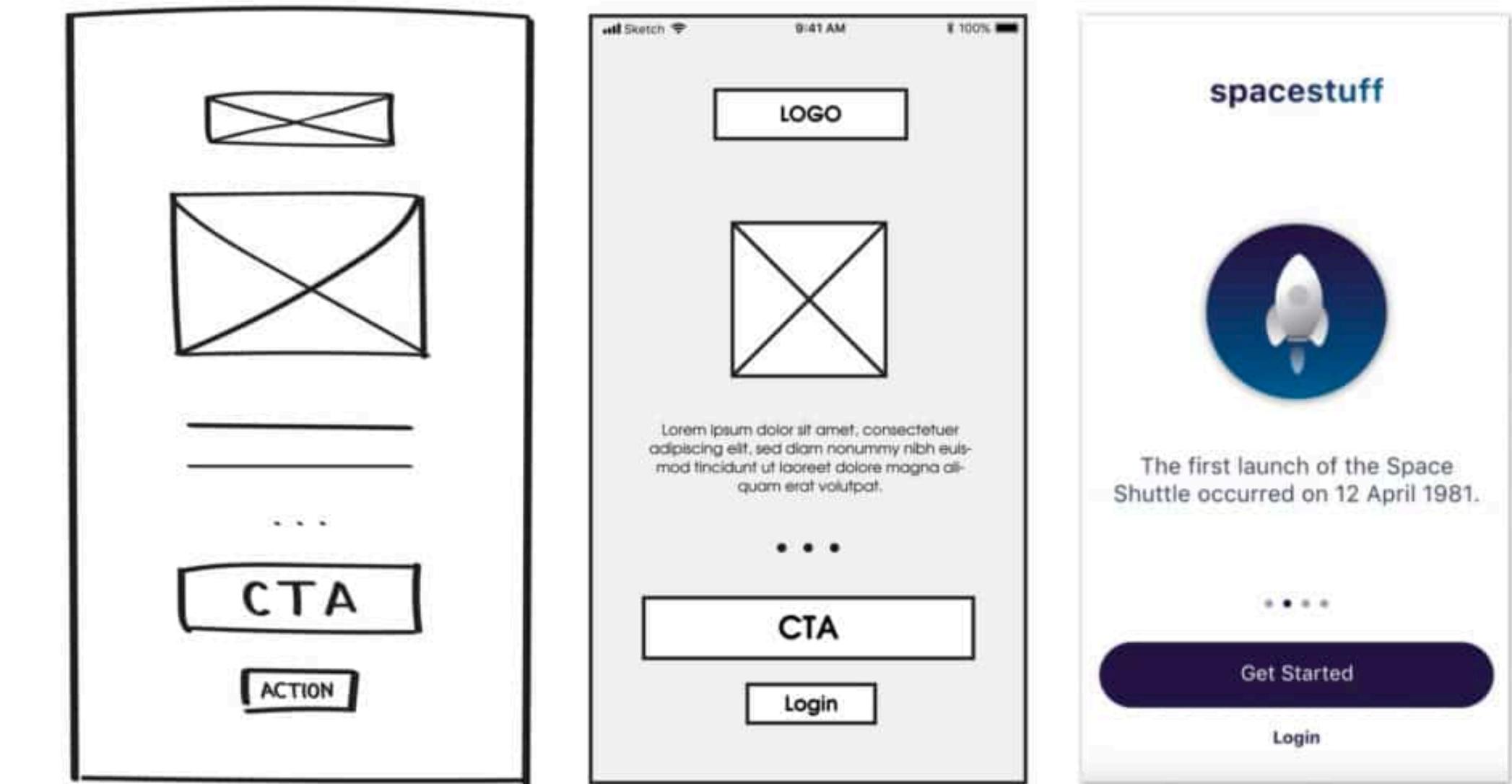
# Fidelity in Prototyping

- High Fidelity

- Prototypes which look like the final product

- Low Fidelity

- Designer sketches with many details missing



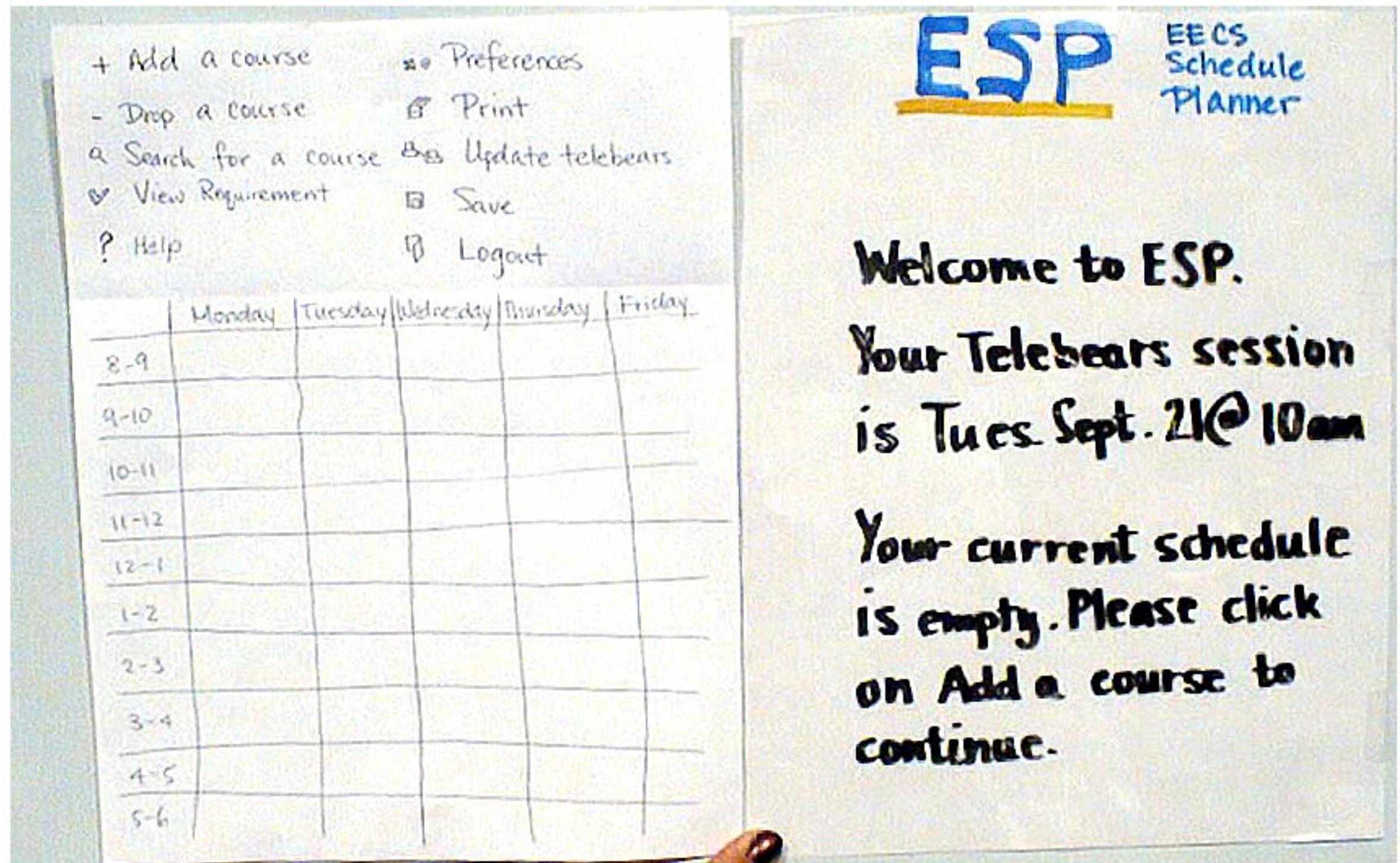
# High Fidelity Prototypes Warp

- 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, alignment

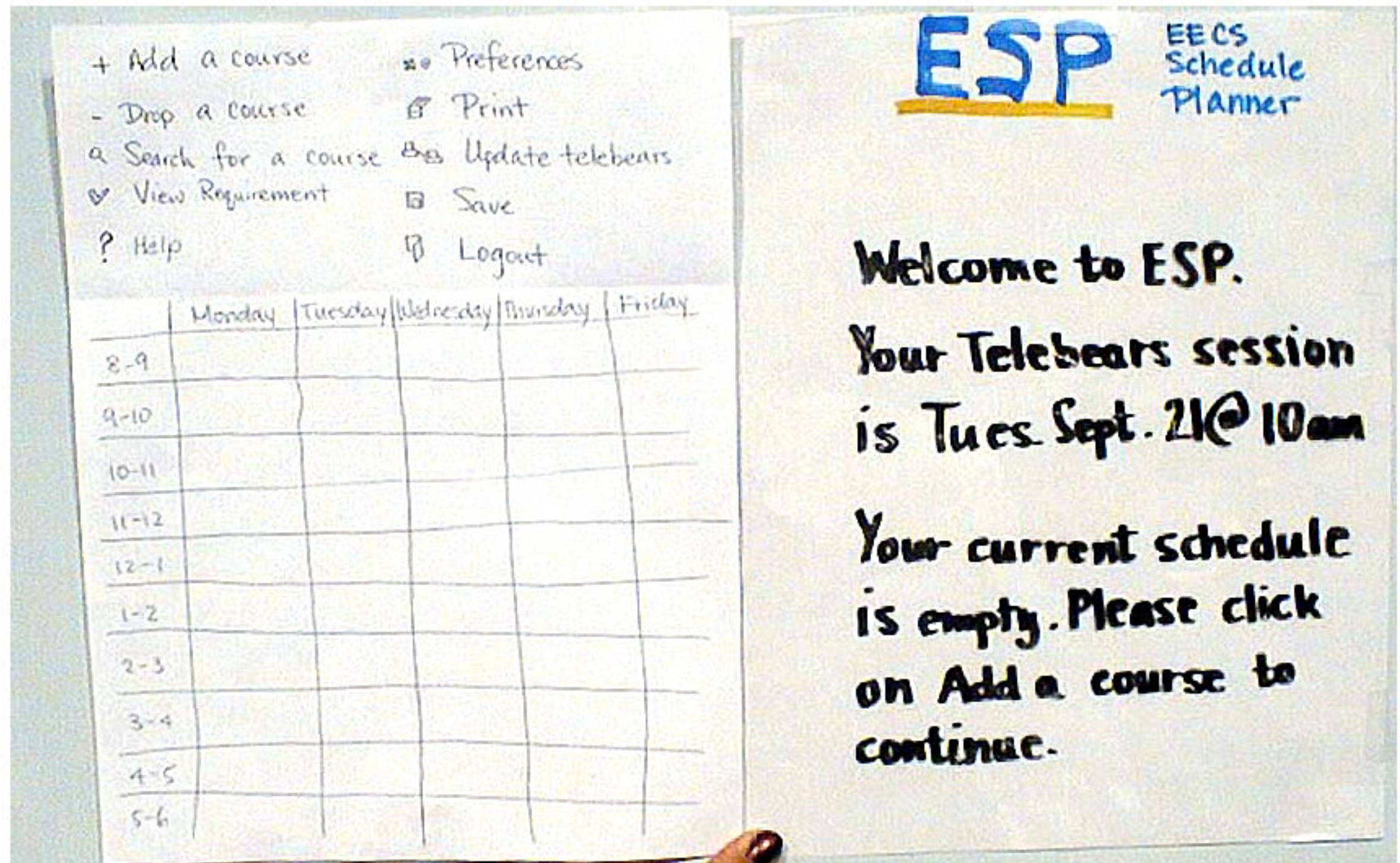
# Low Fidelity Prototypes

- Traditional methods take too long  
(Sketches -> Prototype -> Evaluate -> Iterate)
- Instead, simulate the prototype (Sketches -> Evaluate -> Iterate)
- Sketches act as prototypes
  - A designer “plays computer”
  - Other design team members observe & record
- Kindergarten implementation skills reduce barriers to participation in design and testing

# Paper prototype

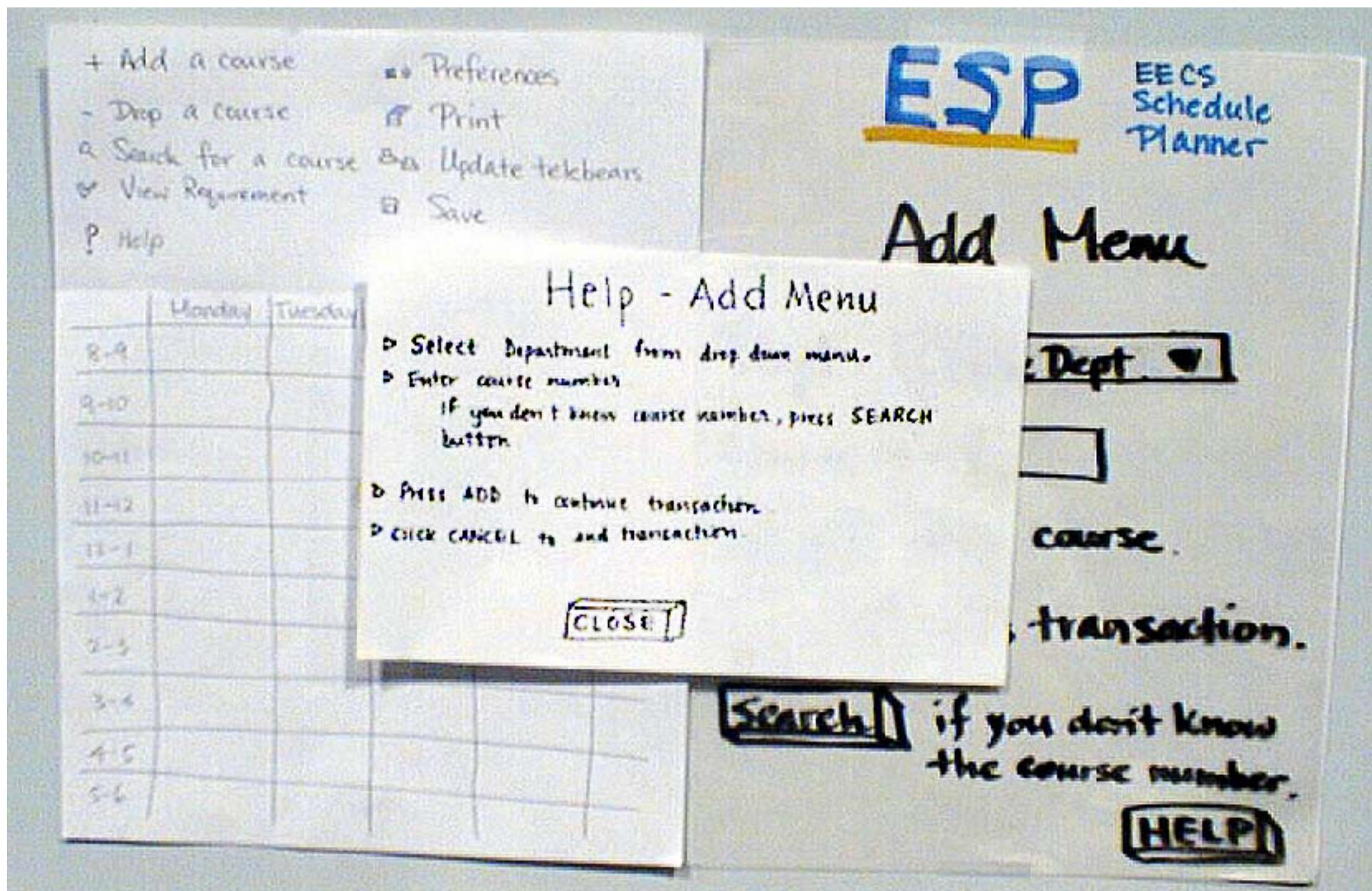


# Paper prototype



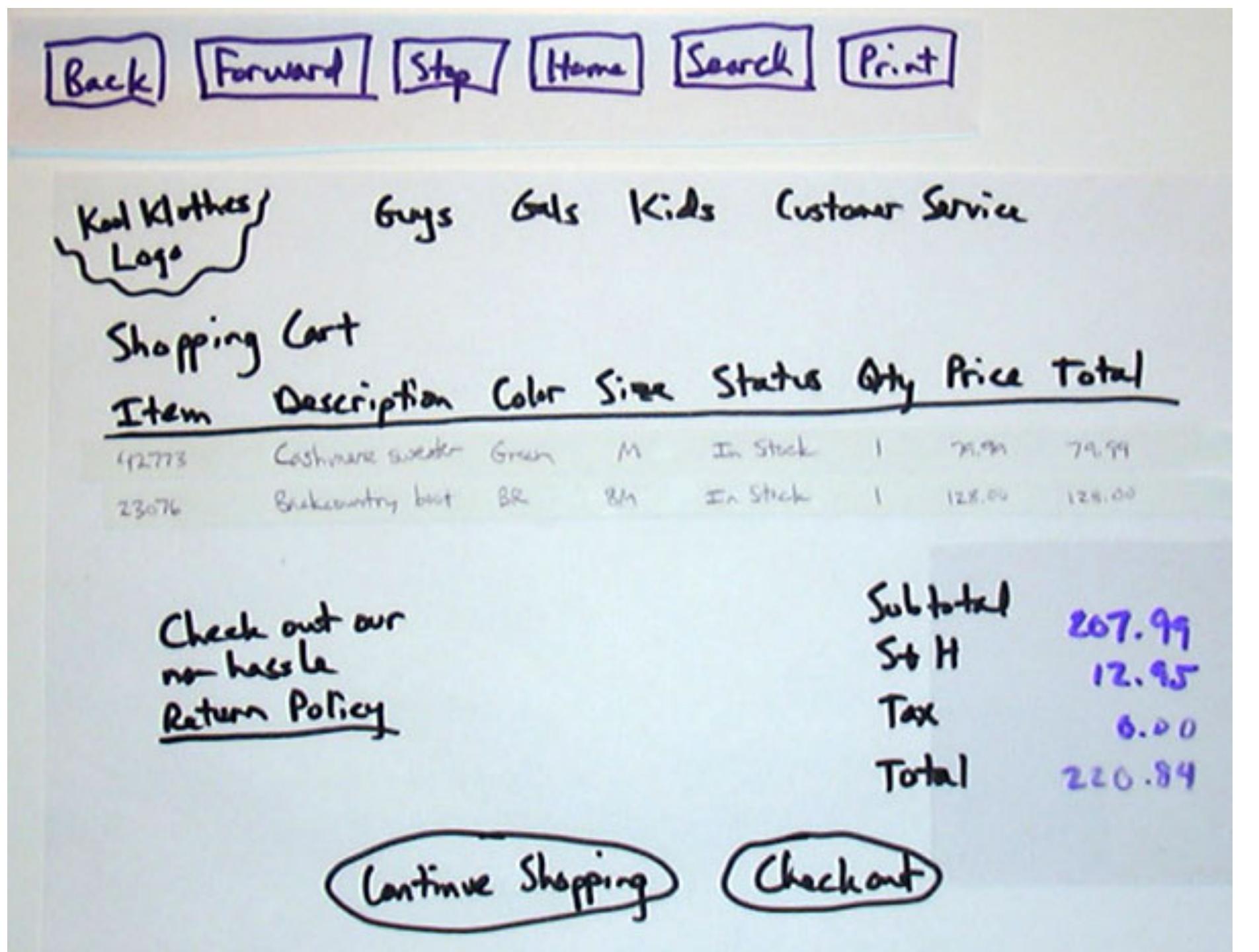
“Screen” faked with  
pre-constructed pieces

# Paper prototype



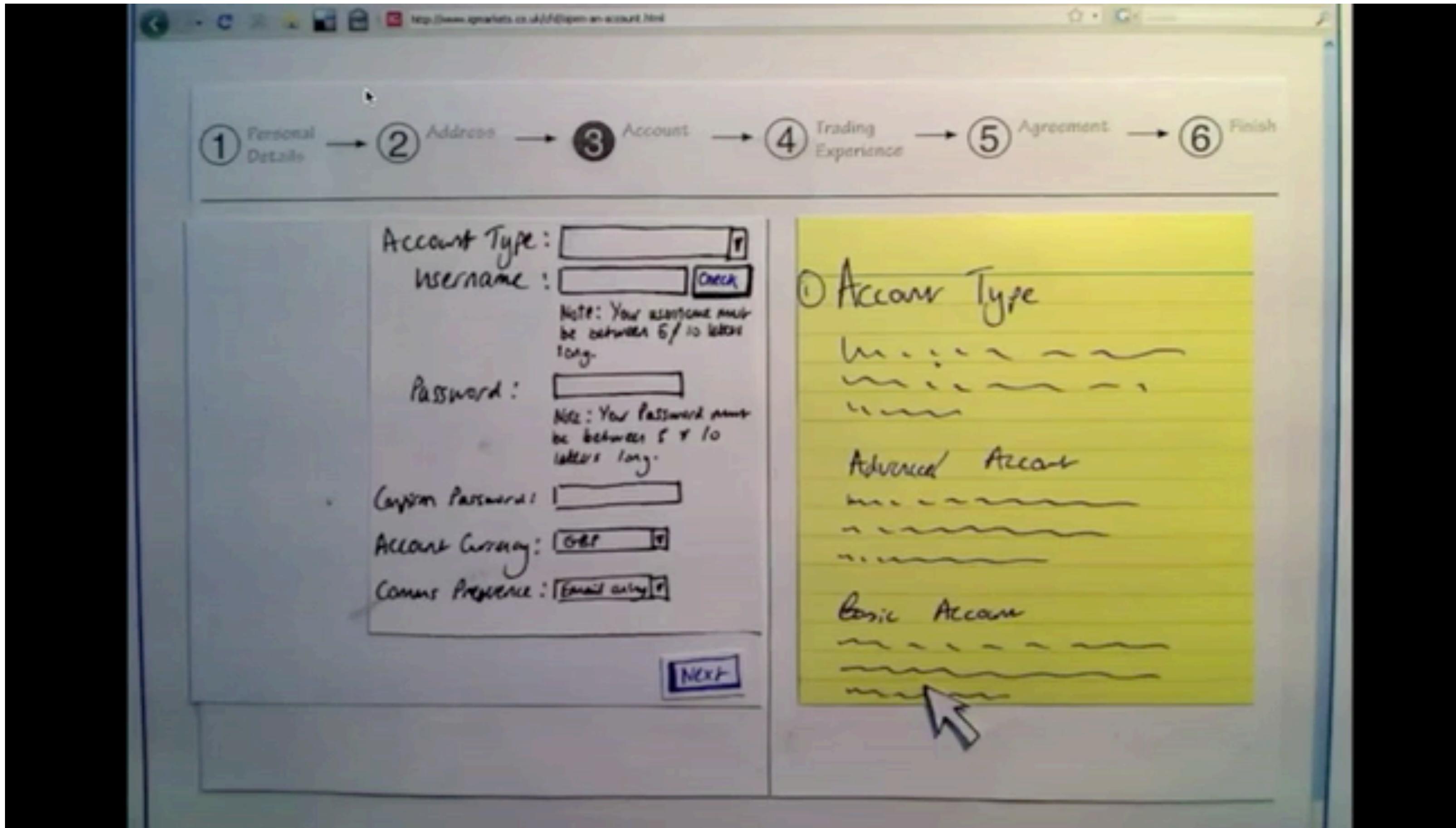
New pieces added in response to interaction

# Paper prototype

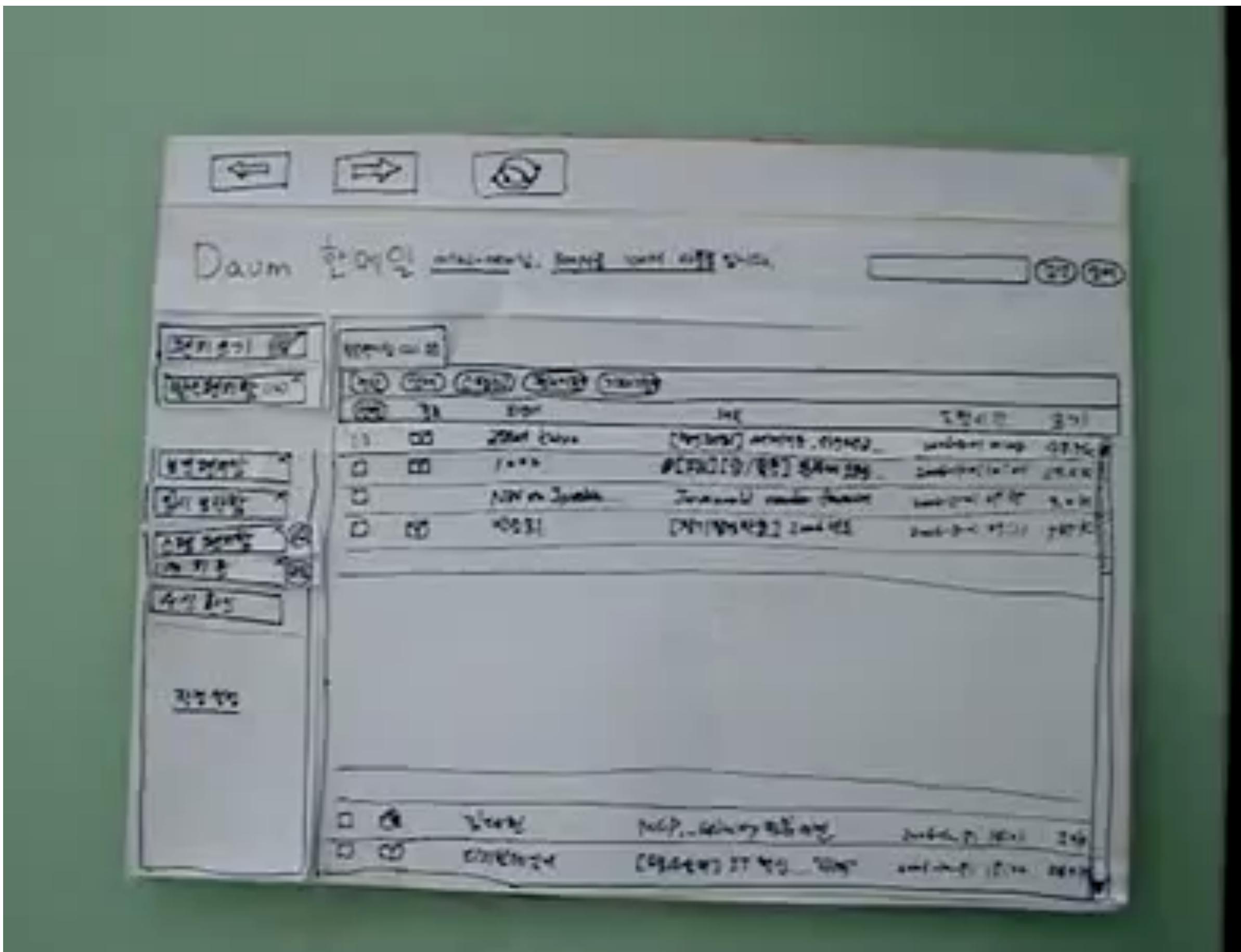


Transparencies allow  
flexible use of text

# 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 photocopier to make many versions

# Constructing the prototype

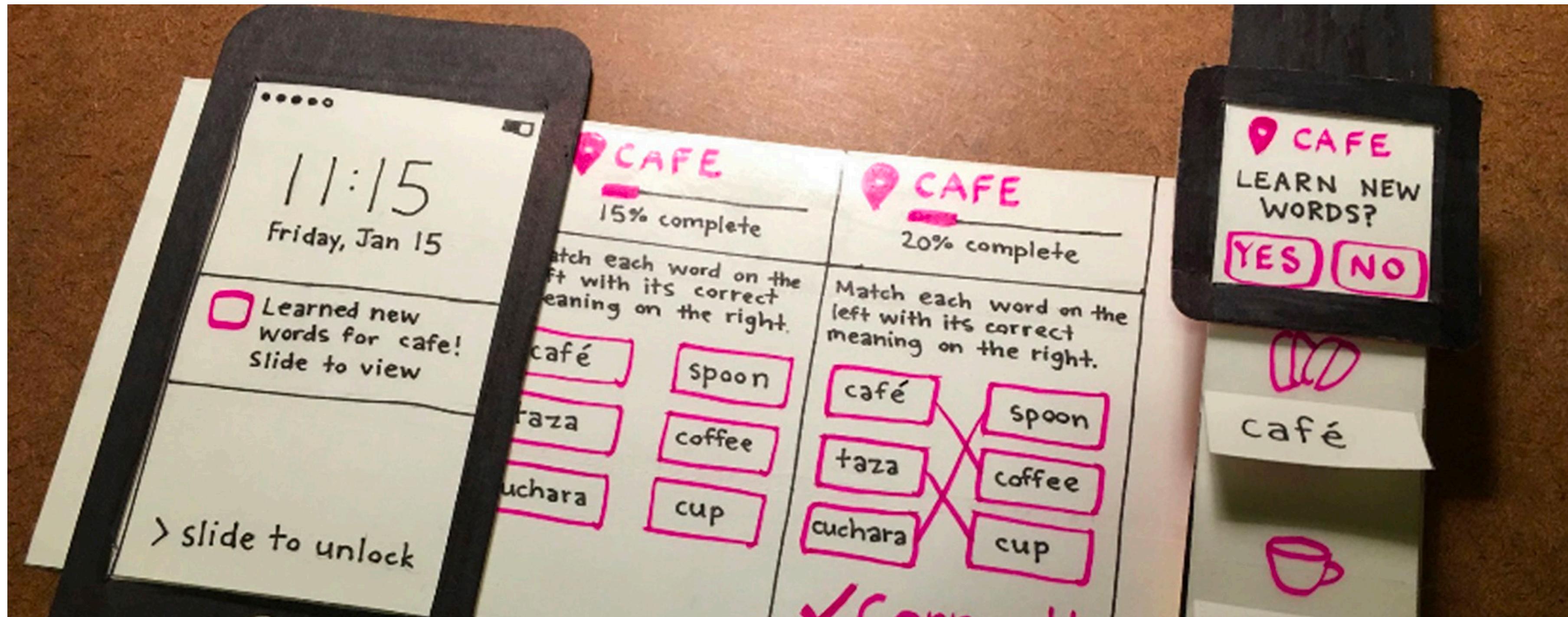


Figure 3

Figure 5

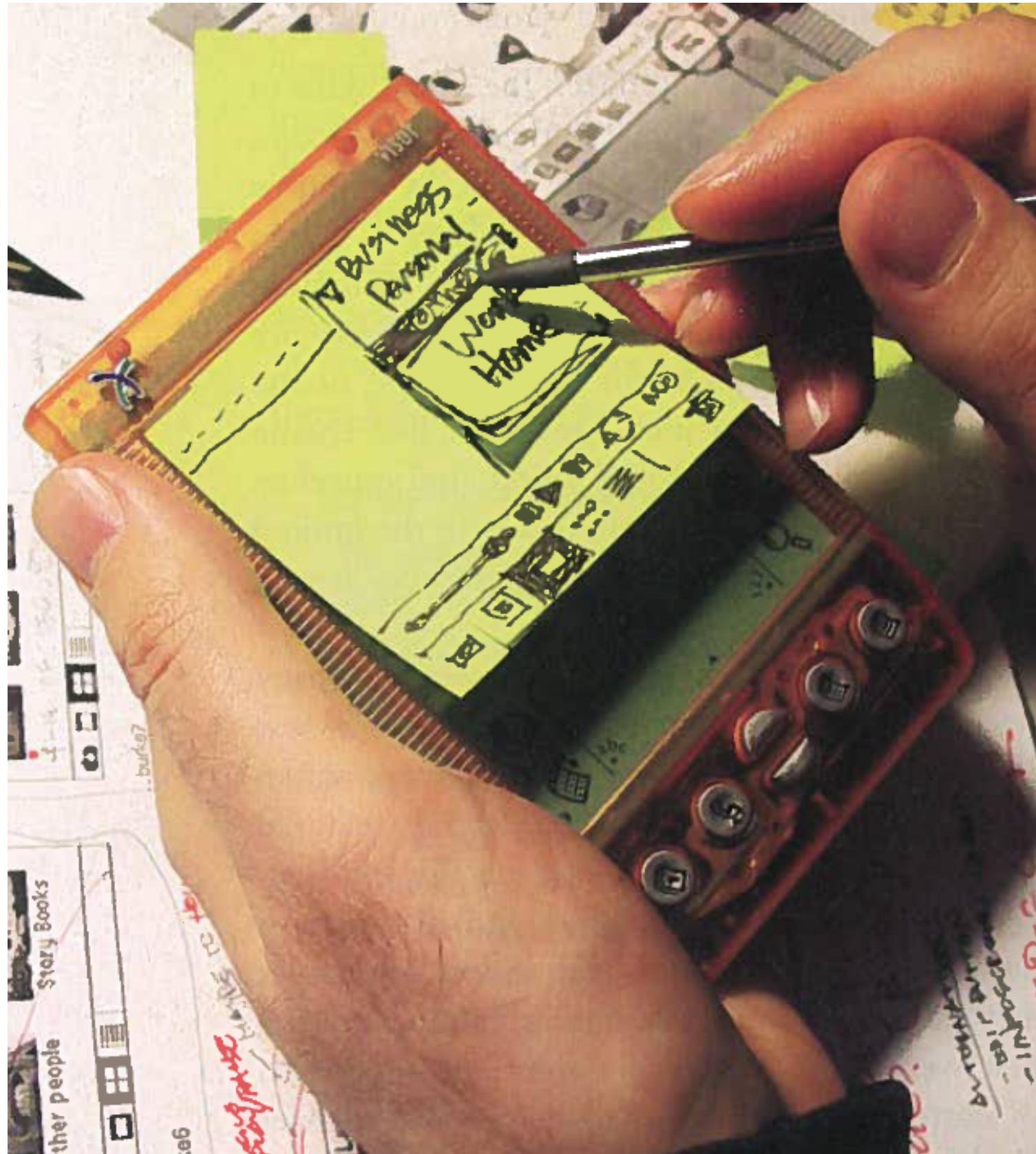
Plan what is needed  
given the tasks

# Constructing the prototype



Remember your target platform constraints

# Constructing the prototype



Remember your target platform constraints

# Constructing a paper prototype



- 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
- In groups of ~4, sketch a paper prototype

# Why usability test?

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

# 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 Gabriela Vasquez
  - Change Gabriela’s phone number to 949-867-5309
- Tasks can be changed to naturally lead to the next

# 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

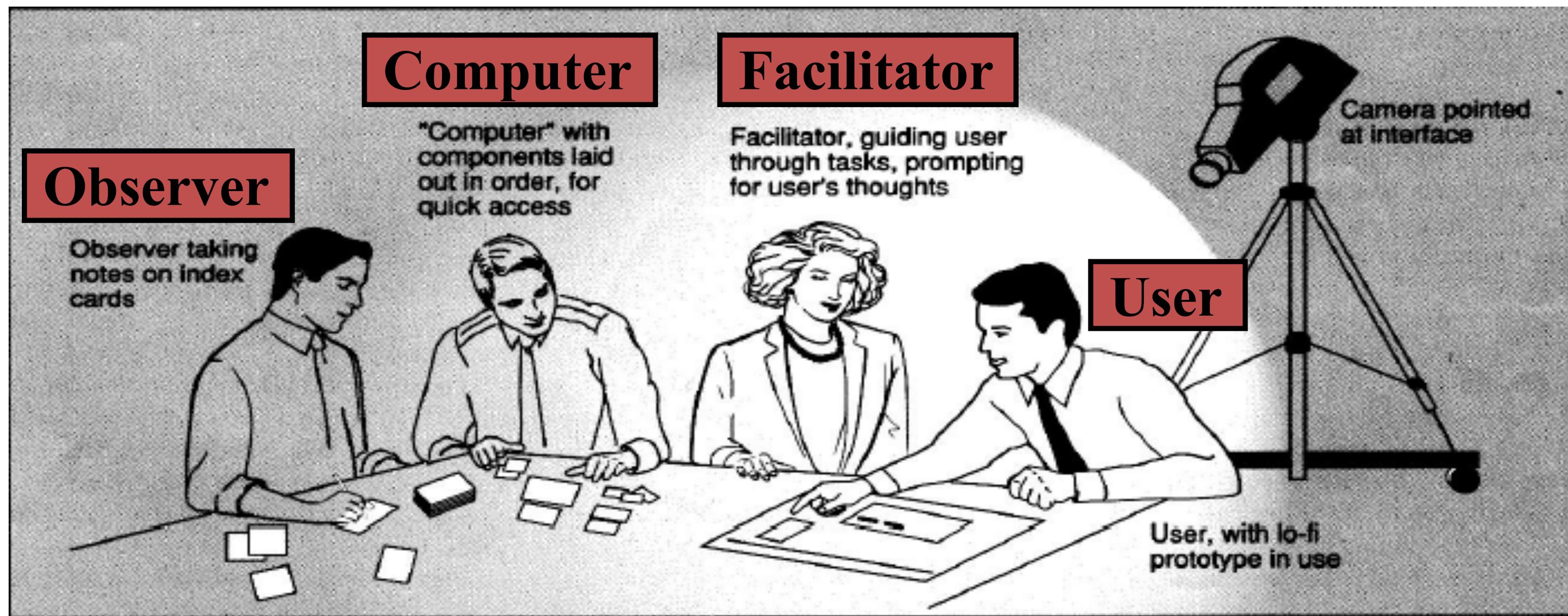
# Preparing for a test

- 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, talk about what you learned from the test
- Thank them for their time
  - Appropriate to give some compensation

# 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

# Improve your paper prototype



- Back in your original group, improve your paper prototype

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