CSE 440: Introduction to HCI

User Interface Design, Prototyping, and Evaluation

Lecture 09:
Paper Prototyping

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Kelsey Munsell

Tuesday/Thursday
12:00 to 1:20

Today

Reading 3 Due Tomorrow

Design Review Tomorrow

Report on Tuesday

Presentations on Thursday / Friday

Paper Prototypes Next Weekend

Bring Prototypes to Following Tuesday

In-Class Inspection Methods

Today

Tips on Effective Presentations

Paper Prototyping

Introduce Yourself

DisTrack

Refocus yourself

Graeme Britz	-	Project Manager
Max Suffel	-	Writer/User Researcher
Angela Suhardi	-	Writer/Designer
Jackie Chui	-	Writer/Designer
Bryan Djunaedi	-	Writer/Designer

Title
Image
Value Proposition

Koala

The recurring subscription management tool that let's you finally take control of your recurring services and payments.

Jen Kang • Vivian Yu • Si Liu • Brendan Lee

Contractions
Typos

Koala

The recurring subscription management tool that let's you finally take control of your recurring services and payments.

Jen Kang • Vivian Yu • Si Liu • Brendan Lee

Finding

Typography
Consistency

- **Reimbursement is a burden…**
  - More people, more difficult
- **Compiling shopping list**
  - mental note, notepad, or phone
- **Brand and price conscious**

Task

Typography
Consistency

1. Making list & budgeting
2. Choosing a store & transportation
3. Shopping
4. Purchasing
5. Storing groceries
6. Managing $$$ & requesting reimbursement

Summary

Widows
Orphans
Process vs. Results

-Iteration is key

-Understand how users think

-Better design ideas came from more out-of-the-box thinking

-Discretionary spending is easy but discretionary spending tracking is hard

-Users crave positive motivation

Widows
Orphans

Things to Do (Tasks)

1. Ability to record running statistics such as distance run, speed, number of runs, etc.
2. Share statistics with friends
3. Create running events and invite friends
4. Send mass notifications to friends for a spontaneous run
5. Find a SmartMatch (based on various criteria) to run with
6. Write and search for reviews on the route/experience

Widows
Orphans

Overall Problem: Joint Pain & Activity

- **Target Audience: Athletes**
  - Health conscious
  - Disciplined

- **Problem: Overexertion and aggravation of injury among athletes**

Sense Breaks

Running with Friends

Erica Putsche, Heidi So, Luke Chang, Linsen Wu

Too Much Text

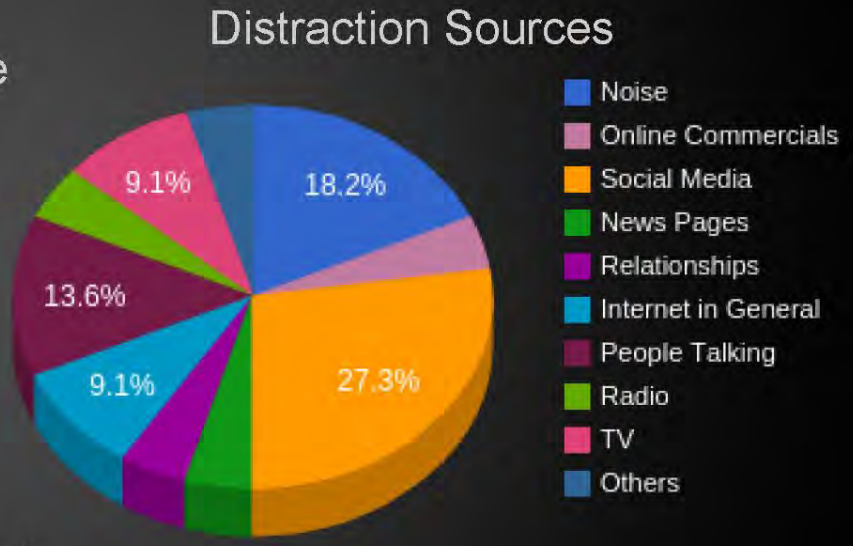
Contextual Inquiry - Insights

Johnson (20, undergraduate, CSE 006 Lab)
- Perception ≠ Observation
- Distracted by people talking and noise
- More focused at CSE Labs than at home

Steve (25, graduate, Mercer Court)
- Motivated by seeing people working
- Distracted by people and social media
- Takes breaks often

George (25, graduate, Odegaard Library)
- Turns notifications off while studying

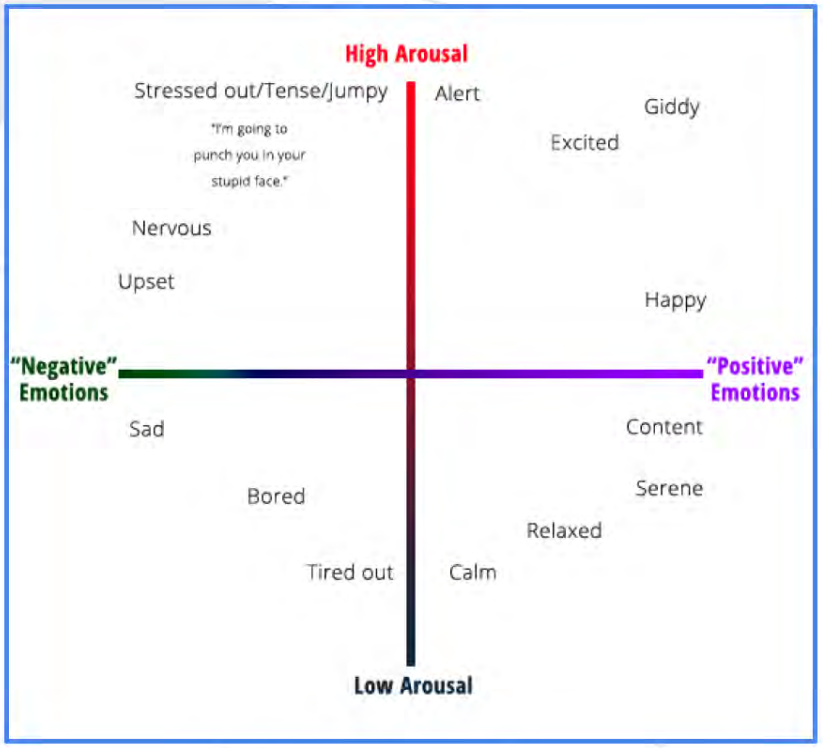
Group (4 undergraduates, Yunnie Bubble Tea)
- Distracted by each other and apps
- Use headphones (music) to focus



Too Much Text
Too Much "People"

Our three inquiries showed us:

1. People valued the insights acquired from a mood journal.
2. People thought journaling was a hassle.
3. People were interested in what triggers their mood
4. People want to share information with a mental health professional



Too Much Text

Design 1: Running separately
May add some motivation but does not provide the full experience of running with a companion

Design 2: Coordinating running events in advance
Tasks can be accomplished using Facebook events or other similar tools

Design 3: Spontaneous Running
Tasks are unique and they also address the concerns raised in our contextual inquiries. Our chosen design also provides us with an interesting opportunity to explore personal informatics

Summary

Too Much Text

-Iteration is key

-Understand how users think

-Better design ideas came from more out-of-the-box thinking

-Discretionary spending is easy but discretionary spending tracking is hard

-Users crave positive motivation

Having Too Much Text

If you can read it

- you probably will
- we probably will

Be conversational, engaged

- even when not talking

Notes are fine

- but do not read them

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Slide Counts as Guidelines
Cramming too Much

Parent Contextual Inquiry

Participants:

- Two parents whose children formerly had IEPs
- One parent with two children that currently have IEPs
- One guardian of a student with an IEP

The Process:

- "The lingo and paperwork are confusing, they come with 17 people and you are there by yourself."

Communication:

- "right now I come in doing all the communications to get information"

Tracking

Have the Right Text
"Overuse Injuries"

Overall Problem: Joint Pain & Activity

- **Target Audience: Athletes**
  - Health conscious
  - Disciplined

- **Problem: Overexertion and aggravation of injury among athletes**

Pictures are Good

Contextual Inquiry

- Dancers
  - Use of entire body
  - Diverse Injuries
- Observation
  - Warmup
  - Preventative Habits

Pictures are Good

Contextual Inquiry

4 Locations

- Odegaard Library
- CSE Undergraduate Labs
- Mercer Court
- Yunnie Bubble Tea (Ave)

3+1 Approaches

- Observation + Interview (3x)
- Interview-only (2x)
- In-group Interview (1x4)
- \+ Online Survey (16x)

Contextual Inquiry

Pictures are Good

- People do not want to be interrupted or distracted
- Most people do not have a liquid intake plan
- People often reach for soda, coffee, or other beverages when they feel thirsty

Pictures are Good

Contextual Inquiry

Professional (20-40s)

Family

Undergrad Student

In-Line References Versus Bibliography Slide

15% of Americans between the ages of 20 and 69 experience hearing loss that may have been caused by **noise at work or during leisure activities.**

(http://www.nidcd.nih.gov/health/hearing/pages/noise.aspx)

Motivation of Participants

Very noisy work environment

Some control over exposure levels

Moderately noisy work environment

Lacks control of his noise exposure

Dartmouth student who is exposed to **noisy social environments** multiple days per week

Has control over exposure levels

Watch the Selling

We can help

Short Tasks

Tasks

- Record mood reflections
- Discover triggers and warning signs
- Discover wellness strategies
- Planning for health
- Quick mood check-ins
- Aid your health professional

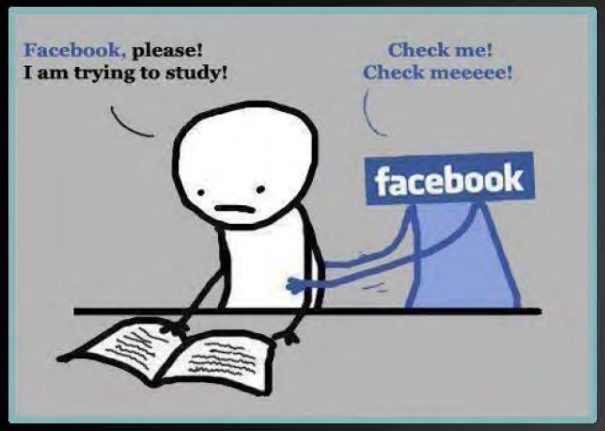
Short Tasks

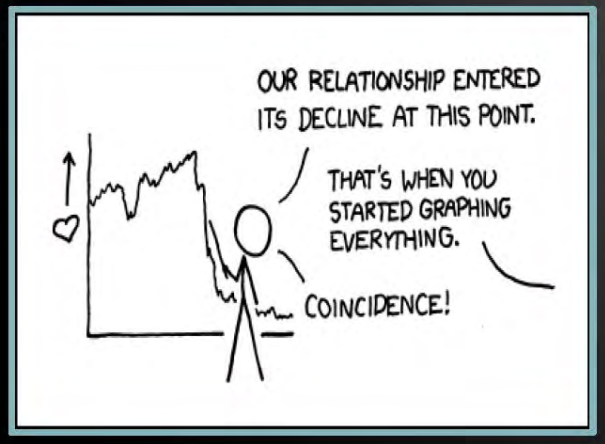
Tasks

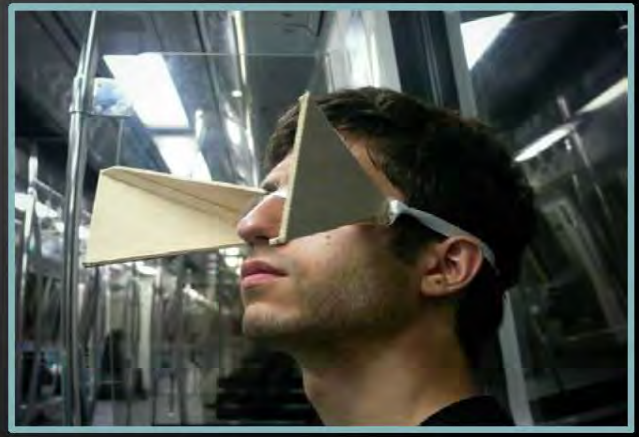
1. Engage a work session.
2. Record digital and non-digital behavior.
3. Prompt for taking breaks.
4. Reflect on recorded data relative to time and location.
5. Find a productive work place.
6. Find and implement methods/strategies to stay focused.

Distracting

Tasks







Speaking of Distractions

Whether correct or not, many things distract

- Plural possessive
- *a posteriori*

Anything that might be sensitive

Original Tasks

Current Tasks:

- Aggregate and collect all IEP information for continuity and stakeholder accessibility.
- Encourage communication between stakeholders.
- Connect with other parents who have children with similar disabilities.

New Tasks:

- Access mini lessons to support the developmental master of IEP tasks.
- Motivational rewards system to encourage students to be active in their IEP.
- IEP videos for parents to understand how to best advocate for their child.

Initial Tasks

Task Groups

1. Tracking liquid intake over time *(Easy)*
2. Education on hydration (Easy)
3. Convenient reminders to drink water *(Medium)*
4. Smart beverage suggestions *(Medium)*
5. Finding motivation for drinking water *(Hard)*
6. Accurate dehydration detection *(Hard)*

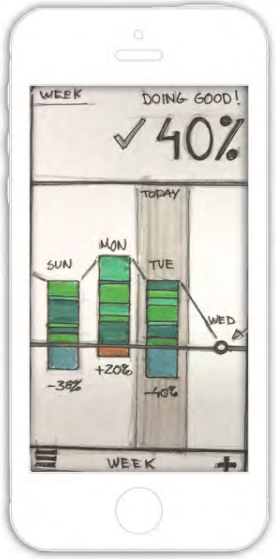
Verb as Task

Adjust budget between different categories.

Verb as Task

Designate spending as discretionary.

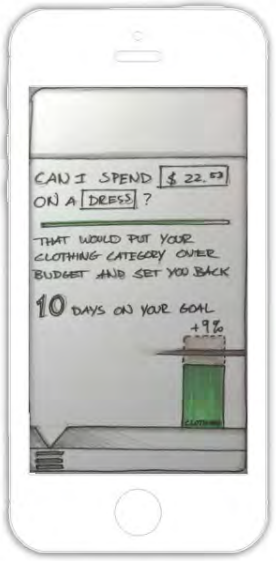
Verb as Task



Review spending **progress** compared to goals.

Account for **future** spending.

Prevent **unwanted** habitual spending.



Check if a potential purchase **fits the budget**.

Consistency of Emphasis

Many people make **general** budgeting goals.

Large items are monitored.

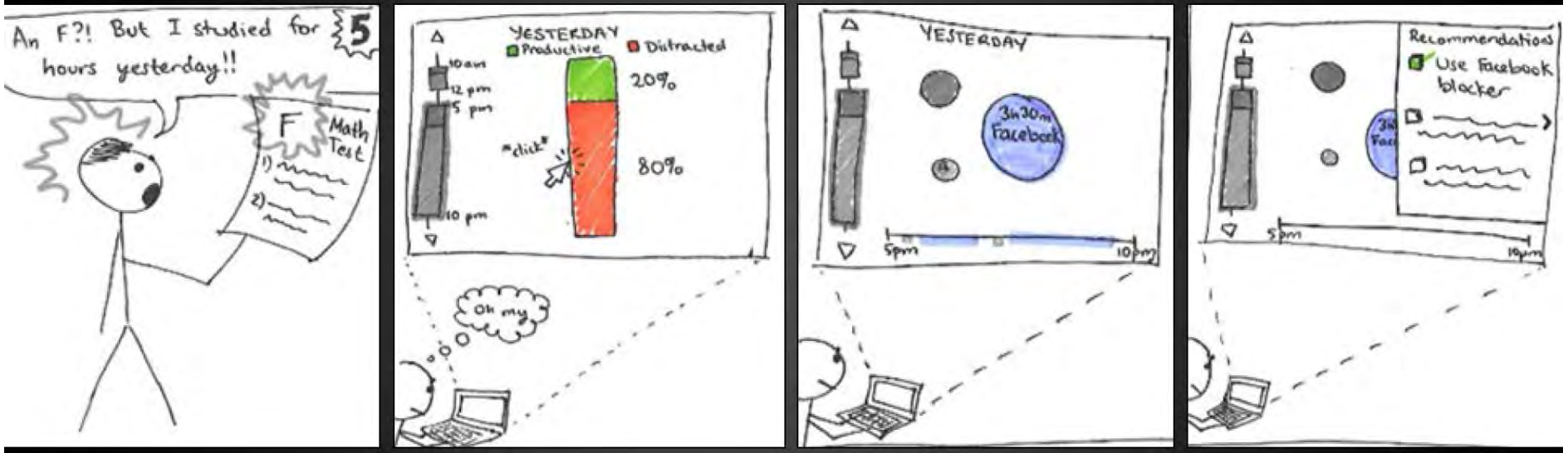
Small items cumulative impact **not considered**.

Challenging setting up budgets.

Complicated input leads to **less use**.

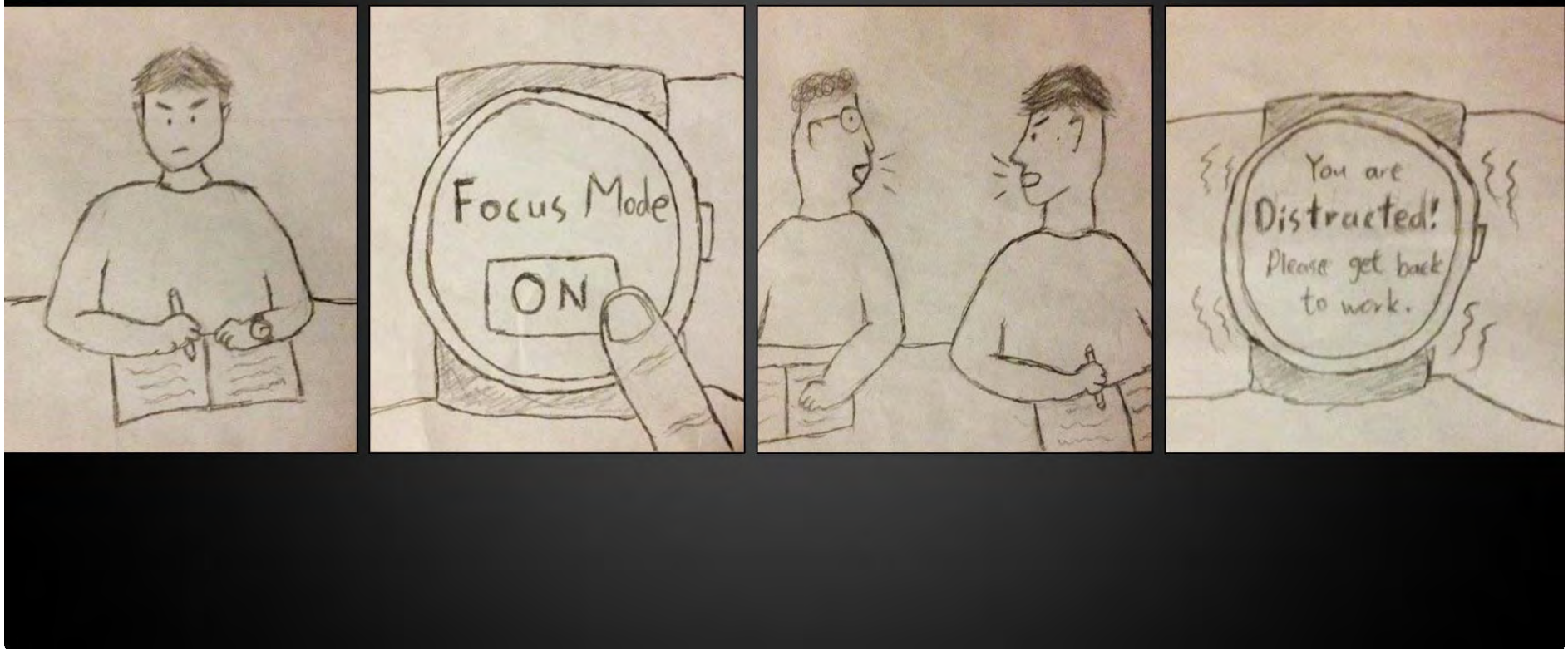
Consistency of Emphasis

Task: **Reflect** on recorded data relative to time and location



Consistency of Emphasis

Task: Find and implement methods/strategies to reduce distractions and increase focus



Design 1

Naming Designs

Pre-shopping

Naming Designs

Tracking Liquid Intake

Education on Hydration

Convenient Reminders

Smart Beverage Suggestions

Design 1

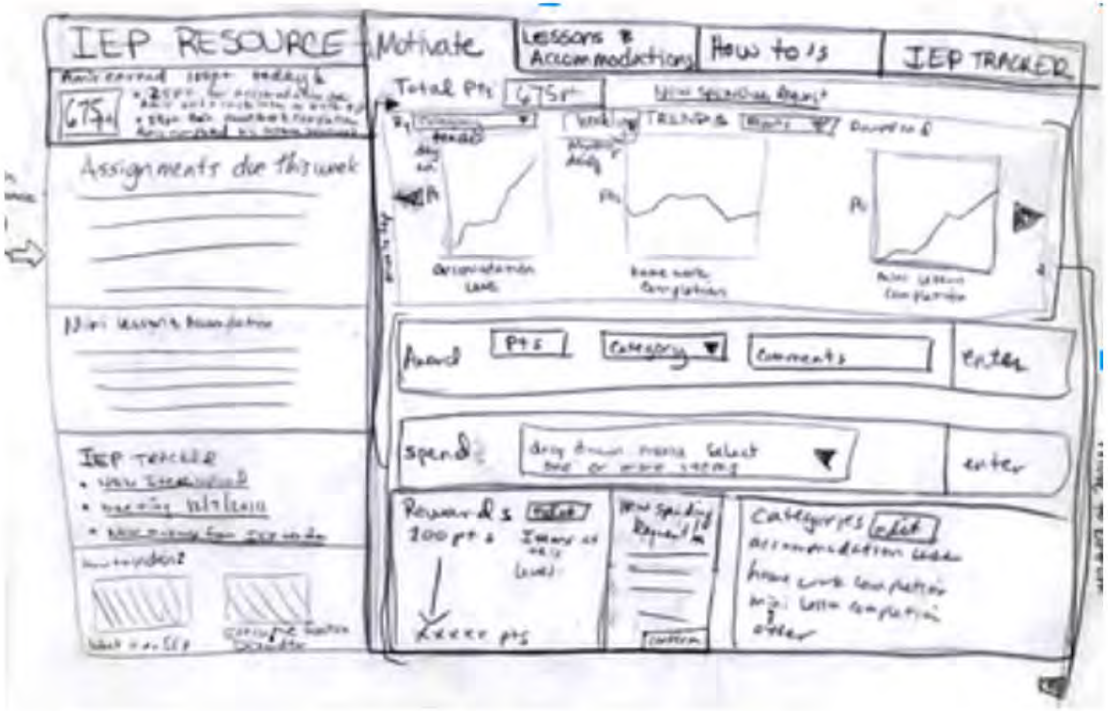
Sensor Ball with Mobile App

Naming Designs versus Slide Title
Hierarchy of Information

Sketch 3

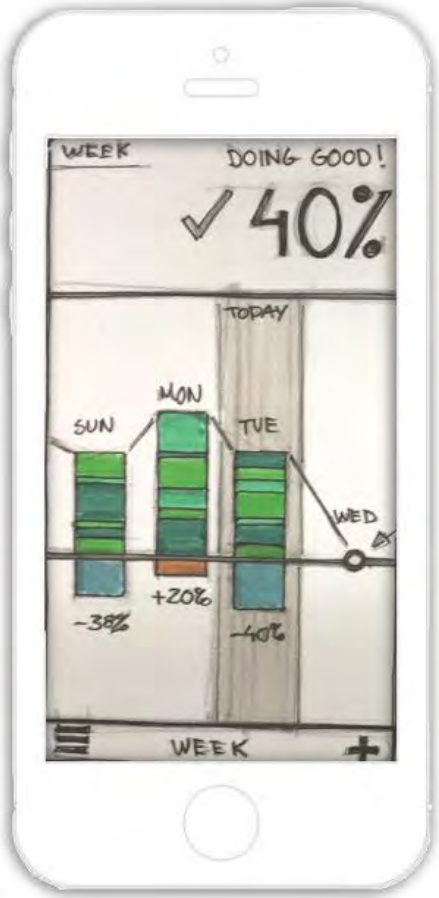
Main Focus:
- Student Motivation

Key Features:
- Mini lessons accessible for the student and parent to work on
- Points awarded for completion of task on the website
- Spending points for various rewards



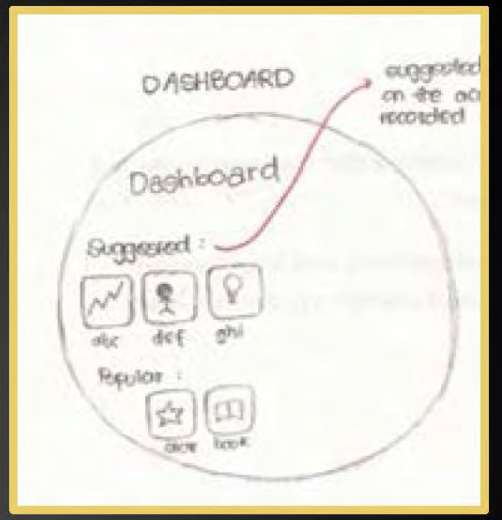
Design 1

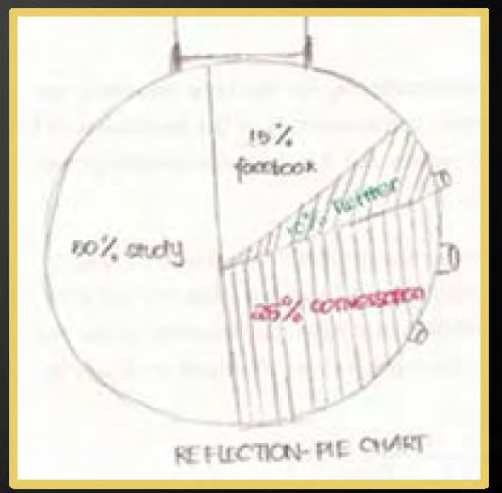
Legibility of Sketches



Blurry Images

Design 3





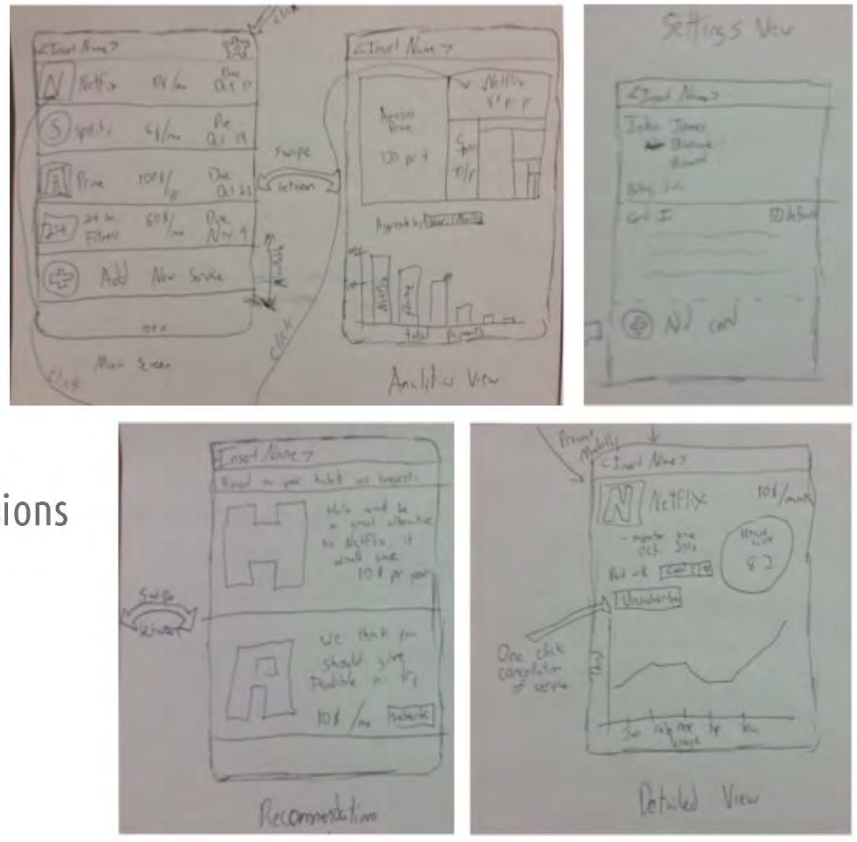
Low Contrast Images
Low Contrast Text

Updated Sketch

Two Tasks

- Recurring subscription management

- Insight and informed decisions



Problem

Check the Projector

A lack of awareness about the long-term implications of noise exposure

Finishing Slide
KACHING

Today

Tips on Effective Presentations

Paper Prototyping

Is My Design Good?

This is not a meaningful question

- It can and will be answered with “Yes”

At least consider asking:

- “What are three good things about this design?”
- “What are three bad things about this design?”

But really the answer is “it depends”

- Remember that designs are used for tasks
- We should ask this in the context of tasks

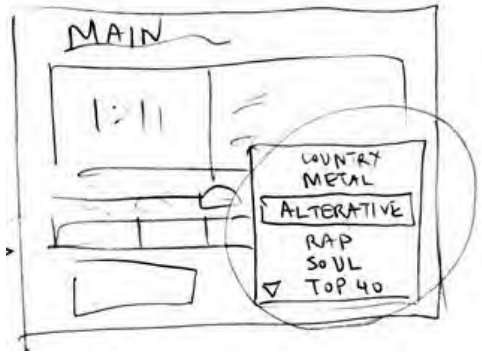
Fidelity in Prototyping

High Fidelity

Prototypes look like
the final product

Low Fidelity

Designer sketches
with many details missing



We have discussed the value of staying lightweight in sketching, but this also applies to prototyping

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

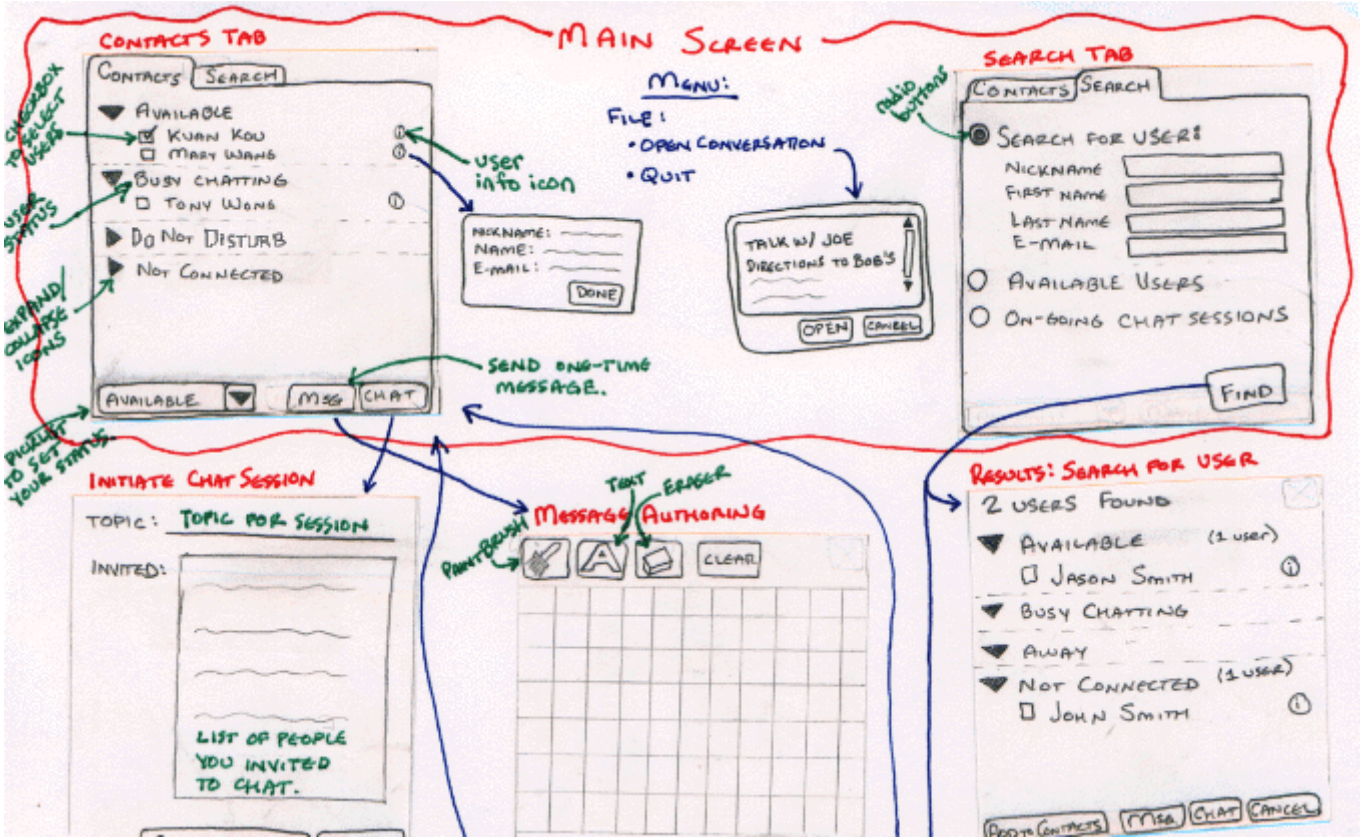
- Sketches → Evaluate → Iterate

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

Sketches


CONTACTS TAB
MAIN SCREEN
SEARCH TAB
CONTACTS
SEARCH
AVAILABLE
KUAN KOU
MARY WANG
BUSY CHATTING
TONY WONG
DO NOT DISTURB
NOT CONNECTED
MENU:
FILE:
• OPEN CONVERSATION
• QUIT
USER INFO ICON
NICKNAME:
NAME:
E-MAIL:
DONE
TALK W/ JOE
DIRECTIONS TO BOB'S
OPEN
CANCEL
SEARCH FOR USER:
NICKNAME
FIRST NAME
LAST NAME
E-MAIL
AVAILABLE USERS
ON-GOING CHAT SESSIONS
FIND
SEND ONE-TIME MESSAGE.
MSG
CHAT
INITIATE CHAT SESSION
TOPIC: TOPIC FOR SESSION
INVITED:
LIST OF PEOPLE YOU INVITED TO CHAT.
MESSAGE AUTHORING
CLEAR
RESULTS: SEARCH FOR USER
2 USERS FOUND
AVAILABLE (1 USER)
JASON SMITH
BUSY CHATTING
AWAY
NOT CONNECTED (1 USER)
JOHN SMITH
MSG
CHAT
CANCEL

Paper Prototype

Basic Materials

Heavy, white paper

Index cards

Post-its

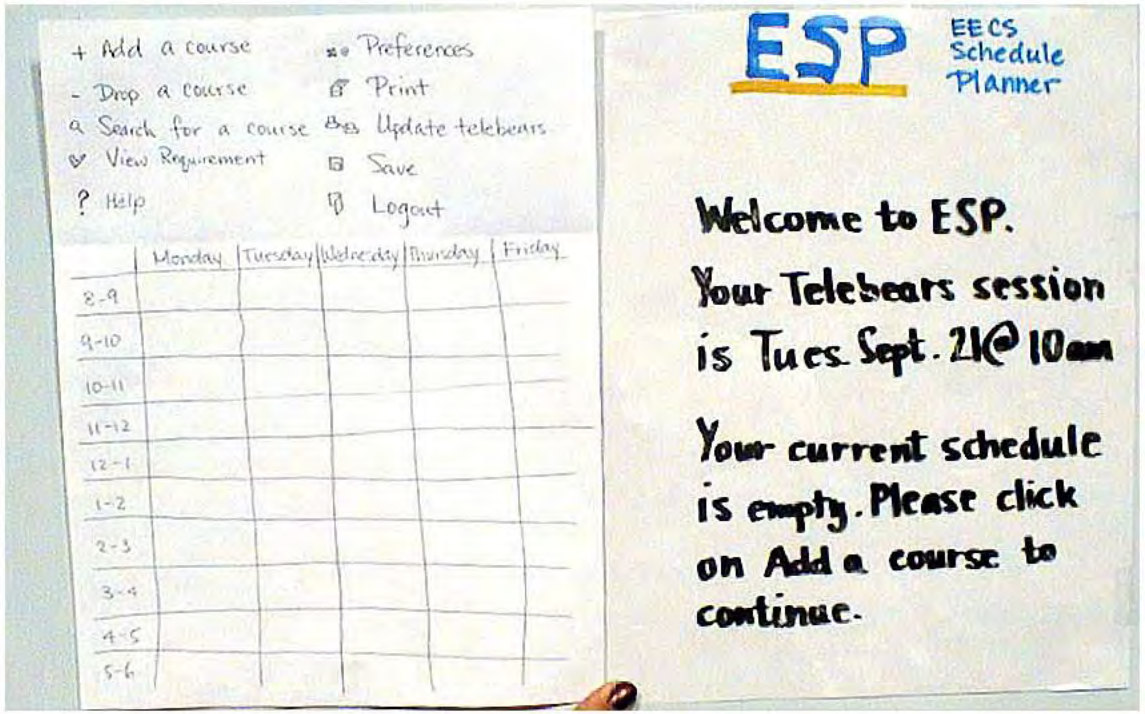
Tape, stick glue, correction tape

Pens and markers in many colors and sizes

Overhead transparencies

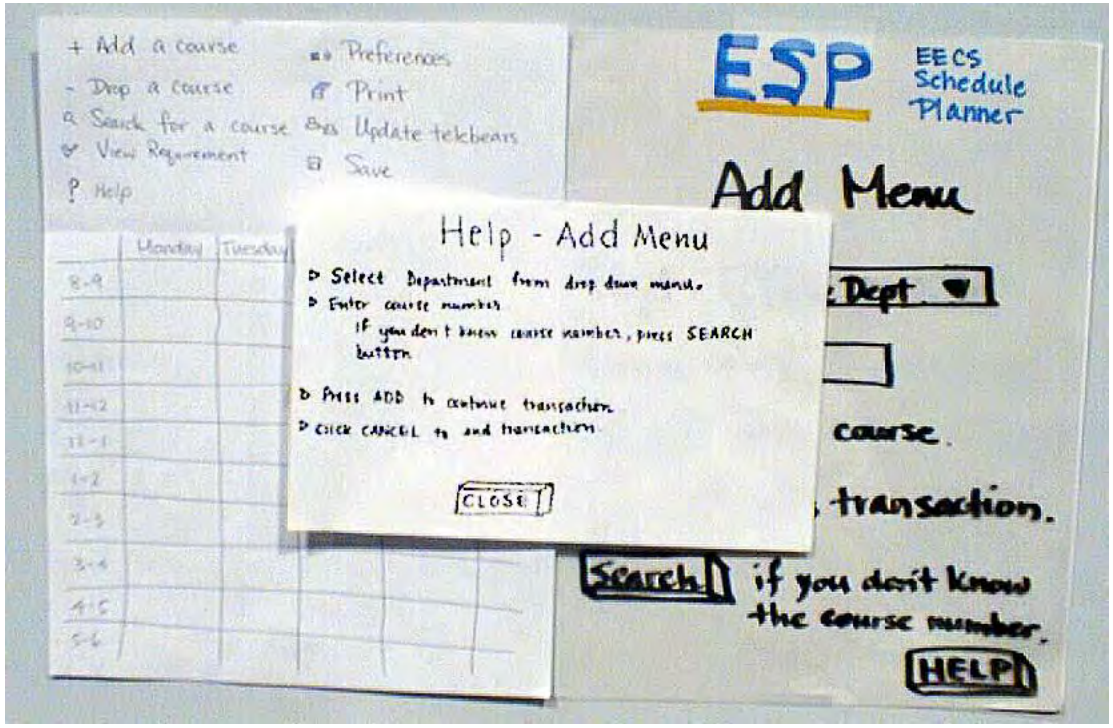
Scissors, X-Acto knife

Paper Prototype



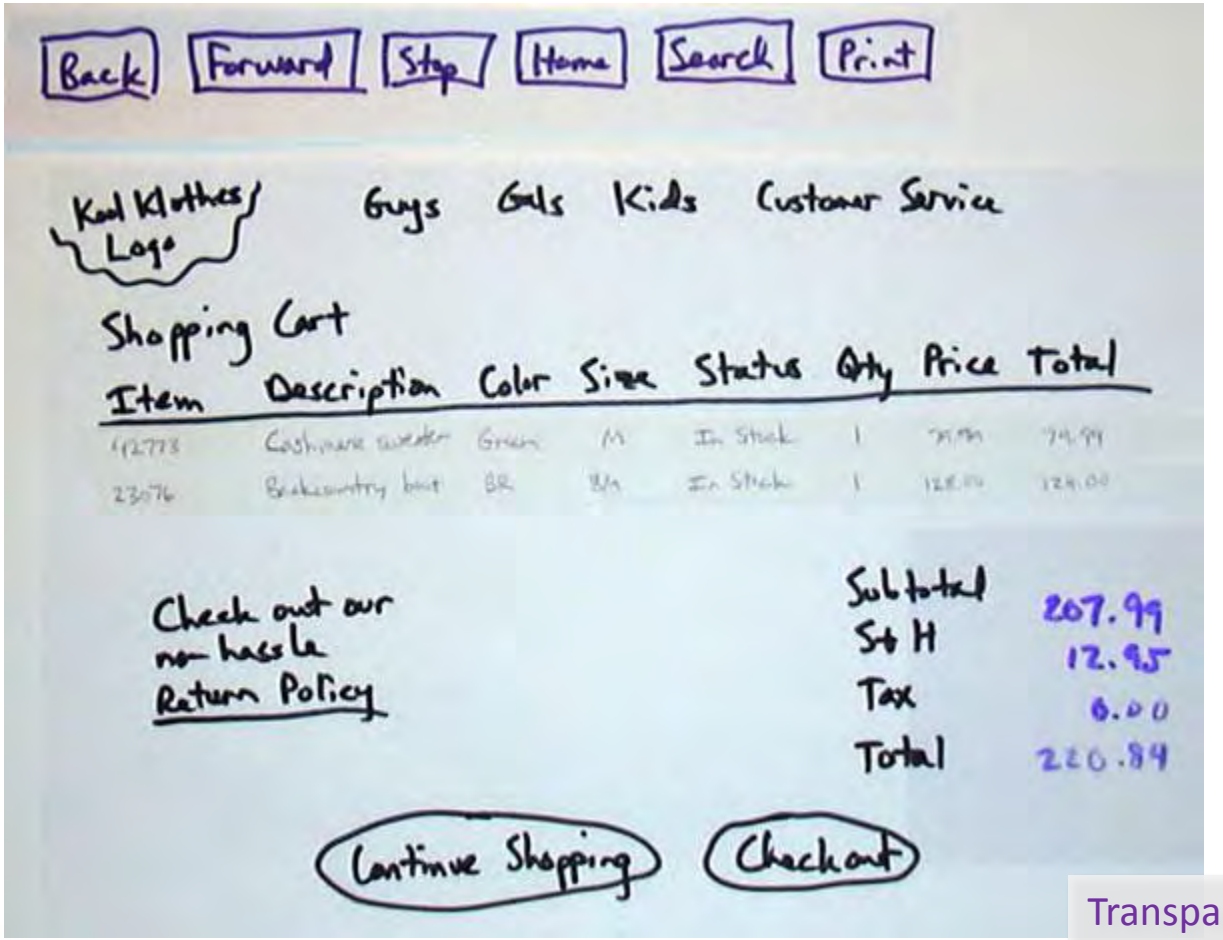
"Screen" faked with pre-constructed pieces

Paper Prototype



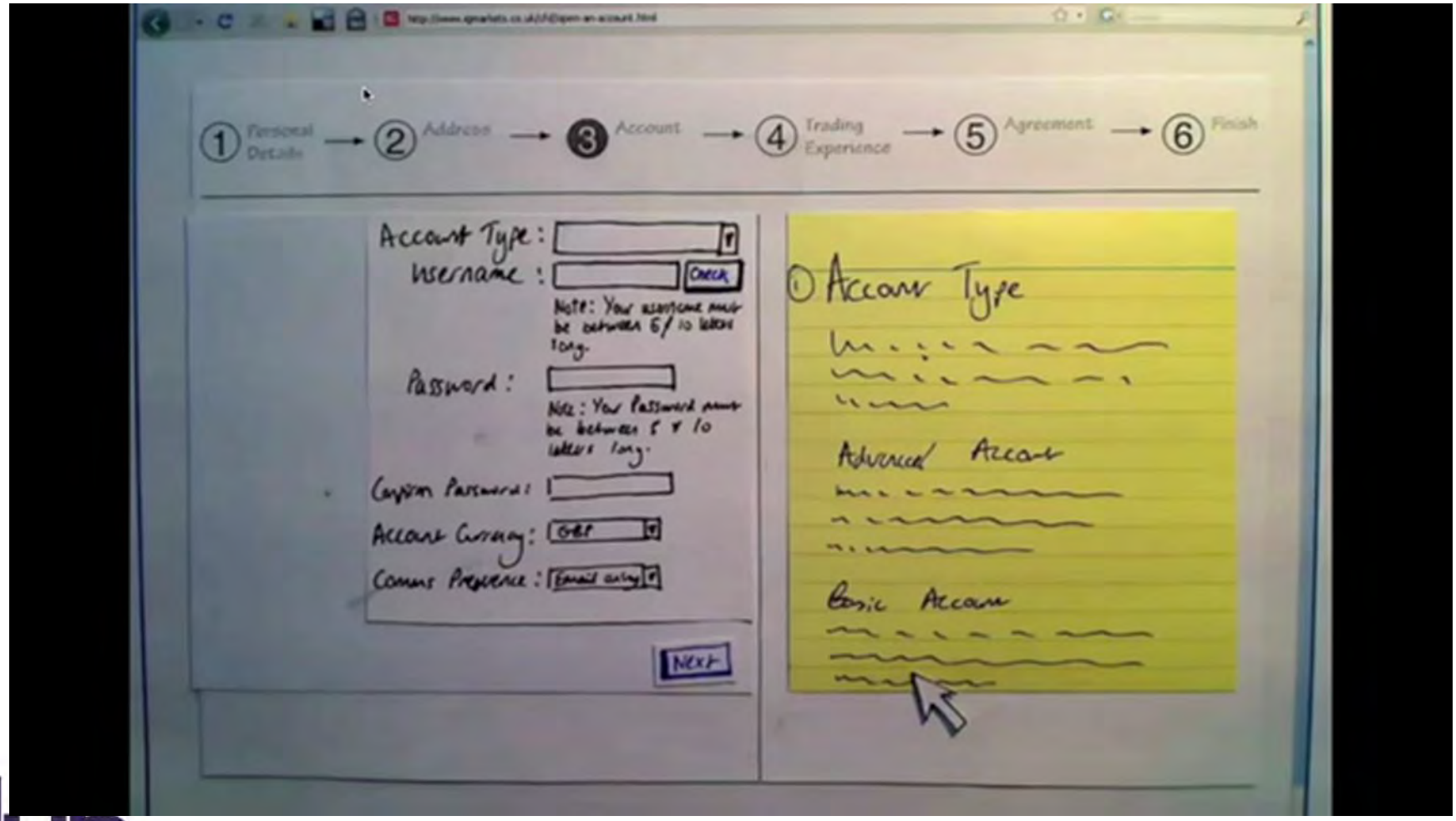
New pieces added in response to interaction

Paper Prototype

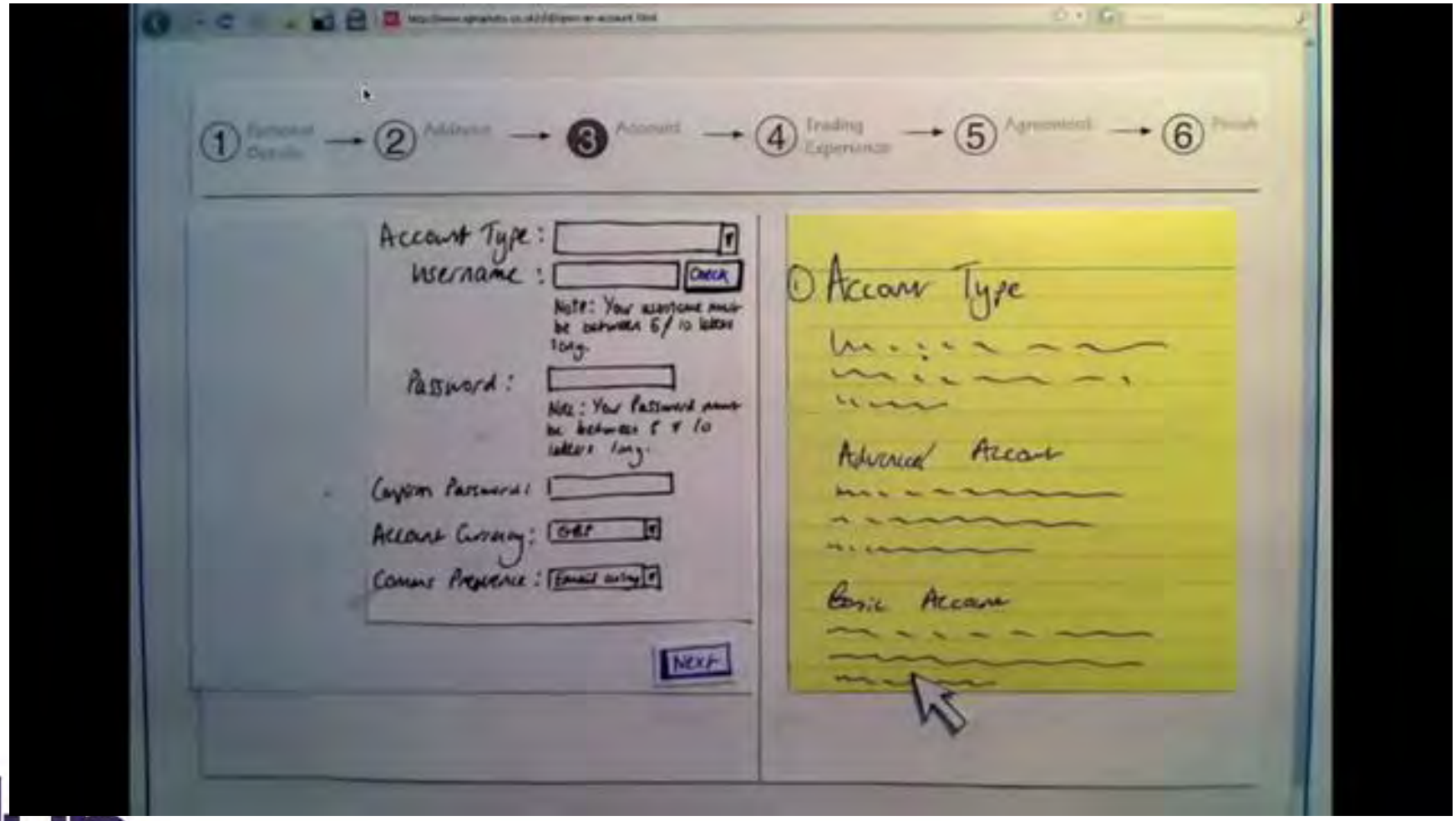


Transparencies allow flexible use of text

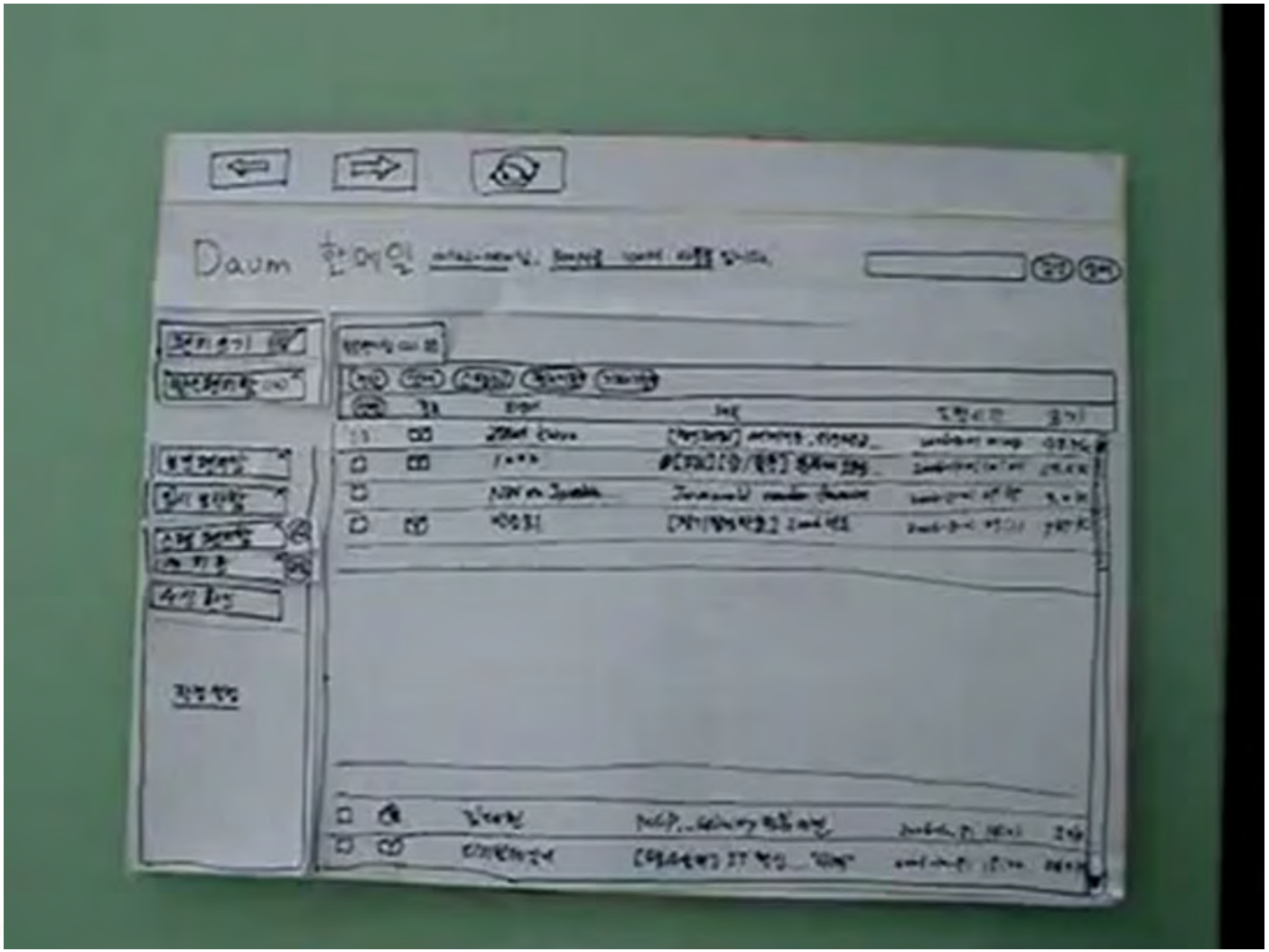
Paper Prototype as Communication



Paper Prototype as Communication



Paper Prototype as Evaluation

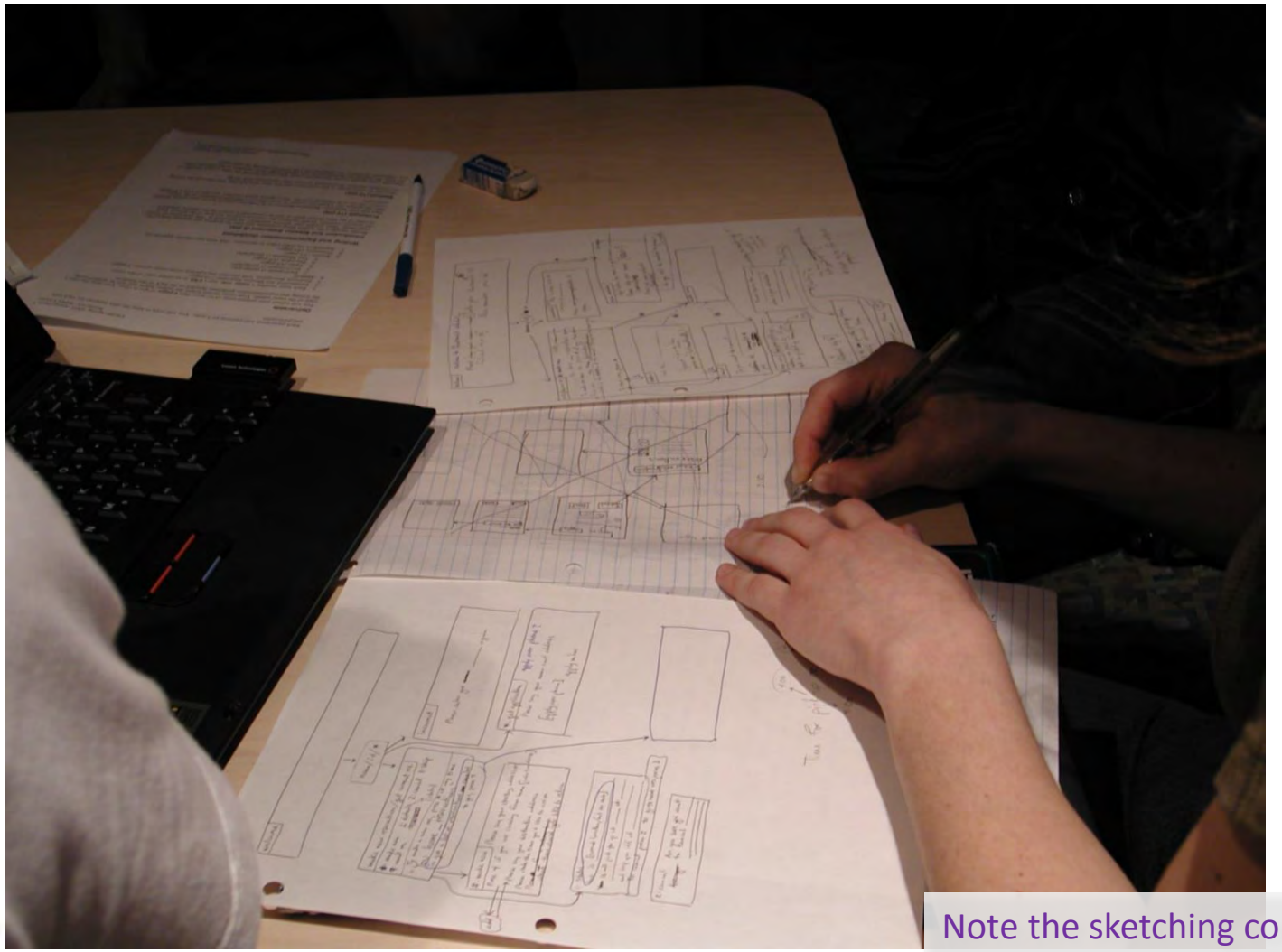


Paper Prototype as Evaluation

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 those pull-down menus already made
  - Planned tasks can guide this
- Use photocopier to make many versions

Constructing the Prototype



Note the sketching continues

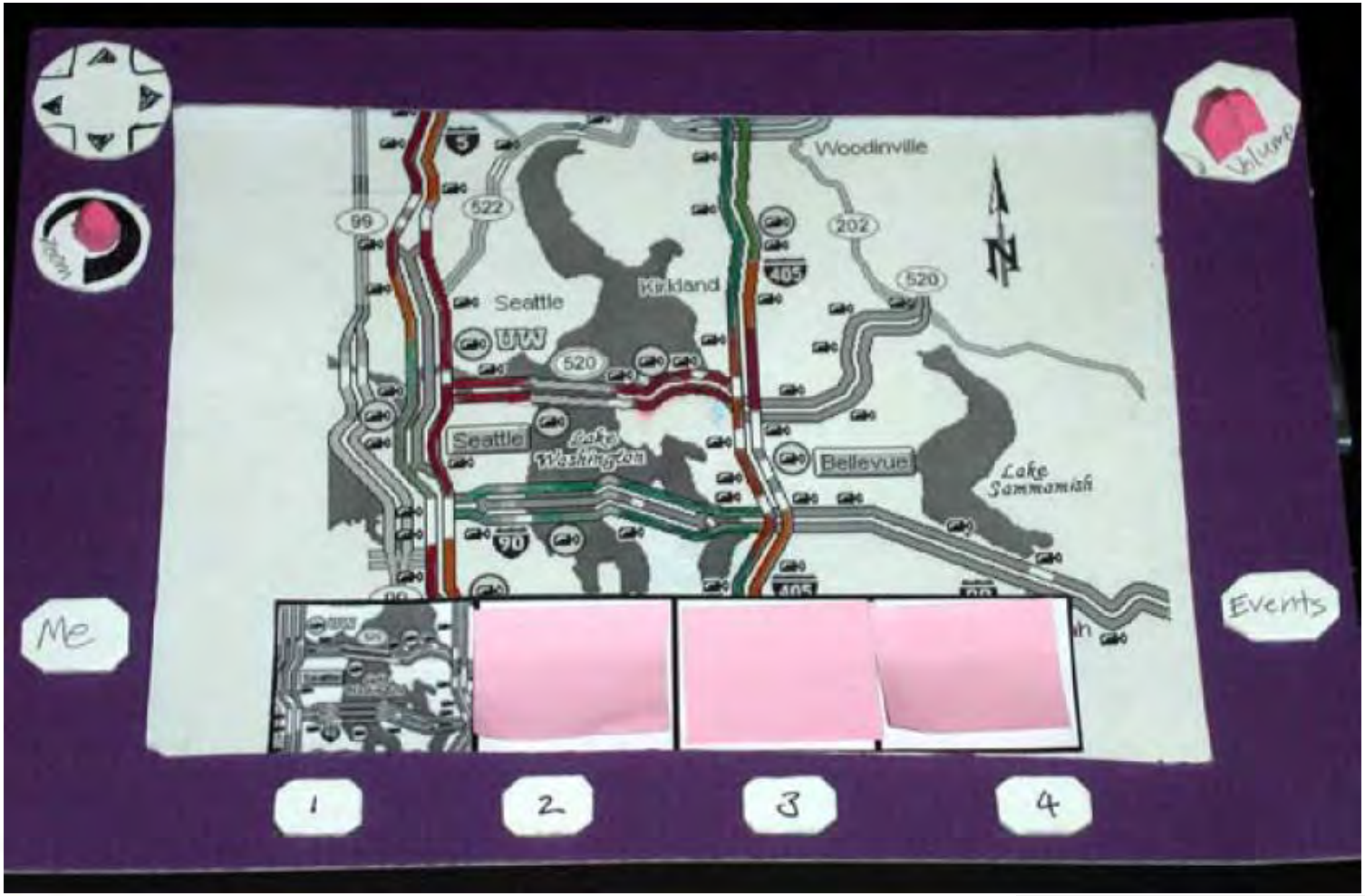
Constructing the Prototype

Planning what is needed given tasks

Constructing the Prototype

Prototyping physical form

Constructing the Prototype



Prototyping physical form

Constructing the Prototype

Remember your target platform constraints

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 innovations

In the long run, this is a win-win

- Both improves design and saves money

Deciding What Data to Collect

- Process data
  - Observations of what people do and think
  - Focused on improving this process
- Summary, statistical, or bottom-line data
  - Summary of what happened (time, errors, success)
  - Focused on measurement

Deciding What Data to Collect

- Process data
  - Observations of what people do and think
  - Focused on improving this process
- Summary, statistical, or bottom-line data
  - Summary of what happened (time, errors, success)
  - Focused on measurement
- Focus on process data
  - Gives overview of where the problems are
  - More useful than “too slow” or “too many errors”

Not a Scientific Experiment

Focus is on improving the design

- Experimental control is not as necessary
- Data measurement is not as precise
- Number of participants is fairly small

Changes can be made

- Fix the obviously broken 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 mobile phones."

Then prescribe tasks

1. Try to find the contacts list in the phone
2. View the contact information for John Smith
3. Change John Smith's number to be 555-555-5555

Tasks can be chained to naturally lead to the next

Stages of a Usability Test

Preparation

Introducing the Test

Conducting the Test

Debriefing

Analyzing the Data

Creating the Report

Preparing for a Test

Select your participants

Friends and family are not your design targets

Understand background, consider recruiting questionnaire

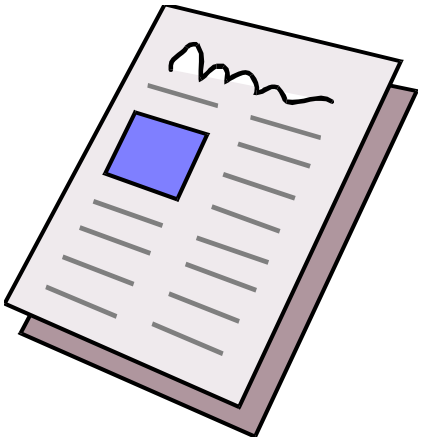
Prepare tasks and paper prototype

Practice to avoid “bugs” in your prototype

Usability Test Proposal

A report that contains

Objective, Description of System, Environment and Materials, Participants, Methodology, Tasks, Test Measures



Work through it with colleagues to debug test

Reuse when presenting final report

Introducing the 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."

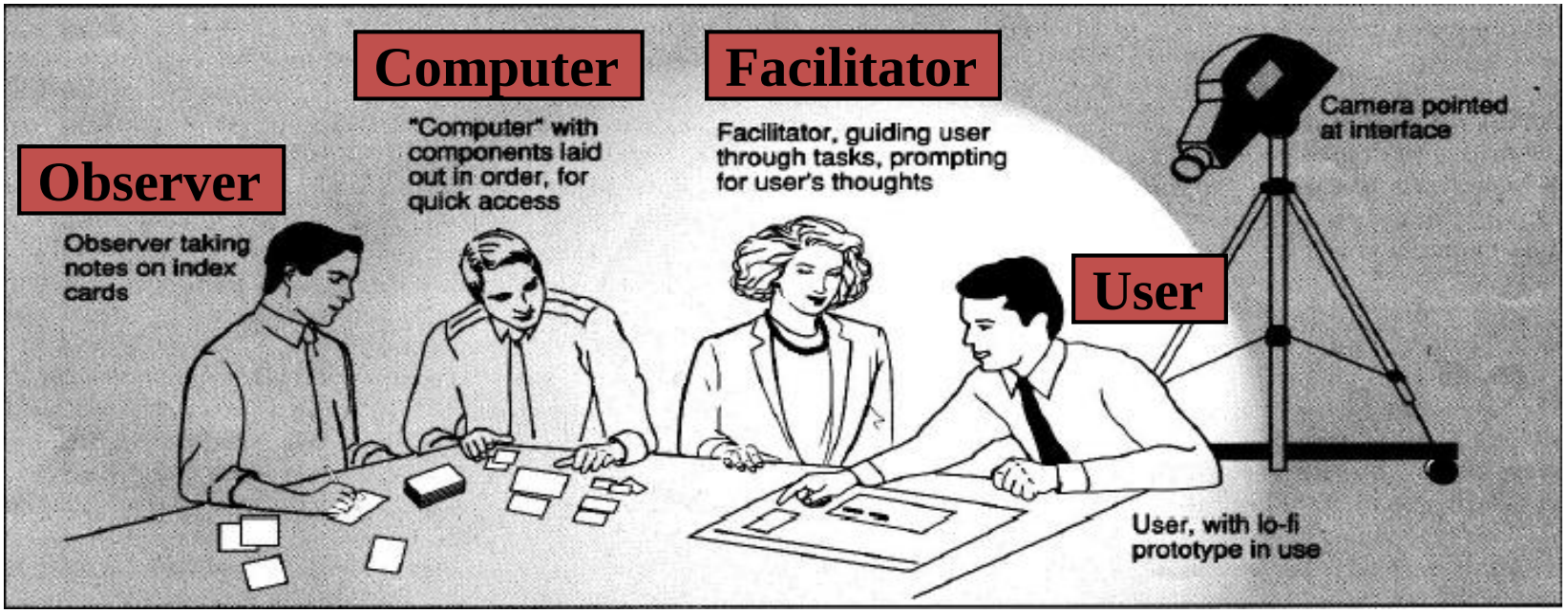
Introducing the Test

Set Expectations for Process

"It is essential you think out loud while working with X. Tell me constantly what you are thinking, looking for, wondering, confused about, surprised, and so on. If you stop talking, I will 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



See the Gommol reading tips on a test session

Rettig, 1994

Talk-Aloud Prompts

"Tell me what you are trying to do."

"Please keep talking."

"Tell me what you are thinking."

"Are you looking for something? What?"

"What did you expect to happen just now?"

"What do you mean by that?"

"Talk-aloud" is similar but distinct from "think-aloud"

Most do not know or care about the difference, so you may see the terms used interchangeably

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 this 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

Analyzing and Reporting the Results

Tests yield many forms of data

Quantitative counts

- time, success/failure
- confusions, errors, workarounds

Observations

- notes about when, where, why, how above occur

Participant comments and feedback

- during session of via a questionnaire

Analyzing and Reporting the Results

Summarize the data

Make a list of critical incidents

- can be positive and negative
- include references back to original data
- try to judge why each difficulty occurred

Sort and prioritize findings

- what does data tell you
- what are the important results
- anything missing from test

Ethical Considerations

Testing is stressful, can be distressing

- people can leave in tears

You have a responsibility to alleviate

- make voluntary with informed consent
- avoid pressure to participate
- let them know they can stop at any time
- stress that you are testing the system, not them
- make collected data as anonymous as possible

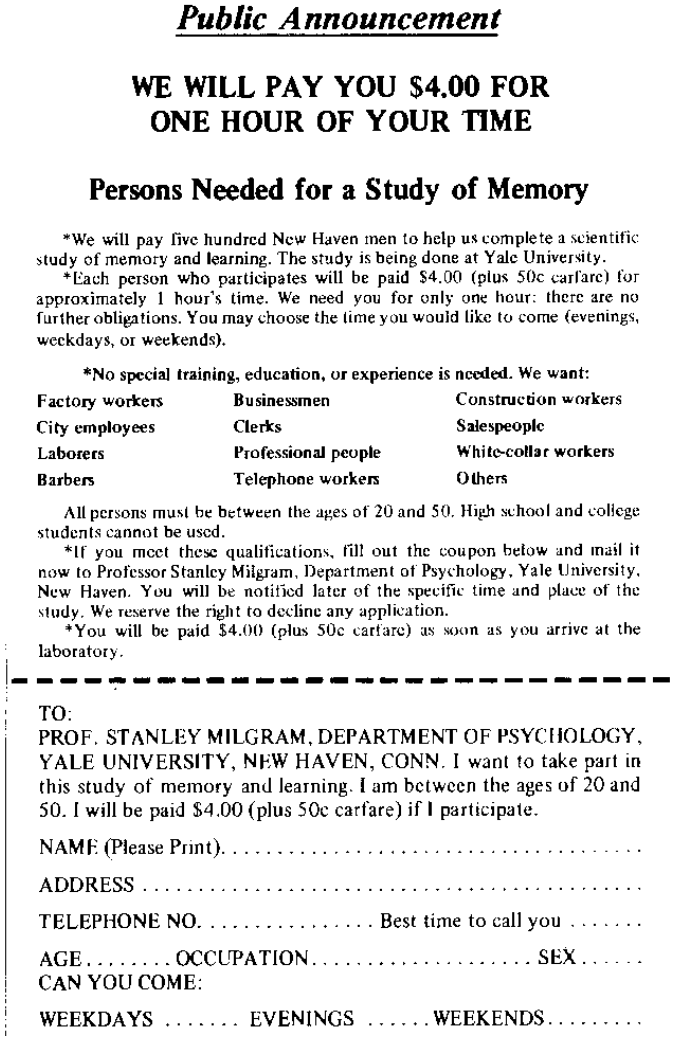
Human Subjects Approvals

Research requires human subjects review of process

This does not formally apply to your design work

But understand why we do this and check yourself

Companies are judged in the eye of the public



Public Announcement

WE WILL PAY YOU $4.00 FOR ONE HOUR OF YOUR TIME

Persons Needed for a Study of Memory

*We will pay five hundred New Haven men to help us complete a scientific study of memory and learning. The study is being done at Yale University.

*Each person who participates will be paid $4.00 (plus 50c carfare) for approximately 1 hour's time. We need you for only one hour: there are no further obligations. You may choose the time you would like to come (evenings, weekdays, or weekends).

*No special training, education, or experience is needed. We want:

Factory workers	Businessmen	Construction workers
City employees	Clerks	Salespeople
Laborers	Professional people	White-collar workers
Barbers	Telephone workers	Others

All persons must be between the ages of 20 and 50. High school and college students cannot be used.

*If you meet these qualifications, fill out the coupon below and mail it now to Professor Stanley Milgram, Department of Psychology, Yale University, New Haven. You will be notified later of the specific time and place of the study. We reserve the right to decline any application.

*You will be paid $4.00 (plus 50c carfare) as soon as you arrive at the laboratory.

TO:
PROF. STANLEY MILGRAM, DEPARTMENT OF PSYCHOLOGY, YALE UNIVERSITY, NEW HAVEN, CONN. I want to take part in this study of memory and learning. I am between the ages of 20 and 50. I will be paid $4.00 (plus 50c carfare) if I participate.

NAME (Please Print). . . . . .

ADDRESS . . . . . .

TELEPHONE NO. . . . . Best time to call you . . . . . .

AGE . . . . . OCCUPATION . . . . . SEX . . . . . .
CAN YOU COME:

WEEKDAYS . . . . . EVENINGS . . . . . WEEKENDS . . . . . .

University of Washington

CSE 440: Introduction to HCI

User Interface Design, Prototyping, and Evaluation

Lecture 09:
Paper Prototyping

James Fogarty
Alex Fiannaca
Lauren Milne
Saba Kawas
Kelsey Munsell

Tuesday/Thursday
12:00 to 1:20