# CSE 440: Introduction to HCI

## User Interface Design, Prototyping, and Evaluation

Lecture 01:
Introduction and
Personal Informatics

James Fogarty
Daniel Epstein
Brad Jacobson
King Xia

Tuesday/Thursday
10:30 to 11:50
MOR 234

dub

design:
use:
build:

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# Two Forms Going Around

## Overload request

We are targeting exactly 48 students

Will email today, attempt to finalize decisions

Email may ask you consider attending a section

Ask your friends to drop immediately

## Section switch availability

To get to 48, we may need to move people

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# Who We Are

## James Fogarty

BS, Virginia Tech, 2000
PhD, Carnegie Mellon, 2006
Joined UW CSE, 2006

## Industrial Stints

IBM, 2000
IBM Research, 2003
Microsoft Research, 2007

# Who We Are

## Cross-Campus HCI Efforts

DUB

MHCID

## Teaching

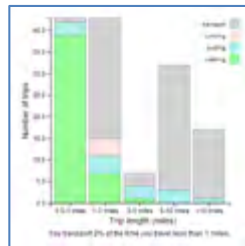CSE 332: Data Structures
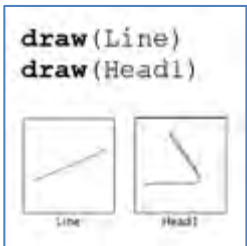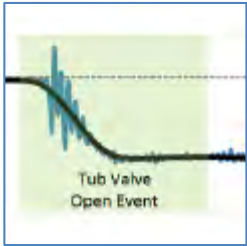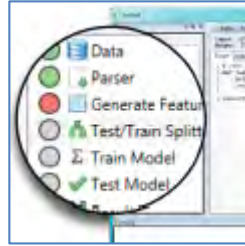
CSE 440: Introduction to HCI

CSE 441: Advanced HCI

CSE 510: Advanced Topics in HCI

CSEP 510: Human-Computer Interaction

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# Who We Are



Computing

You

# Who We Are

Daniel Epstein

BS, Computer Science
University of Virginia, 2012

Grad Student, UW CSE
2012-20XX?

Research: Sharing self-tracked data with friends and family

Hobbies: Game development, running, hiking, programming competitions
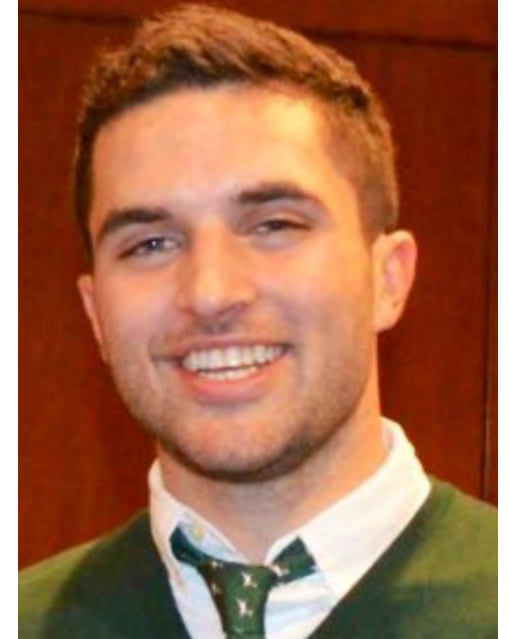
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# Who We Are

Brad Jacobson

BA, Psychology

Dartmouth College, 2013

MS, University of Washington

HCDE, 2013 – 2014

Interests:    user research,
"pop-psych" books, soccer, skiing,
and plenty of tv shows and movies

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# Who We Are

King Xia

University of Washington, 2015

Computer Science & Business
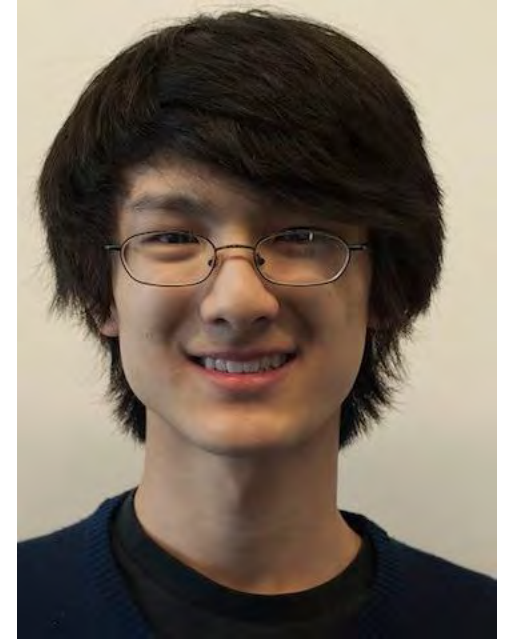
Interests:   The Kingkiller Chronicles,
learning new languages,
LoL, cooking, debate

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# What Is This Course?



Time for a Door Quiz:

Say out loud what action you use to open the door

Push

Pull

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# Door Quiz

# Door Quiz

# Door Quiz

# Door Quiz
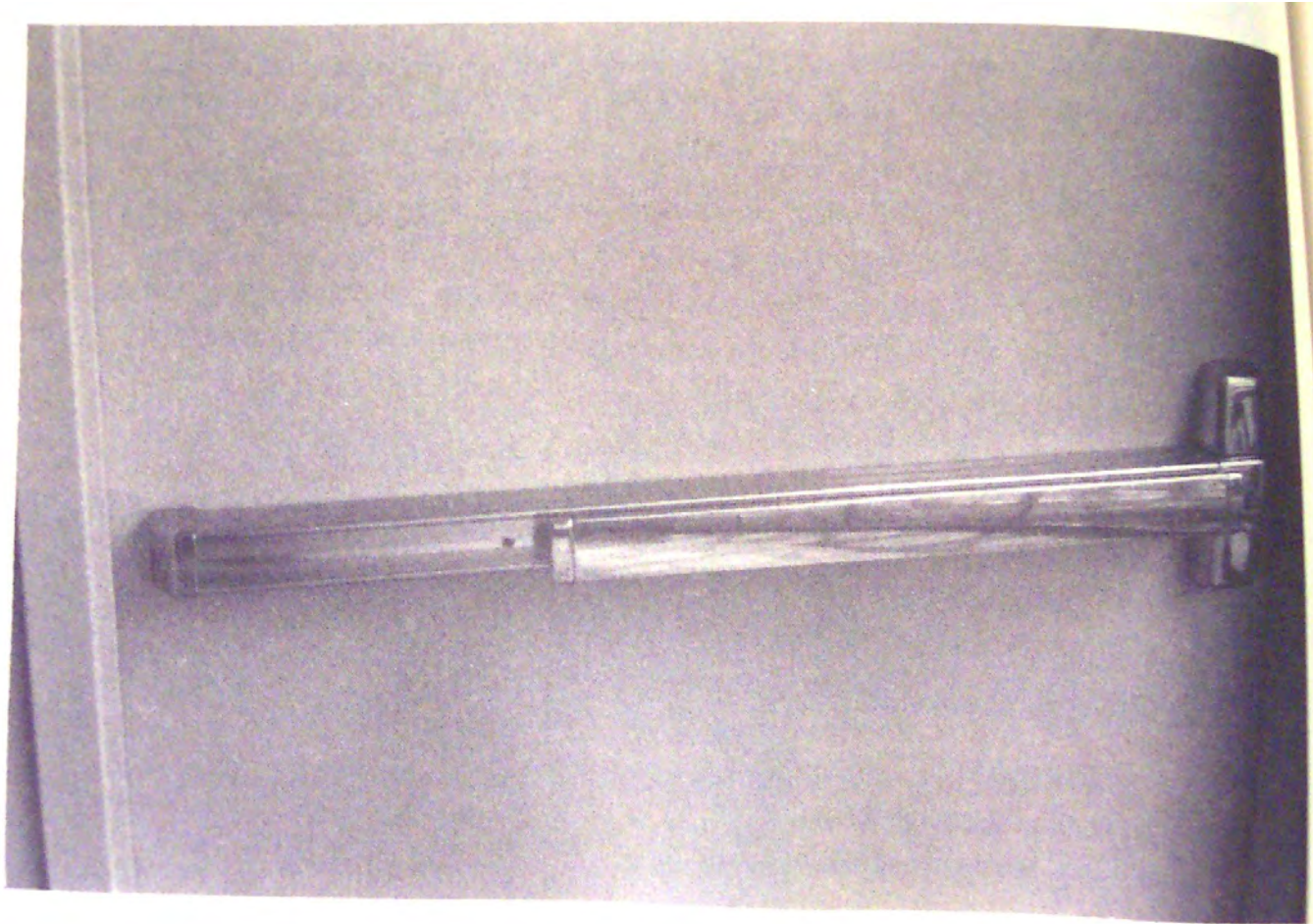
# Door Quiz



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# Door Quiz
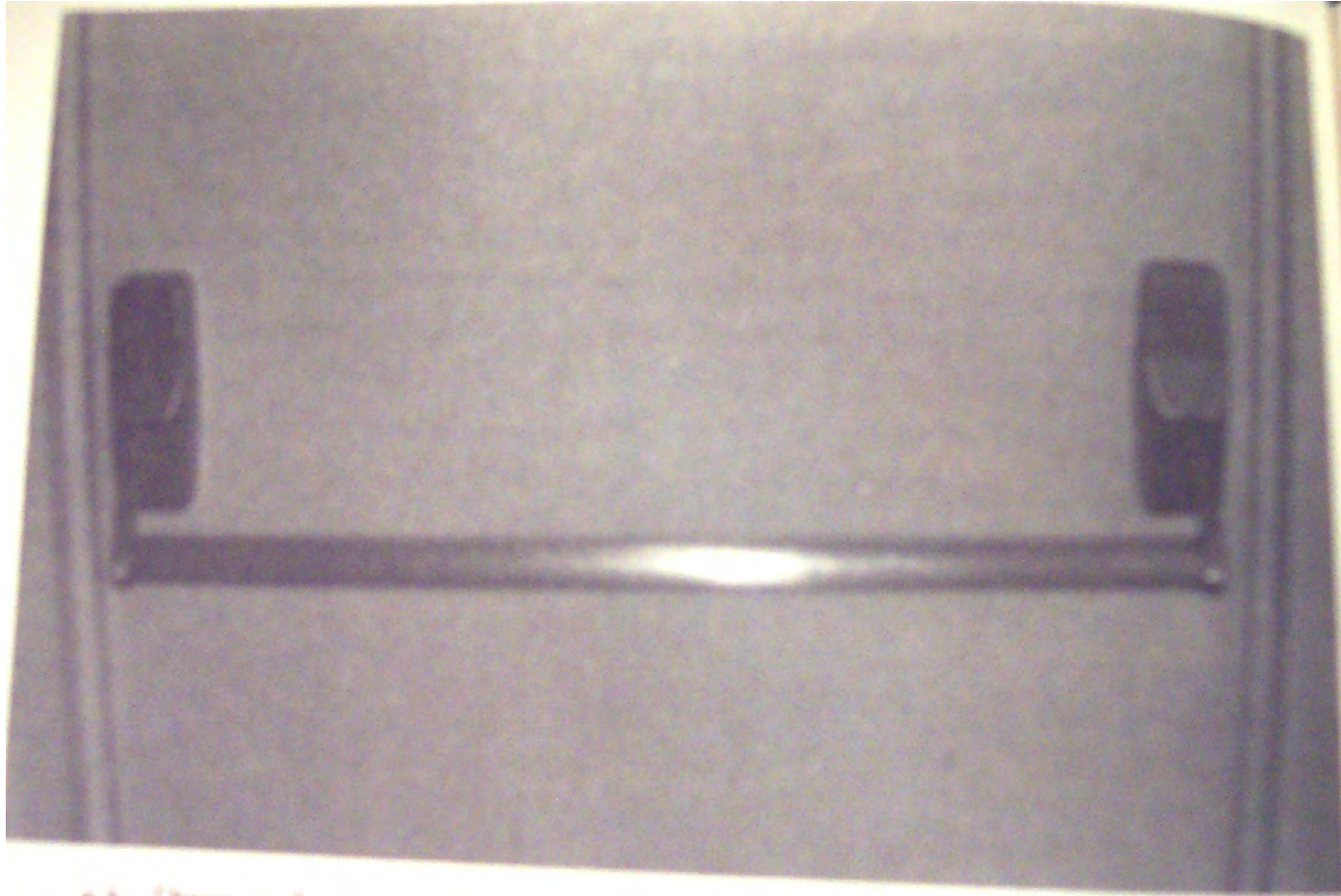
# Door Quiz

# Door Quiz

# Door Quiz

# What is so Special about Computers?

Nothing!  It is about good designs and bad designs

We all make push/pull decisions many times per day

We all encounter doors that do this badly

We all see signs that do not change what we do



MORE THAN 100,000 COPIES SOLD

"Design may be our top competitive edge. This book is a joy—fun and of the utmost importance."
TOM PETERS

THE DESIGN OF EVERYDAY THINGS

Previously published as *THE PSYCHOLOGY OF EVERYDAY THINGS*

DONALD A. NORMAN    WITH A NEW INTRODUCTION BY THE AUTHOR
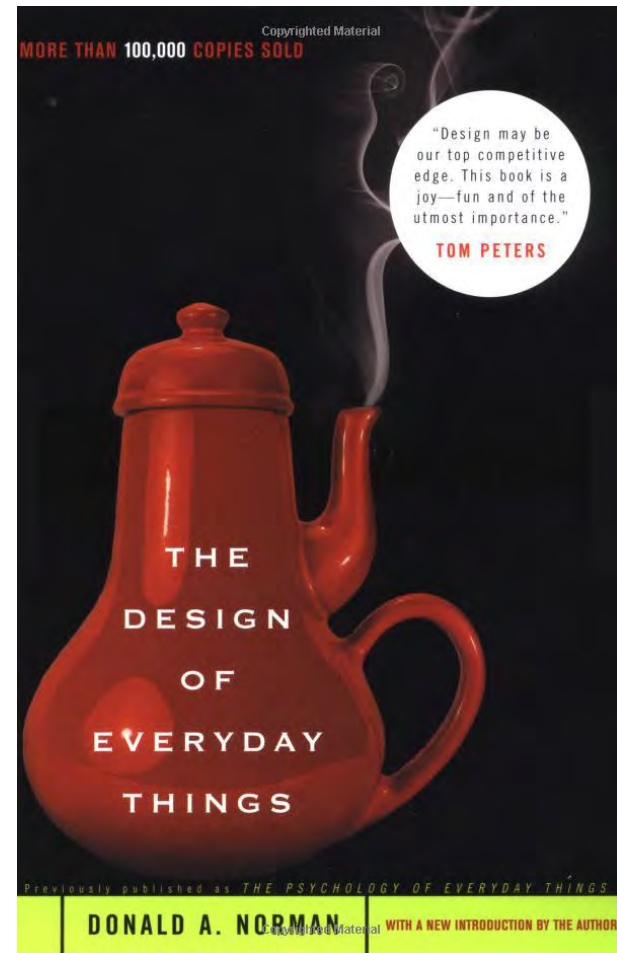
# What is so Special about Computers?

Yet we blame ourselves

Absolutely everything we encounter in the made world was designed

Too often poorly designed

Read this book

Be warned you cannot unread it, you become angry



MORE THAN 100,000 COPIES SOLD

"Design may be our top competitive edge. This book is a joy—fun and of the utmost importance."
TOM PETERS

THE DESIGN OF EVERYDAY THINGS

Previously published as THE PSYCHOLOGY OF EVERYDAY THINGS

DONALD A. NORMAN    WITH A NEW INTRODUCTION BY THE AUTHOR
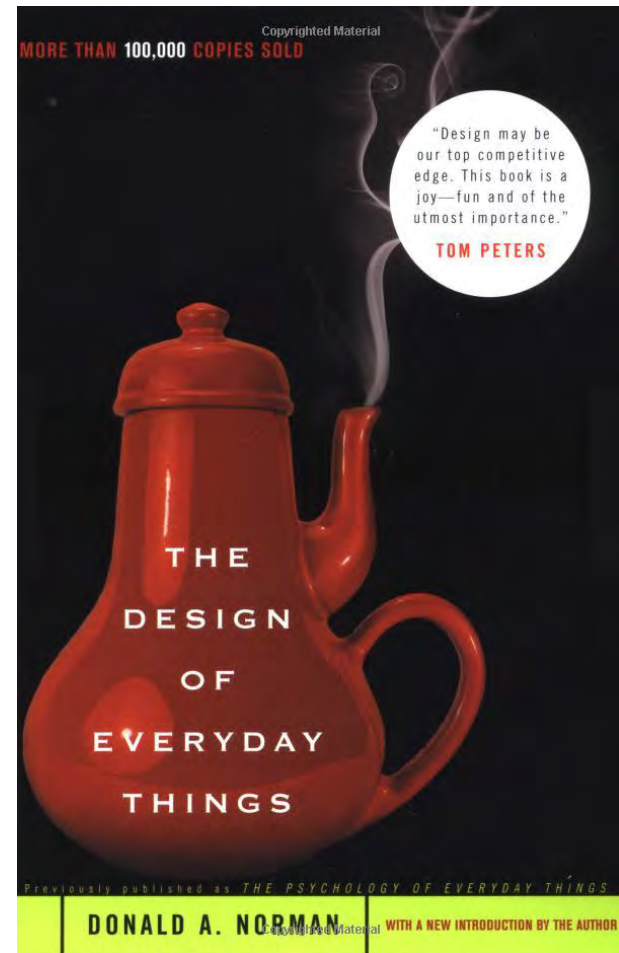
# Iterative Human-Centered Design

This is a course about process

This is not a course about 'good' interfaces or rules that you should follow in design

Rapid iteration and exploration is the most important and effective tool for effective design

# A Whole Lot of Administrivia

Today we have a lot to cover

Course Mechanics and Project Overview

Some Perspectives

Assignment 1:  Project Proposal

Background in Personal Informatics

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# The Price of Progress

# Staying in Touch

Web:                 http://www.cs.washington.edu/440
                     You are responsible for calendar

Email Us:            cse440-instr [at] cs.washington.edu

Email:               You are responsible for course email

Office Hours:        Posted on Calendar
                     Also By Appointment

# GitHub Repository

The website, assignments, and other materials are being run from a GitHub repository

https://github.com/uwcse440/web-cse440-au14

You will contribute when posting your projects

You can and should contribute when you see the opportunity

# Project Overview

The core of this course is a group project

Propose and do an intense end-to-end design

Getting the Right Design

Getting the Design Right

Communicating the Design

Not an implementation course

StoneSoup

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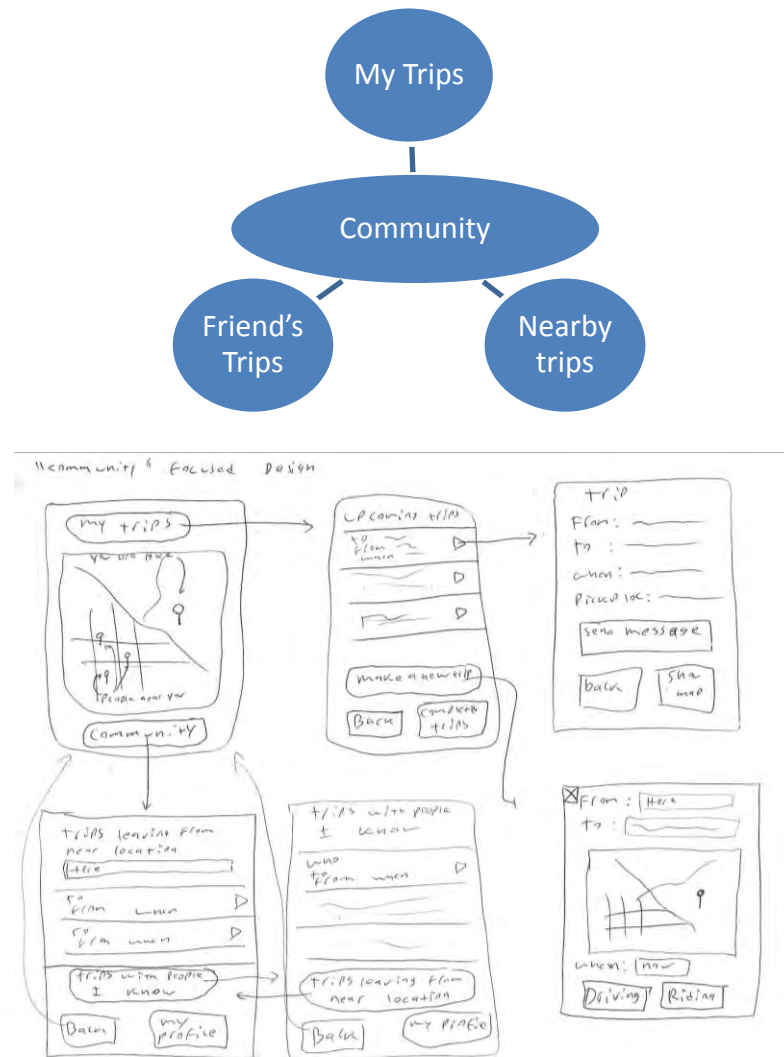# Contextual Inquiry & Task Analysis

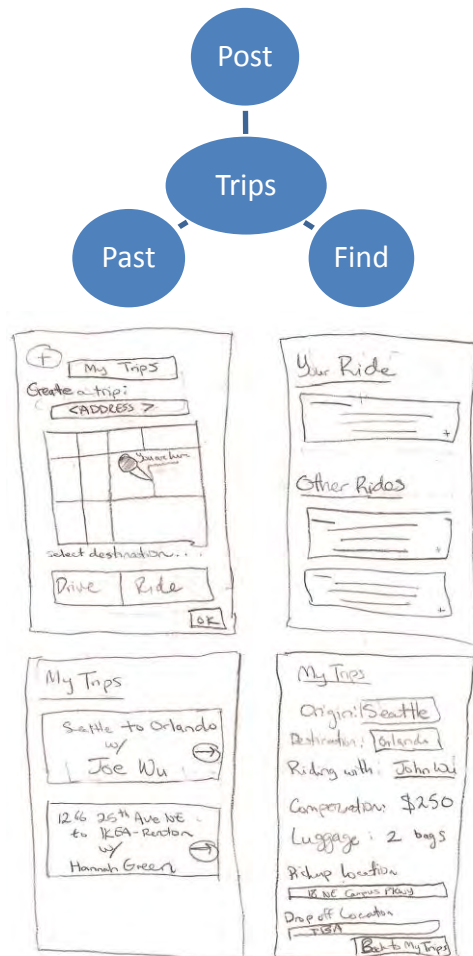## Observe practices and understand needs



Consumester



FoodWatch

# Sketching & Storyboarding

# Sketching & Storyboarding
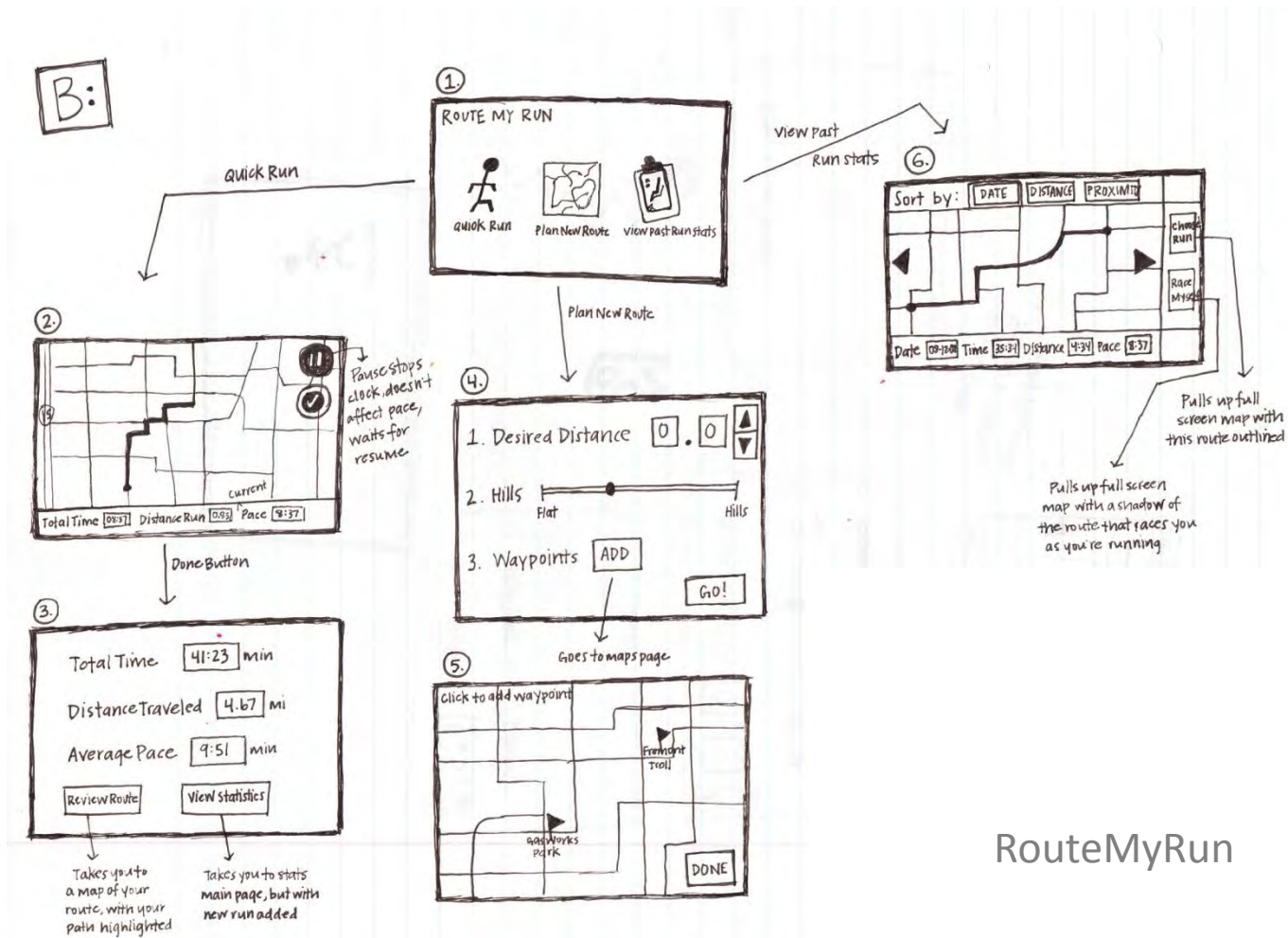


RouteMyRun

# Low-Fidelity Prototyping & Testing





RideAlong

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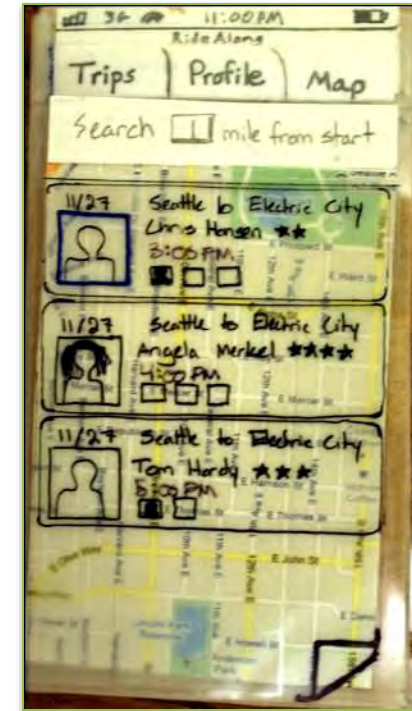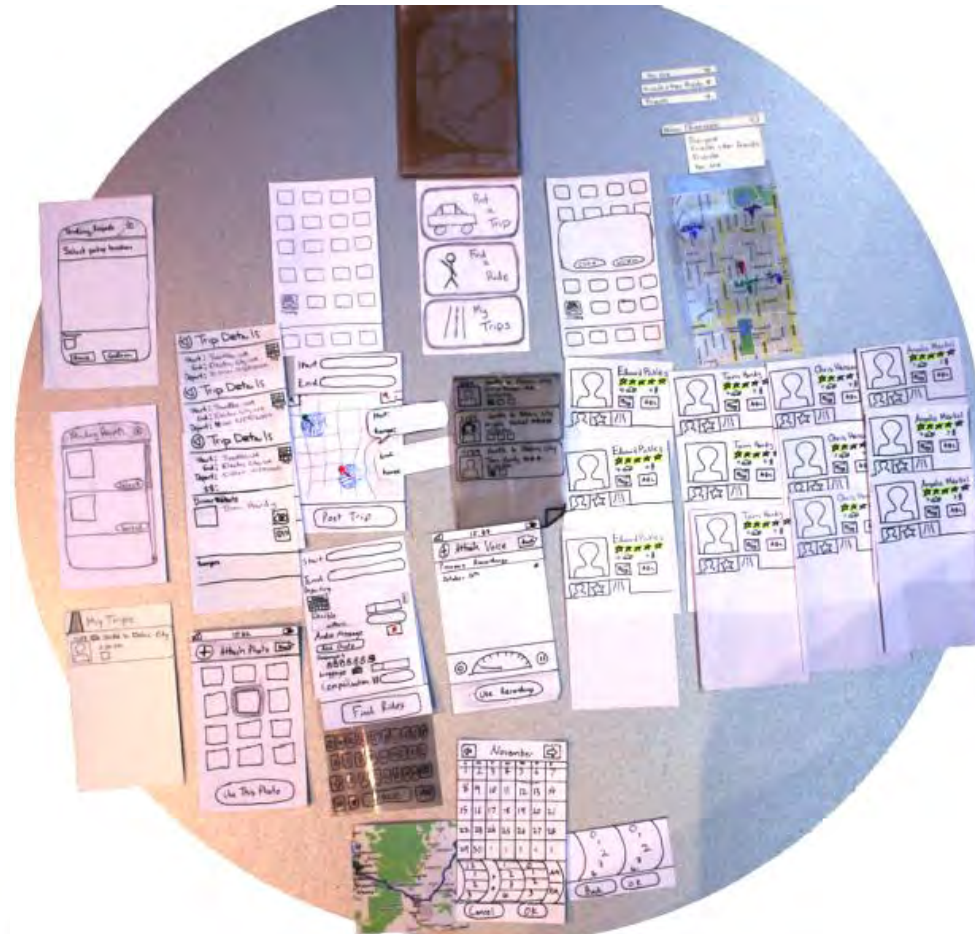
# Digital Mockup



Fitter



.calm

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# Video Prototypes



GetOut



PickUp

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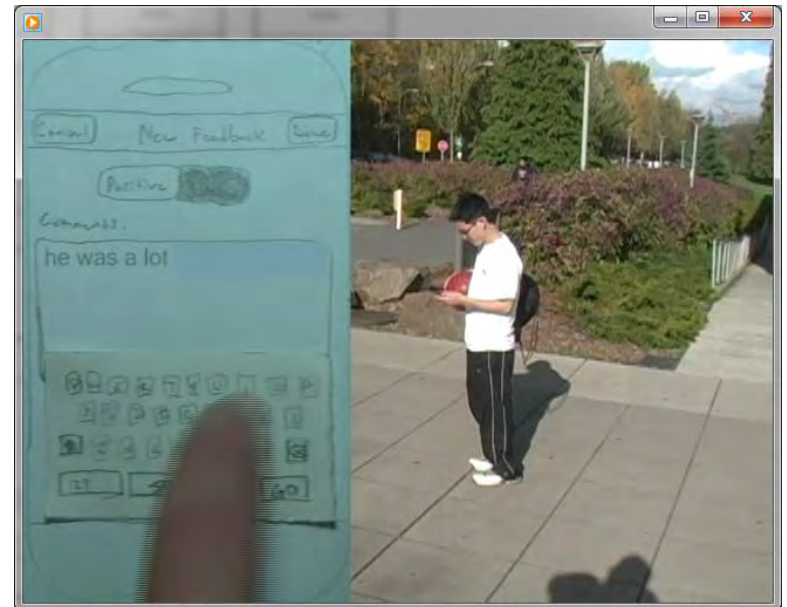
# Learn by Example from Prior Projects

Plantr:

http://courses.cs.washington.edu/courses/cse440/13au/projects/plantr/

NutriView:

http://courses.cs.washington.edu/courses/cse440/13au/projects/nutriview/

JuiceBox:

http://courses.cs.washington.edu/courses/cse440/13au/projects/juicebox/

# Studio Time in Section and Lecture

This course is designed around rapid feedback

Section is primarily studio time with the staff

Groups will be formed within section

Your team will always bring a product to studio

Participation is a critical component of the course

Many in-class exercises scheduled for Tuesdays

Participation is a critical component of the course

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# Grading

Group Project: 65%

Assignment 1: 3%

Assignment 2: Getting the Right Design: 21%

Final Report 15%, Milestones 6%

Assignment 3: Getting the Design Right: 14%

Final Report 10%, Milestones 4%

Assignment 4: Communicating the Design: 15%

Website 5%, Video Prototype 5%, Poster 5%

Presentations: 12%

Exam (25%)

Readings (5%)

Participation (5%)

# Grading

We provide a grading scale, but it is subjective

Design is subjective, and so is this course

Wow us with your work, not with complaining

Entire project process is designed for feedback

Milestone grades mean you did the milestone

You still must act on feedback as part of continuing to refine and develop your project

A focus on "doing the work" and "getting feedback" means final grades are more "quality of result"

# Submissions

Many assignments are due "night before class"

It means "before I wake up", which is often 5:00am

Catalyst operationalizes this as 4:00am

"Day of class", "just before class", or "in class"
are all unacceptable, risking zero credit

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# "Now" vs "When You Need It" Content

This course has both, we will try to distinguish

Several assigned readings will be posted

<span style="color:purple">Intentionally minimal but critical</span>

<span style="color:purple">May be on exam</span>

<span style="color:purple">Small reading report required</span>

Additional resources will be made available

<span style="color:purple">If you find others you want to share, GitHub!</span>

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# A Whole Lot of Administrivia

Today we have a lot to cover

Course Mechanics and Project Overview

Some Perspectives

Assignment 1:  Project Proposal

Background in Personal Informatics

# Some Reflection

This will not be an easy course

Students have said this was their most intense course

You have two deadlines per week, every week

But I believe in everything that is included

This course challenges aspects of what
the CSE curriculum has taught you is important

It will be what you make it

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# People Really Get It



Was this class intellectually stimulating? Did it stretch your thinking? (Yes) No    Why or why not?

I think [crossed out] the first six weeks of this class should be required traing for all PM's at Microsoft. Our software would beneft so much from the material shared in this class.

Was this class intellectually stimulating? Did it stretch your thinking? (Yes) No    Why or why not?

Yes, because it put me outside of my box working on my own by requiring user studies with unknown people

# People Really Get It



Was this class intellectually stimulating? Did it stretch your thinking?     (Yes)   No      Why or why not?

*Yes. Coolest part was forced engagement with non engineers.*

What aspects of this class contributed most to your learning?

*Interacting with users during assignments*

# Sometimes We Forget to be Clear

Was this class intellectually stimulating? Did it stretch your thinking?    Yes    No    Why or why not?

Yes, this class stretch my thinking Sence the ideas of Human-Computer interaction were new to me. But overall I don't feel that I learned a lot at this class. & May Bo, that is a specifics of the subject - there is not too much of "Real" knoledge in it?

What suggestions do you have for improving the class?

I didn't 'get' why we were doing iterative design projects until you told us that it was so that we could improve the designs around us, from then on I got the class.

# But it is not for Everybody



What aspects of this class detracted from your learning?

Finding strangers in malls ? coffee shops was a major hurdle

What suggestions do you have for improving the class?

Don't exclude the two most available sources of people - friends ? university students

# A Whole Lot of Administrivia

Today we have a lot to cover

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Assignment 1:  Project Proposal


Background in Personal Informatics

# Project Proposal Schedule

Project Brainstorm Due Tonight

Brainstorming in Section Tomorrow

Project Proposal Due Monday Night

Sponsored Projects Posted Tuesday

Project Bids Due Wednesday Night

Groups Assigned Thursday

Brainstorming in Section Friday

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# Assignment 1a: Project Brainstorm

You have an assignment due tonight:

http://courses.cs.washington.edu/courses/cse440/14au/assignments/assignment1/

Propose 3 project ideas:

These are starting points for brainstorming

Submit online:

This proves that you did your preparation

Submit via email if unable to access Catalyst

Bring to section tomorrow:

You have a lot more brainstorming ahead of you

# Assignment 1b: Project Proposal

You have an assignment due tonight:

http://courses.cs.washington.edu/courses/cse440/14au/assignments/assignment1/

One page of text:

Problem and Motivation

Analyze the problem or idea (e.g., a scenario)

Submit online:

Sponsored Projects will be Posted for Bidding

# A Whole Lot of Administrivia

Today we have a lot to cover

<span style="color:purple">Course Mechanics and Project Overview</span>

<span style="color:purple">Some Perspectives</span>

<span style="color:purple">Assignment 1:  Project Proposal</span>

Background in Personal Informatics

# Background in Personal Informatics

Some Definitions

What is the Point?

What is the Problem?



Chester, T. (2013). *The Sunday Times.* "You Are Just a Number"

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# What is Personal Informatics

"We define personal informatics systems as those that help people collect personally relevant information for the purpose of self-reflection and gaining self-knowledge. There are two core aspects to every personal informatics system: collection and reflection."

Li I., Dey A., Forlizzi J. *CHI 2010.*
"A Stage-Based Model of Personal Informatics Systems"

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# What is Quantified Self

"The Quantified Self is an international collaboration of users and makers of self-tracking tools."

"Our aim is to help people get meaning out of their personal data."

"Self knowledge through numbers."

Wolf G. (2009). *Wired Magazine.*
"Know Thyself: Tracking Every Facet of Life, from Sleep to Mood to Pain, 24/7/365"

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# What is the Point?



Gnothi seauton

"Know thyself"

# Leonardo da Vinci

Leonardo da Vinci

Odometers on the left

Pedometer on the right

To track troop activities



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# Benjamin Franklin



Temperance
Silence
Order
Resolution
Frugality
Industry
Sincerity
Justice
Moderation
Cleanliness
Tranquility
Chastity
Humility

# Benjamin Franklin



| | S. | M. | T. | W. | T. | F. | S. |
|---|---|---|---|---|---|---|---|
| **TEMPERANCE.** | | | | | | | |
| *EAT NOT TO DULLNESS.* *DRINK NOT TO ELEVATION.* | | | | | | | |
| T. | | | | | | | |
| S. | * | * | | * | | * | |
| O. | * * | * | * | | * | * | * |
| R. | | | * | | | * | |
| F. | | * | | | * | | |
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# Manpokei



万歩計

# Thousands of Health Monitoring Apps



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# Activity and Medical Sensing Devices
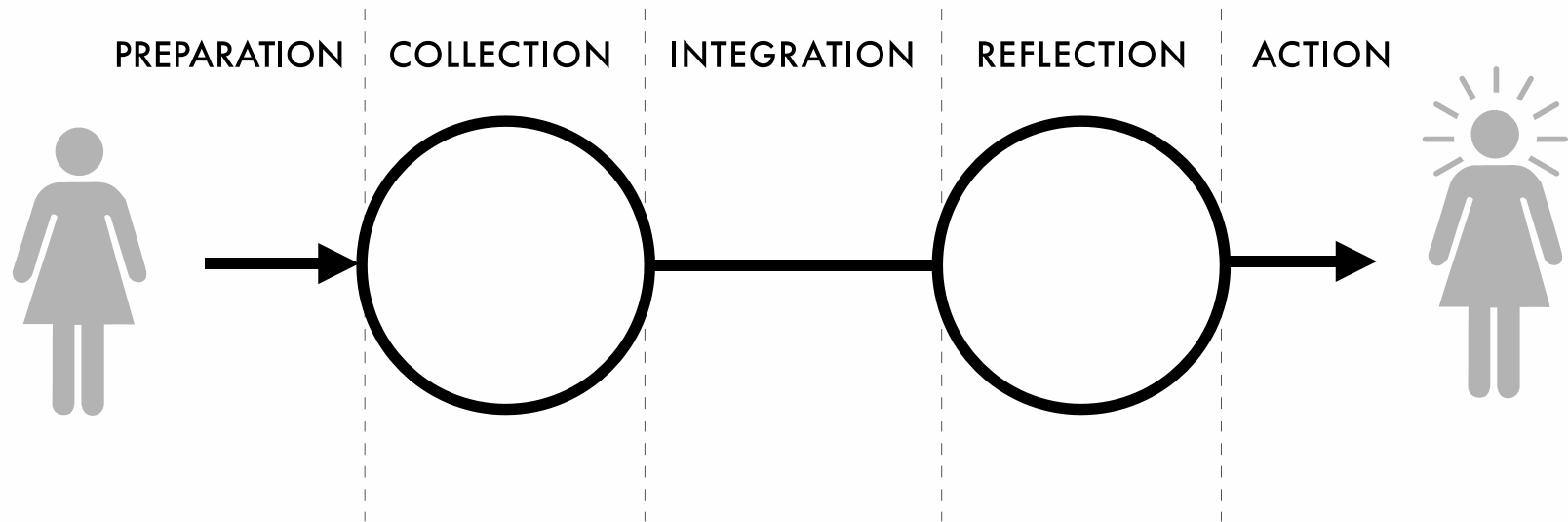




Thermometer

Heart rate monitor

Blood pressure monitor

Blood glucose meter

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# Five-Stage Model of Personal Informatics

PREPARATION | COLLECTION | INTEGRATION | REFLECTION | ACTION

Li I., Dey A., Forlizzi J. *CHI 2010.*
"A Stage-Based Model of Personal Informatics Systems"

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# Five-Stage Model of Personal Informatics

Alice

20 years old

Has a family history of heart disease

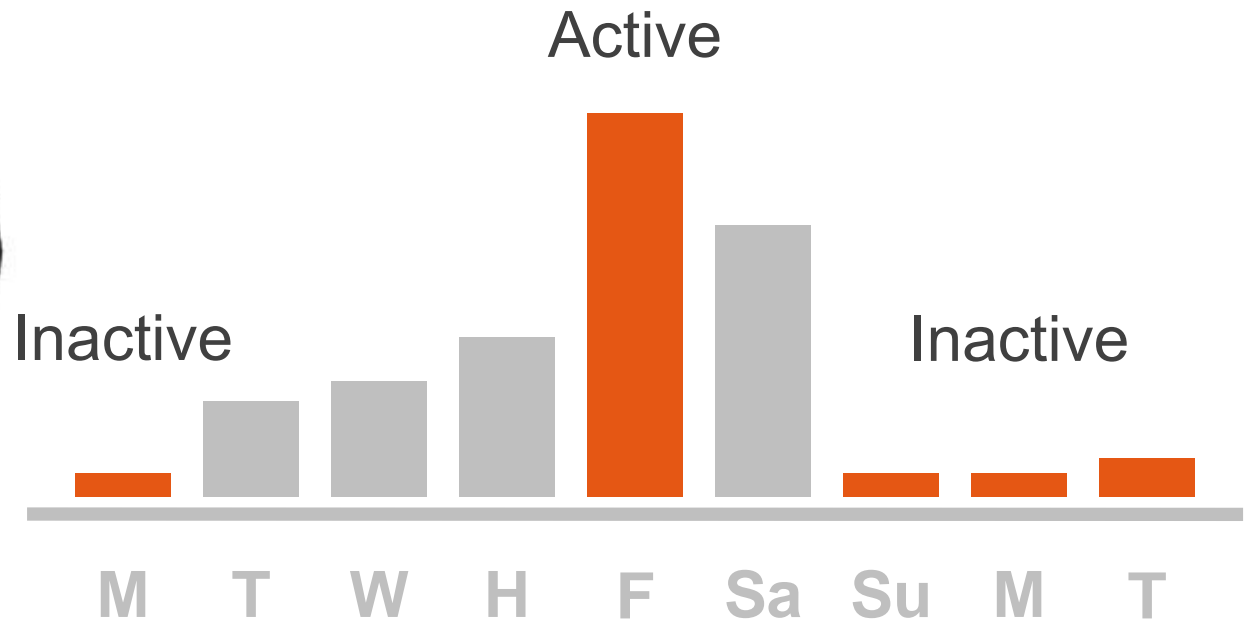Wants to be more active

Does not know how, because she is busy

Li I., Dey A., Forlizzi J. *CHI 2010.*
"A Stage-Based Model of Personal Informatics Systems"

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# Preparation

Li I., Dey A., Forlizzi J. *CHI 2010*.
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# Preparation



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# Collection

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# Integration



**M   T   W   H   F   Sa   Su   M   T**

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"A Stage-Based Model of Personal Informatics Systems"

# Reflection



Active

Inactive

Inactive

M  T  W  H  F  Sa  Su  M  T

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"A Stage-Based Model of Personal Informatics Systems"

# Action

Walk in park instead of watching TV

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# Five-Stage Model of Personal Informatics



PREPARATION | COLLECTION | INTEGRATION | REFLECTION | ACTION

Li I., Dey A., Forlizzi J. *CHI 2010*.
"A Stage-Based Model of Personal Informatics Systems"

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# What is the Problem?

Examining serious
self-trackers, as
they represent the
early adopters



Choe E.K., Lee N.B., Lee B., Pratt W., Kientz J.A. CHI 2014.
"Understanding Quantified Selfers' Practices in Collecting and Exploring Personal Data"

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# Quantified Self Talk Format



1. What I did

2. How I did it

3. What I learned

Analyzed 52 videos

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"Understanding Quantified Selfers' Practices in Collecting and Exploring Personal Data"
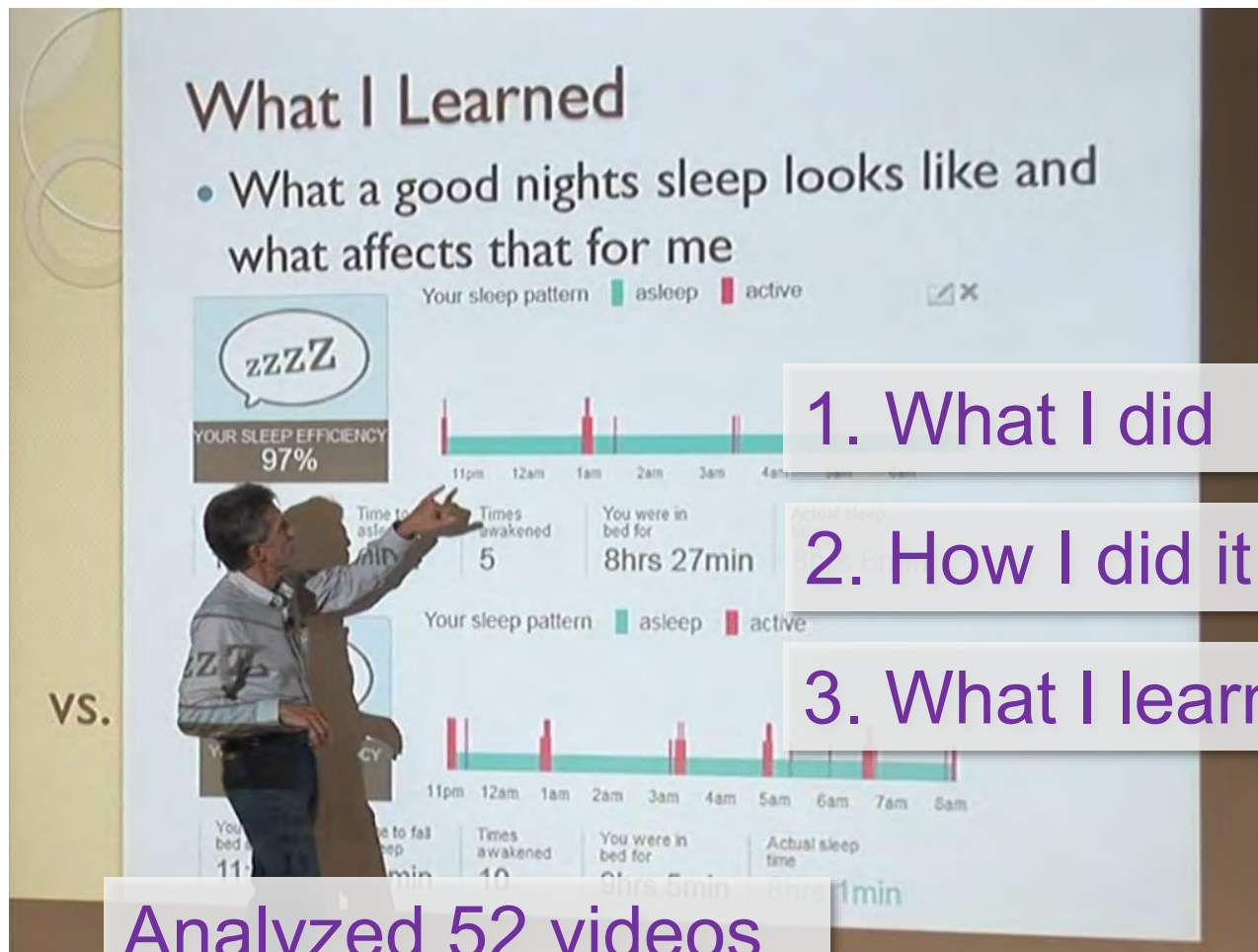
# Questions about the Quantified Self



Profile

Motivation
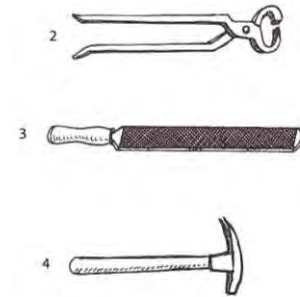
Tools
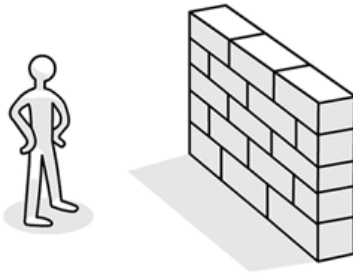
Challenges

Workarounds

Visualizations

Weight – Lost 6 lbs

213 lbs
Thu, Dec 1

207 lbs
Sun Jan 1

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# Analysis



Themes

Profiles

Visualizations

Choe E.K., Lee N.B., Lee B., Pratt W., Kientz J.A. CHI 2014. "Understanding Quantified Selfers' Practices in Collecting and Exploring Personal Data"

# What do they track?



Top 5 items: activity, food, weight, sleep, and mood

Number of People Who Tracked an Item

What people track

Other items: cognitive performance, blood glucose, location, heart rate, knowledge, stress, body fat, productivity, snoring, movies, posture, medicine, skin condition, home energy usage, clothes, and public transit usage

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# Movies Seen in Theatres Since 2001



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# Clothing Log

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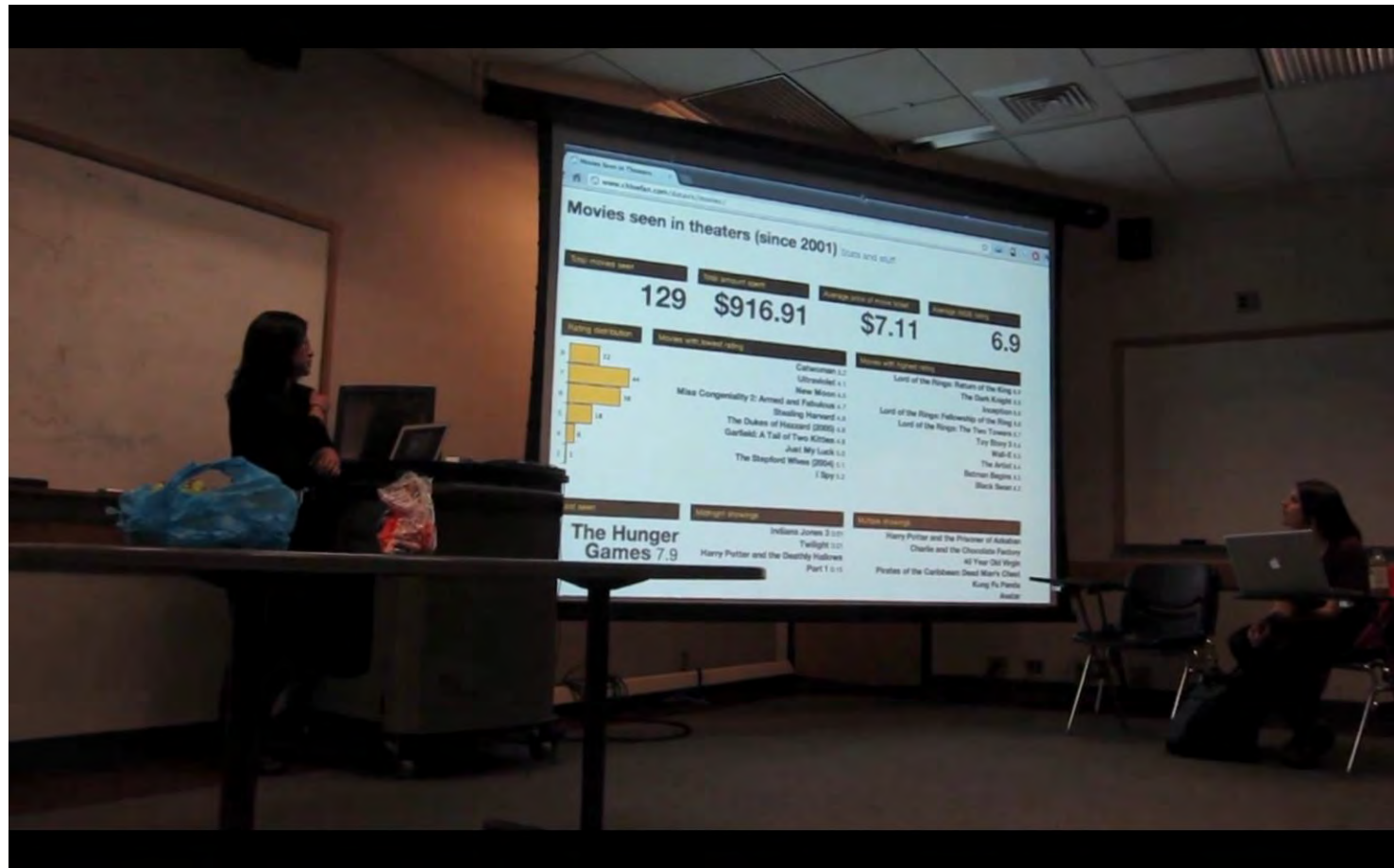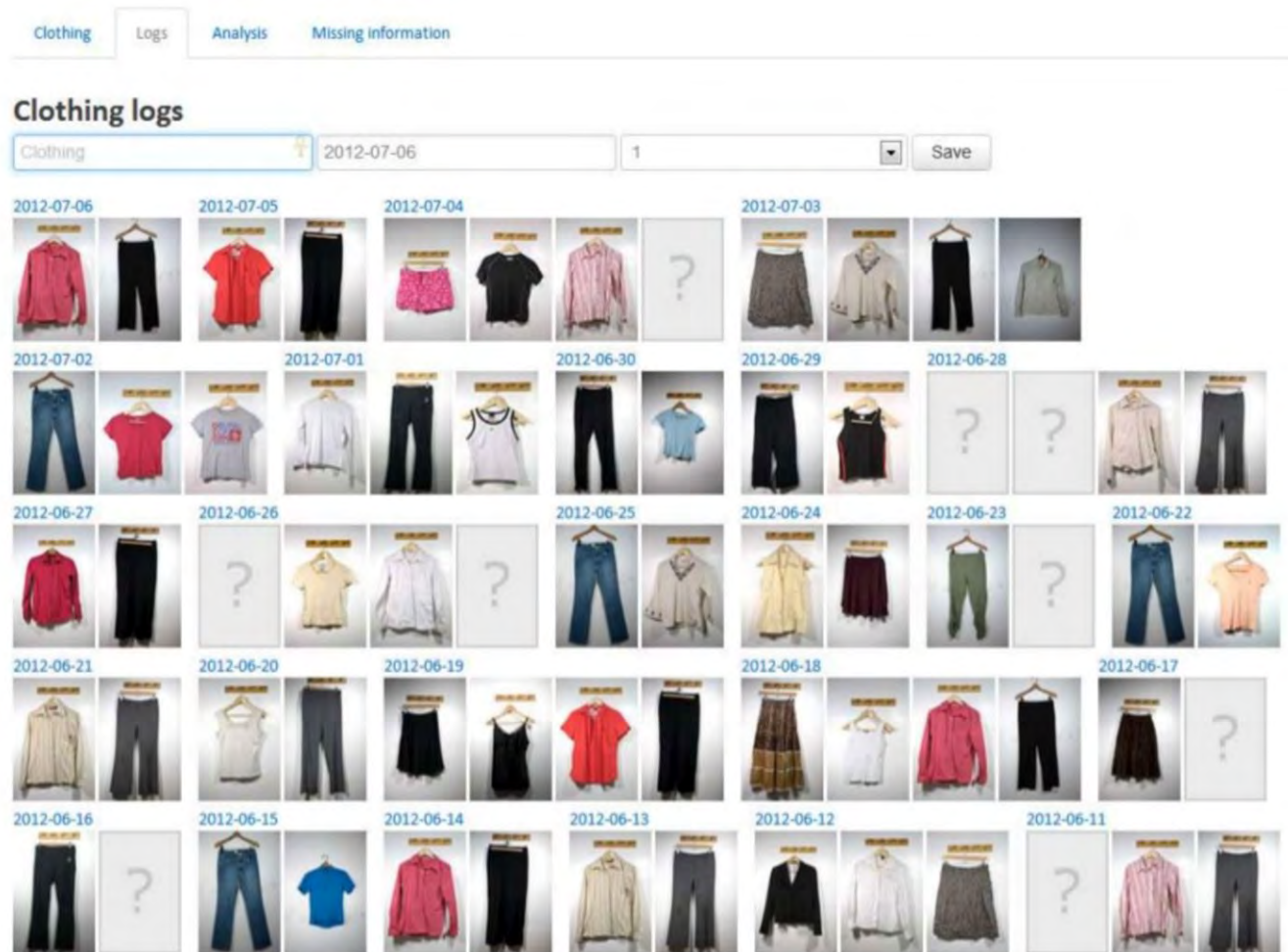
# What do they Track?

A Diabetic Experience with Self-Quantification

Analyzing My Cancer Data

Going Vegan in December

Improving Skin Health

Cognitive Performance

15 Weeks of Self-Tracking

Diabetes, Exercise, and QS

Experience Sampling of My Stress

Hacking Your Subconscious Mind

Self-tracking is more than just buying a FitBit

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# Motivations for Tracking

| Motivations | Sub-categories |
|---|---|
| To improve health | To cure or manage a condition |
| | To achieve a goal |
| | To find triggers |
| | To answer a specific question |
| | To identify relationships |
| | To execute a treatment plan |
| | To make better health decisions |
| | To find balance |
| To improve other aspects of life | To maximize work performance |
| | To be mindful |
| To find new life experiences | To satisfy curiosity and have fun |
| | To explore new things |
| | To learn something interesting |

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# Data Collection and Exploration Tools

| Data Collection Tool | % (#) |
|---|---|
| Commercial hardware | 56% (29) |
| Spreadsheet | 40% (21) |
| Custom software | 21% (11) |
| Pen and paper | 21% (11) |
| Commercial software | 19% (10) |
| Commercial website | 10% (5) |
| Camera | 6% (3) |
| Open-source platform | 6% (3) |
| Custom hardware | 4% (2) |
| Other | 10% (5) |

| Data Exploration Tool | % (#) |
|---|---|
| Spreadsheet | 44% (23) |
| Custom software | 35% (18) |
| Commercial website | 27% (14) |
| Commercial software | 12% (6) |
| Open-source platform | 8% (4) |
| Statistical software | 4% (2) |
| Pen and paper | 2% (1) |

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# Building Custom Tools
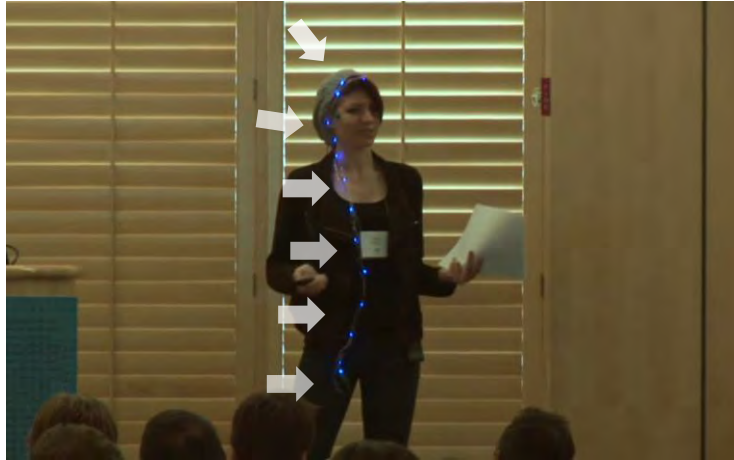


Captures smile via wearable sensing
Provides real-time feedback



Captures snoring via mobile app
Provides data visualization

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# Custom Visualizations

Choe E.K., Lee N.B., Lee B., Pratt W., Kientz J.A. CHI 2014.
"Understanding Quantified Selfers' Practices in Collecting and Exploring Personal Data"

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# Custom Visualizations



Choe E.K., Lee N.B., Lee B., Pratt W., Kientz J.A. CHI 2014.
"Understanding Quantified Selfers' Practices in Collecting and Exploring Personal Data"

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# Why are they Building Custom Tools?

Desirable features are not supported

Collect and reflect on the data using a single tool

Perform self-experimentation

Barriers to success

Tracking too many things

Not tracking triggers and context

Lacking scientific rigor

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# Tracking Too Many Things

"I can honestly say that I've made the classic newbie self-tracking mistake which is that I track everything. I didn't know exactly what to track, so I tracked caffeine, dairy, wheat, sugar, nuts, fruit, vegetables, meat, chicken, fish, alcohol supplements…"

People burn out on self-tracking

Choe E.K., Lee N.B., Lee B., Pratt W., Kientz J.A. CHI 2014. "Understanding Quantified Selfers' Practices in Collecting and Exploring Personal Data"

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# Not Tracking Triggers and Context
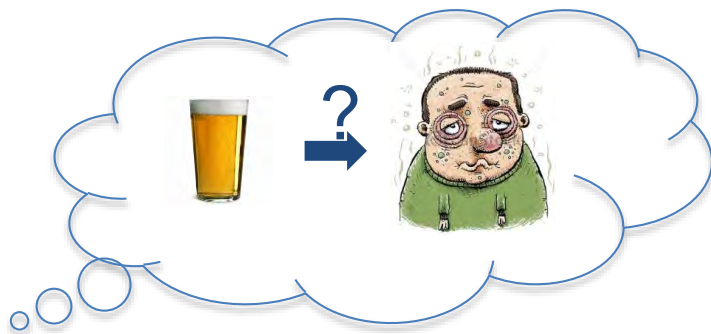
"I was trying to track all these symptoms and I was completely ignoring the cause…"

People lack clues on what to track

Miss information on how to improve outcome

They track the wrong information

Choe E.K., Lee N.B., Lee B., Pratt W., Kientz J.A. CHI 2014.
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# Lacking Scientific Rigor

Conduct self-experimentations without control or without addressing confounding factors



And they conduct flawed experiments

Choe E.K., Lee N.B., Lee B., Pratt W., Kientz J.A. CHI 2014.
"Understanding Quantified Selfers' Practices in Collecting and Exploring Personal Data"

University of Washington

# Your Challenge

People invest tremendous effort for little value

Do better, help people achieve their goals

These are smart people, these are hard problems

Think big about the opportunities

Get past the technology fetish

Understand the problems people face

Find the role for interactive technology

dub

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# Some Reflection

We have high expectations

We want you to do cool stuff

But we are also enthusiastic and we listen

Email us, point out opportunities, ask questions

If you are not onboard, please drop now

Please email us so that we know a spot opened

cse440-instr [at] cs.washington.edu

University of
Washington

# CSE 440: Introduction to HCI

## User Interface Design, Prototyping, and Evaluation

Lecture 01:
Introduction and
Personal Informatics

James Fogarty
Daniel Epstein
Brad Jacobson
King Xia

Tuesday/Thursday
10:30 to 11:50
MOR 234

design:
use:
build:

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