

# 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

# Two Forms Going Around

## Overload request

We are targeting exactly 48 students

Will attempt to finalize decisions today

Consider attending a section tomorrow

Ask your friends to drop immediately

## Section switch availability

To get to 48, we may need to move people

# 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

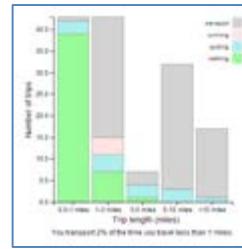
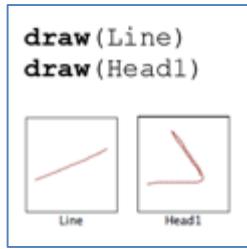
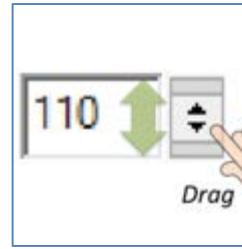
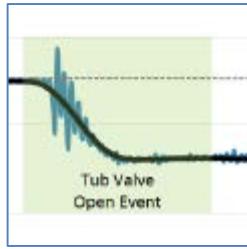
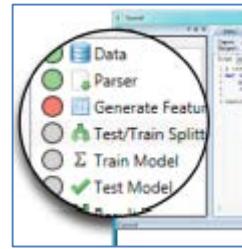
CSE 441: Advanced HCI

CSE 510: Advanced Topics in HCI

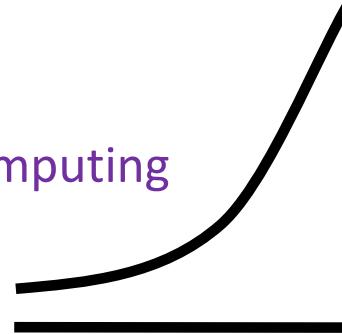
CSEP 510: Human-Computer Interaction



# 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

# Who We Are

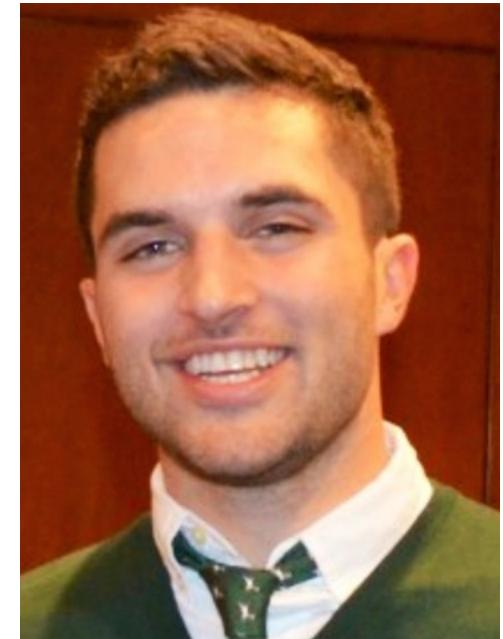
Brad Jacobson

BA, Psychology

Dartmouth College, 2013

MS, University of Washington

HCDE, 2013 – 2014

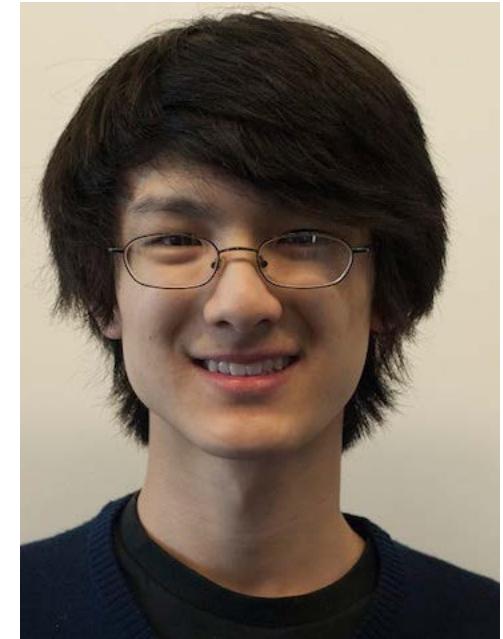


Interests: user research,  
“pop-psych” books, soccer, skiing,  
and plenty of tv shows and movies

# Who We Are

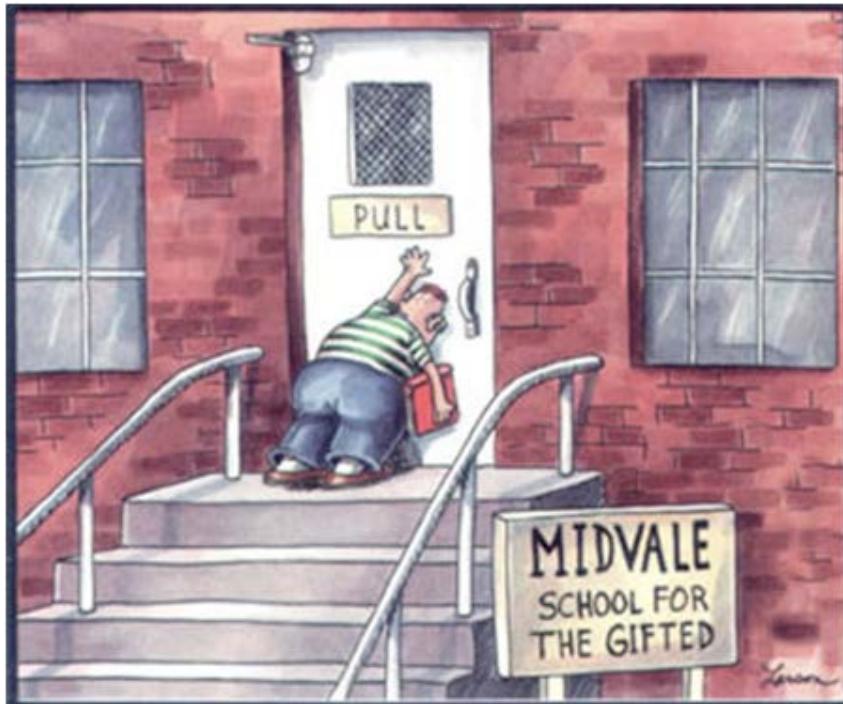
King Xia

University of Washington, 2015  
Computer Science & Business



Interests: The Kingkiller Chronicles,  
learning new languages,  
LoL, cooking, debate

# What Is This Course?



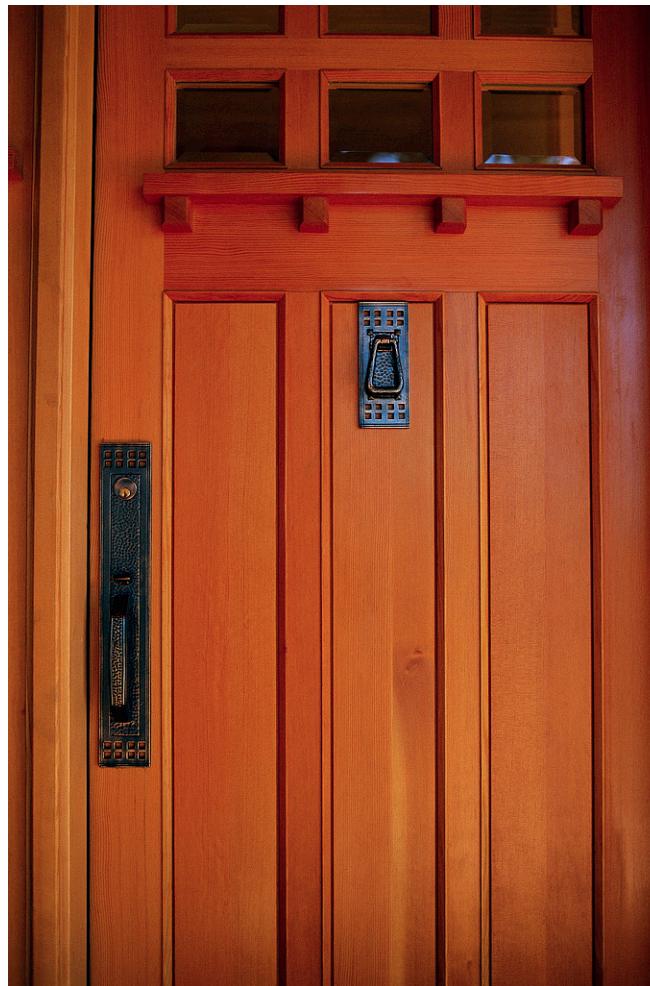
Time for a Door Quiz:

Say out loud what action  
you use to open the door

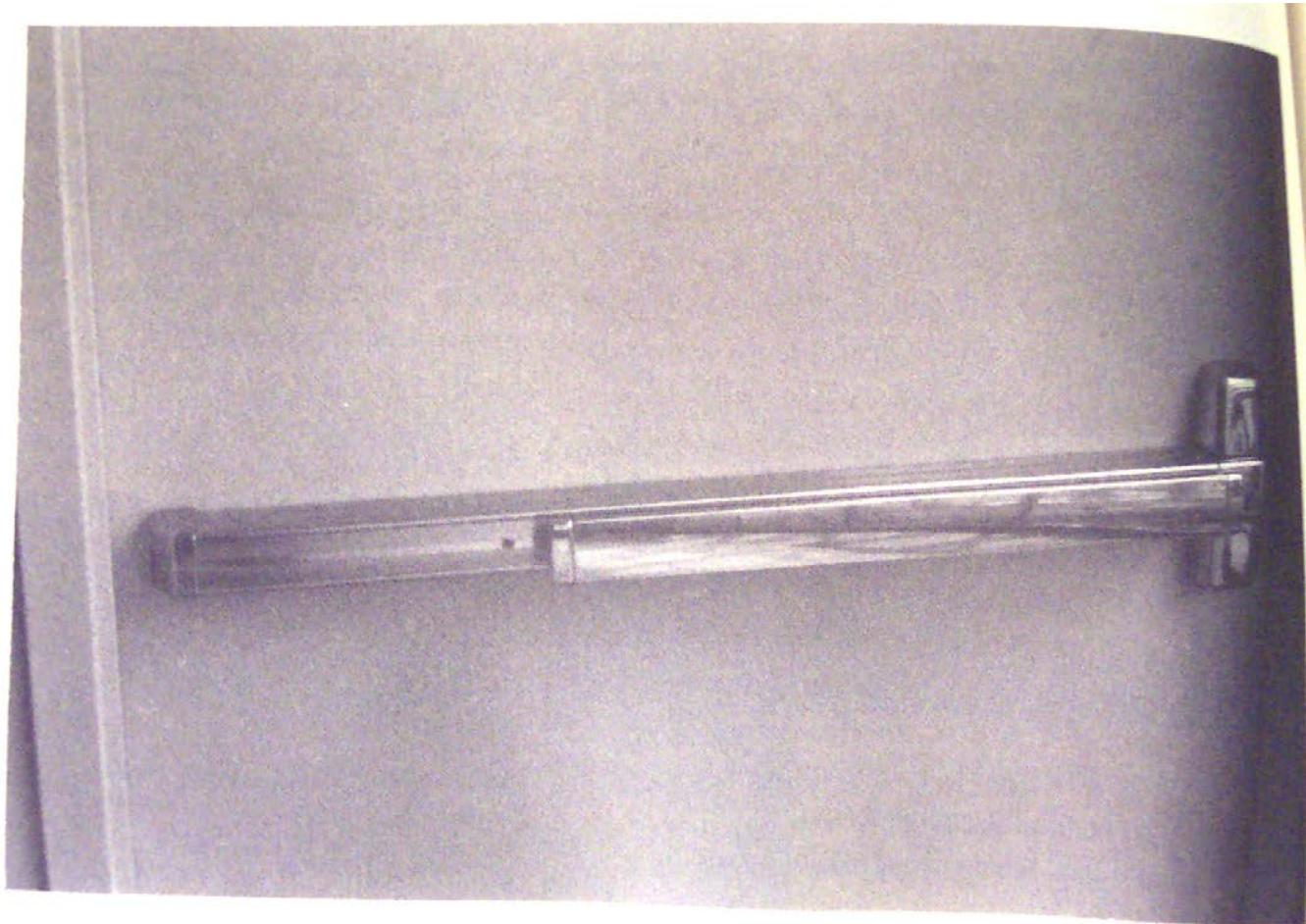
Push

Pull

# Door Quiz



# Door Quiz



# Door Quiz



# Door Quiz



# Door Quiz



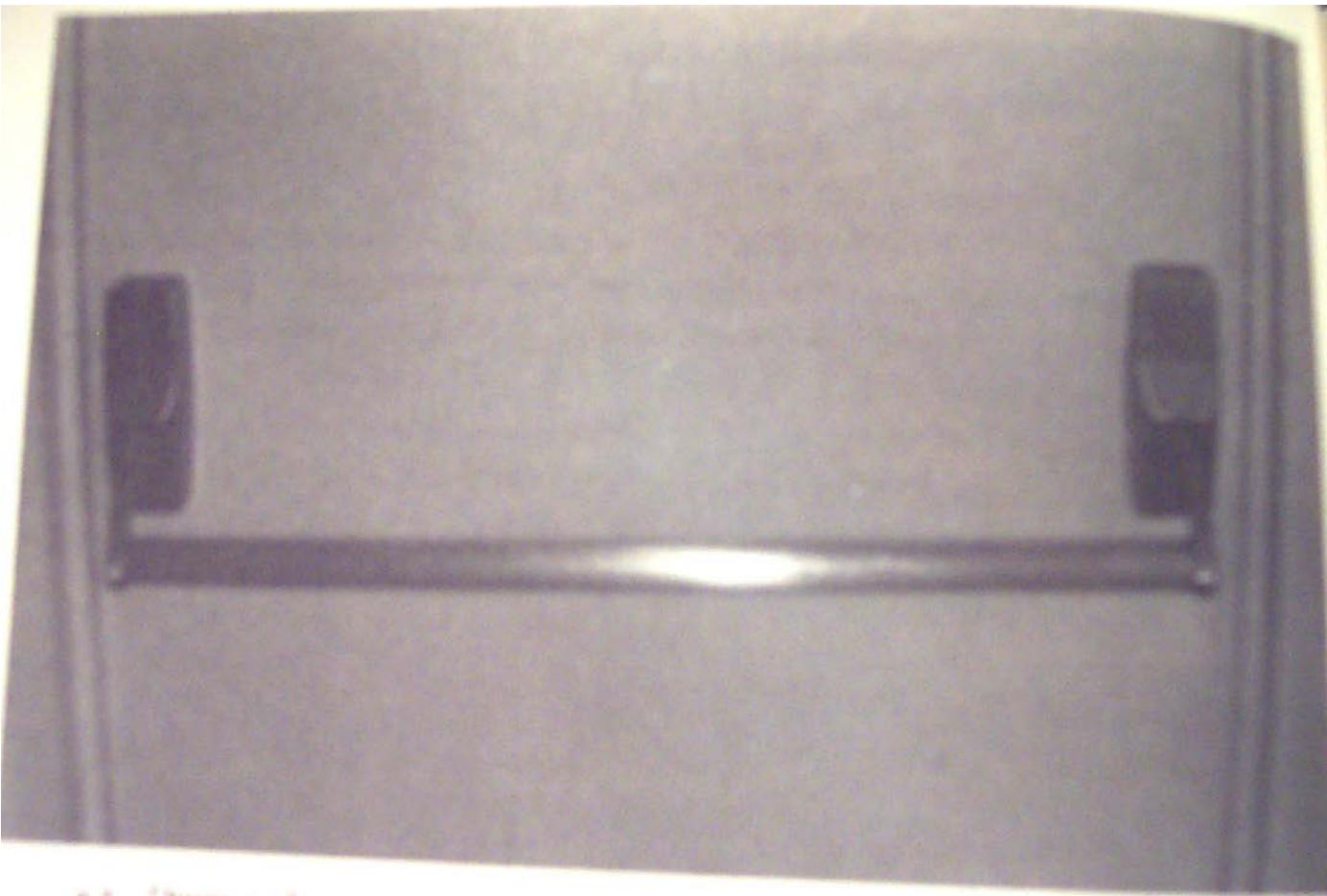
# Door Quiz



# Door Quiz



# Door Quiz



# Door Quiz



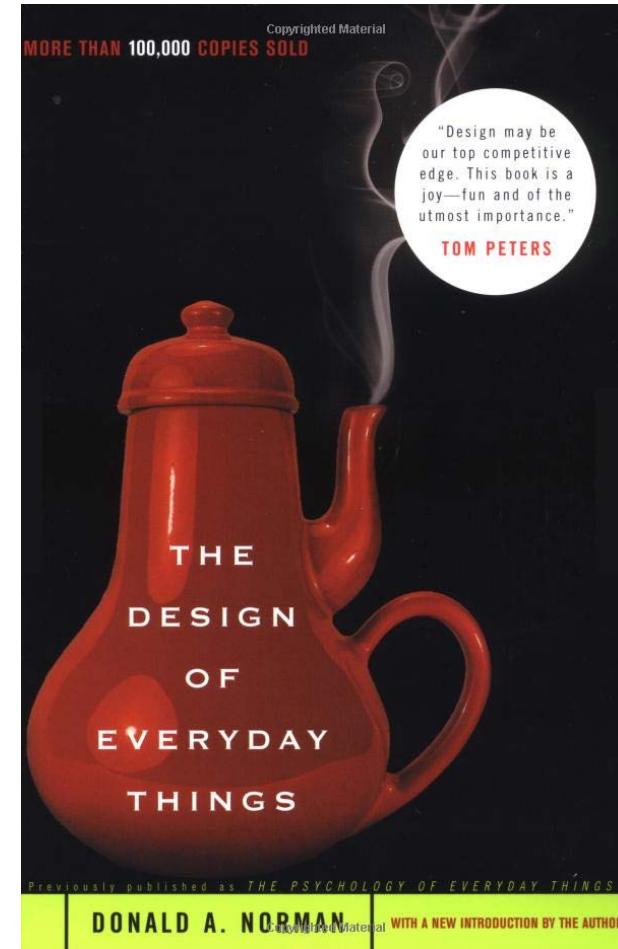
# What is so Special about Computers?

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



# What is so Special about Computers?

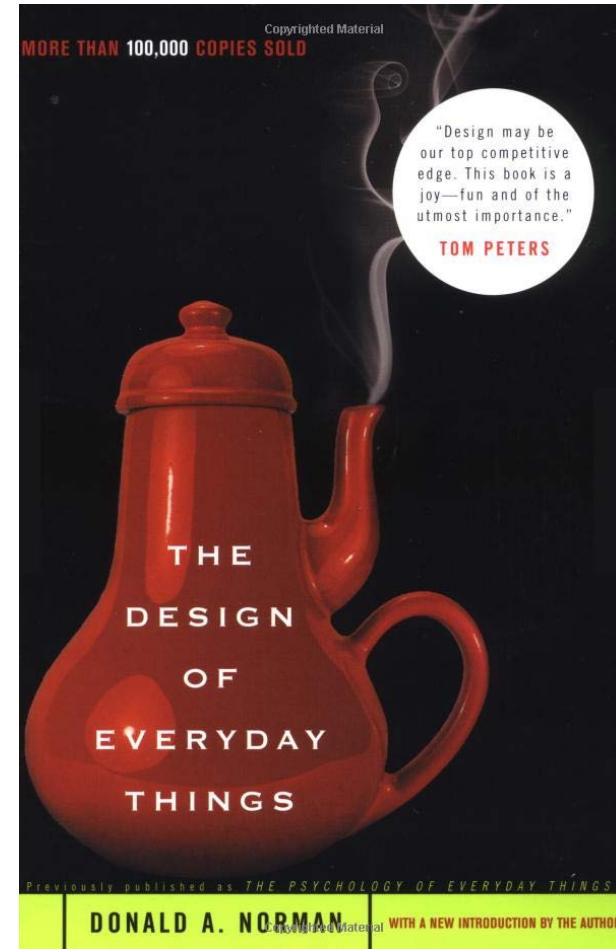
Yet we blame ourselves

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



# 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

# 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

# Contextual Inquiry & Task Analysis

Observe practices and understand needs



Consumester

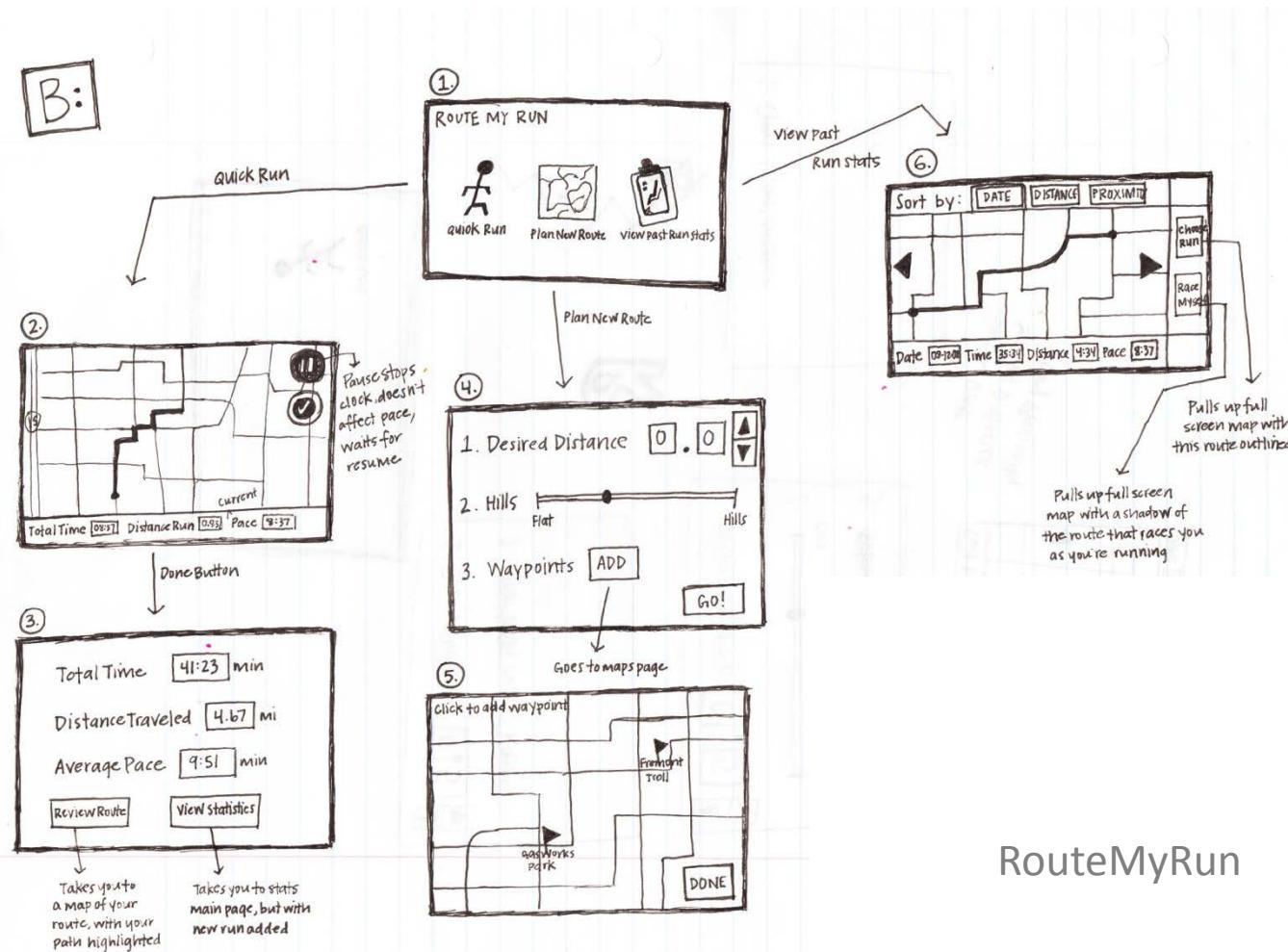


FoodWatch

# Sketching & Storyboarding

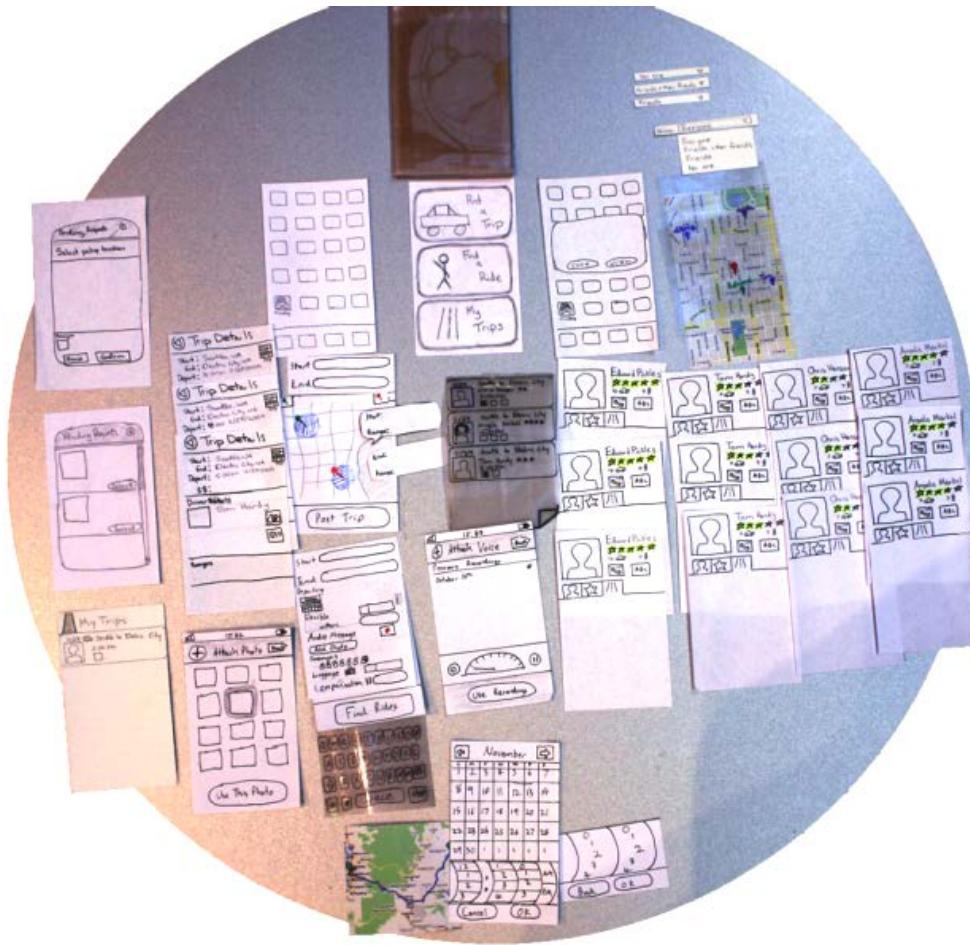


# Sketching & Storyboarding



RouteMyRun

# Low-Fidelity Prototyping & Testing



RideAlong

# Digital Mockup



Fitter

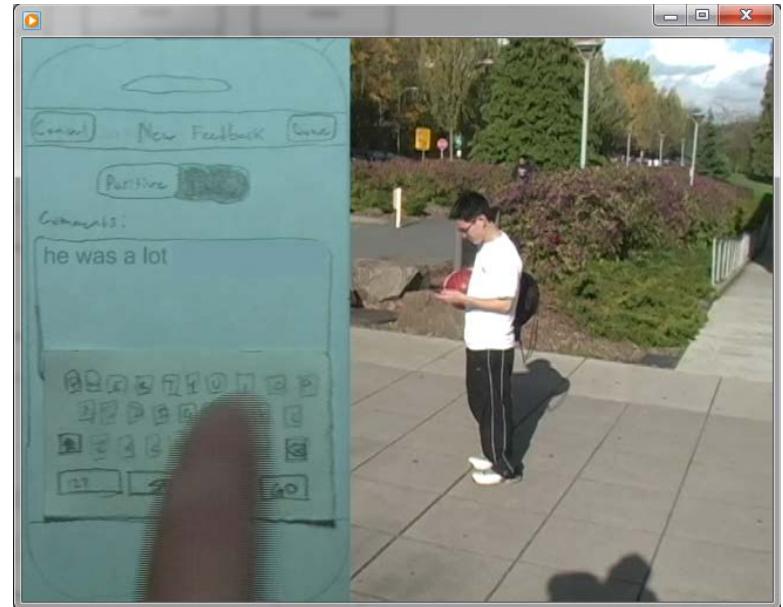


.calm

# Video Prototypes



GetOut



PickUp

# 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

# 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

# “Now” vs “When You Need It” Content

This course has both, we will try to distinguish

Several assigned readings will be posted

- Intentionally minimal but critical

- May be on exam

- Small reading report required

Additional resources will be made available

- If you find others you want to share, GitHub!

# A Whole Lot of Administrivia

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# 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

# People Really Get It

Was this class intellectually stimulating? Did it stretch your thinking?

Yes

No

Why or why not?

I think ~~that~~ the first six weeks of this class should be required training for all PM's at Microsoft. Our software would benefit 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. Coolst part was forced engagement with non engineer.

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 since the ideas of human-computer interaction were new to me. But overall I don't feel that I learned a lot at this class. It may be, that is a specifics of the ~~subject~~ subject - there is not too much of "real" knowledge 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

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# 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

# 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

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

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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”

# 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**.”

# 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.”

# 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



# Benjamin Franklin



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

# Benjamin Franklin



TEMPERANCE.								
EAT NOT TO DULLNESS. DRINK NOT TO ELEVATION.								
T.	S.	M.	T.	W.	T.	F.	S.	
T.								
S.	*	*		*		*		
O.	**	*	*		*	*	*	*
R.			*				*	
F.		*			*			
I.			*					
S.								
J.								
M.								
C.								
T.								
C.								
H.								

# Manpokei



万歩計

# Thousands of Health Monitoring Apps



# Activity and Medical Sensing Devices



Thermometer



Blood glucose meter

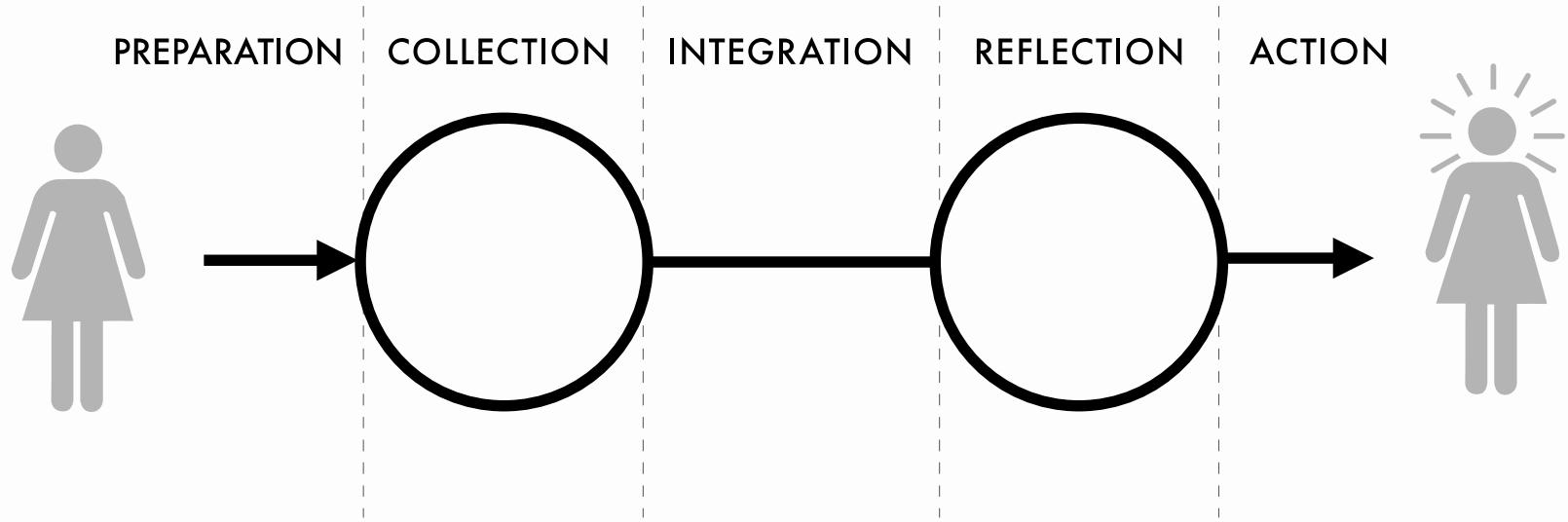


Blood pressure monitor



Heart rate monitor

# Five-Stage Model of Personal Informatics



# 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

# Preparation



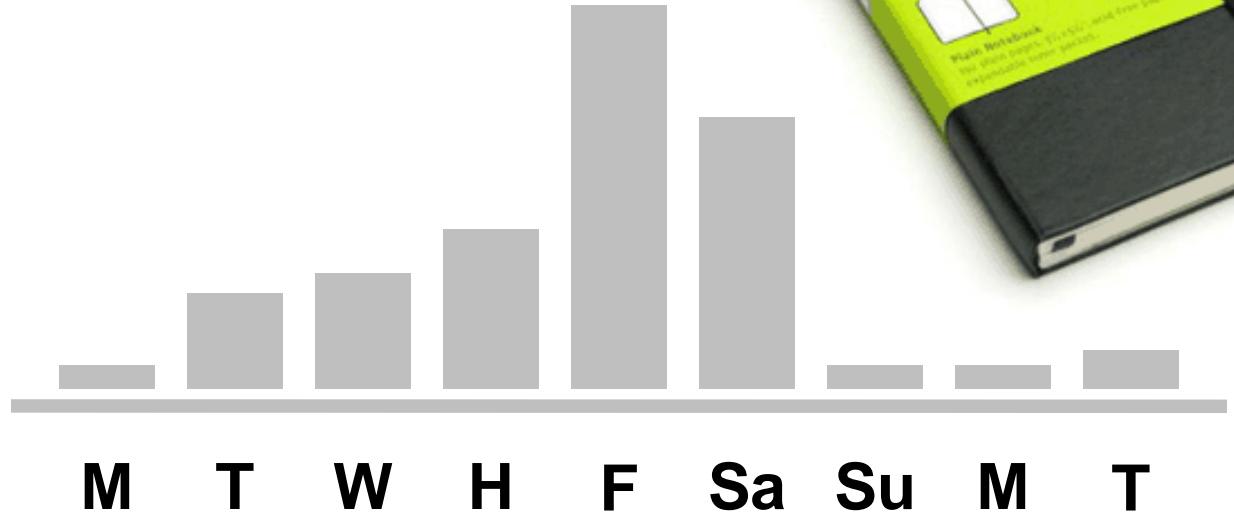
# Preparation



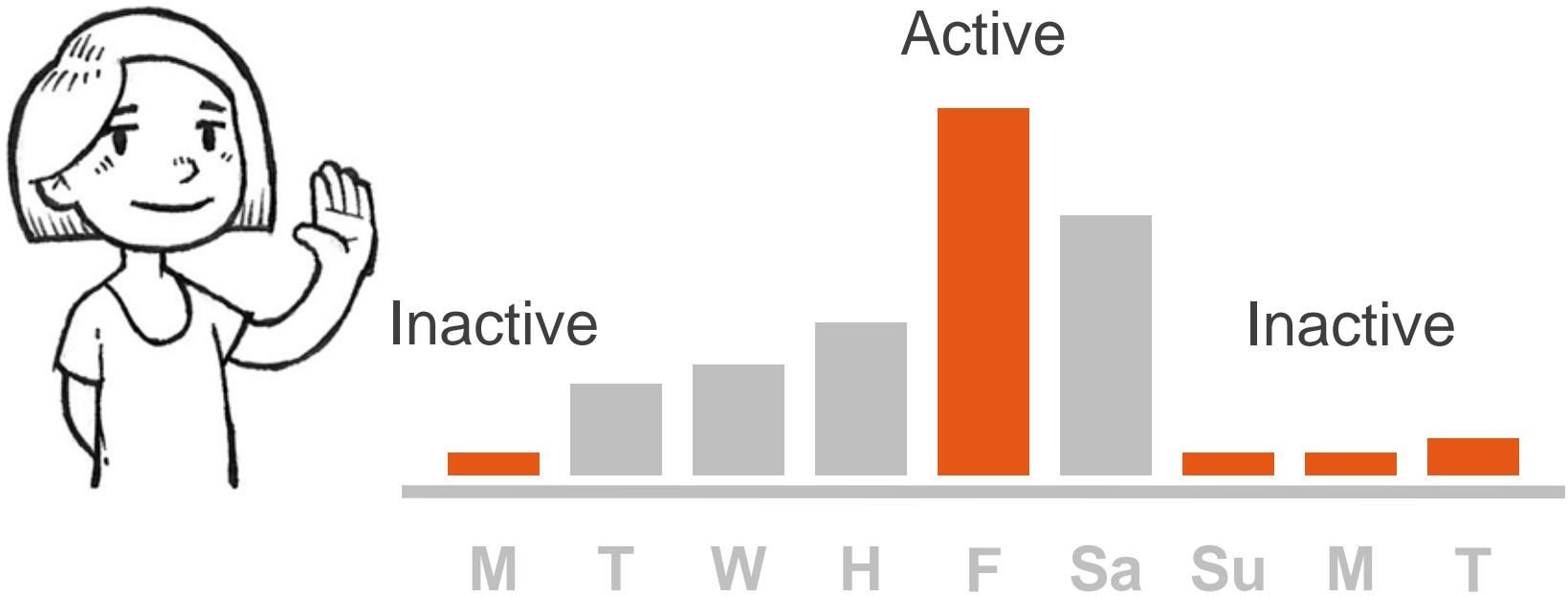
# Collection



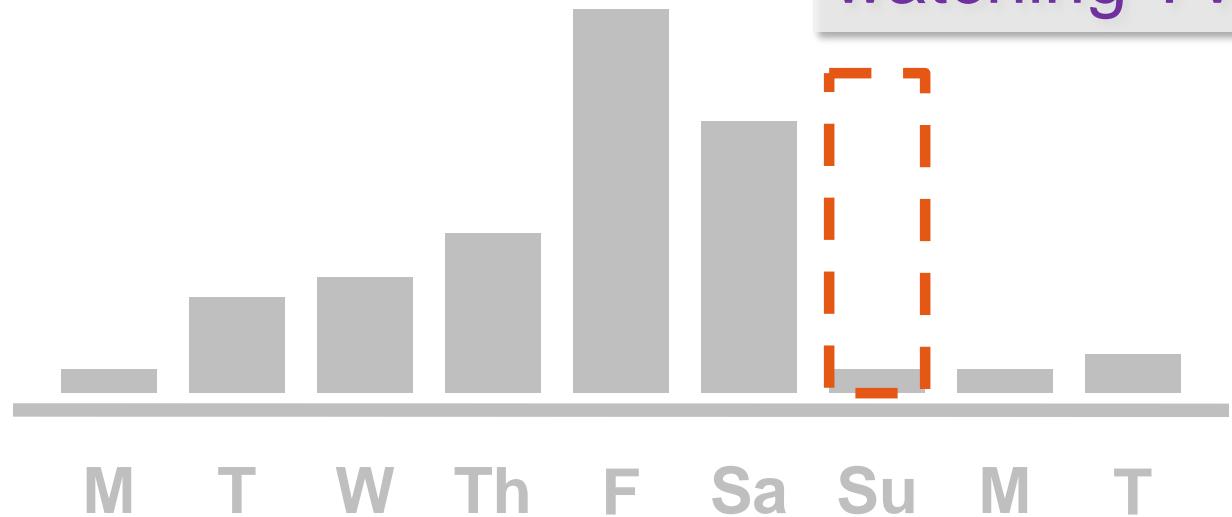
# Integration



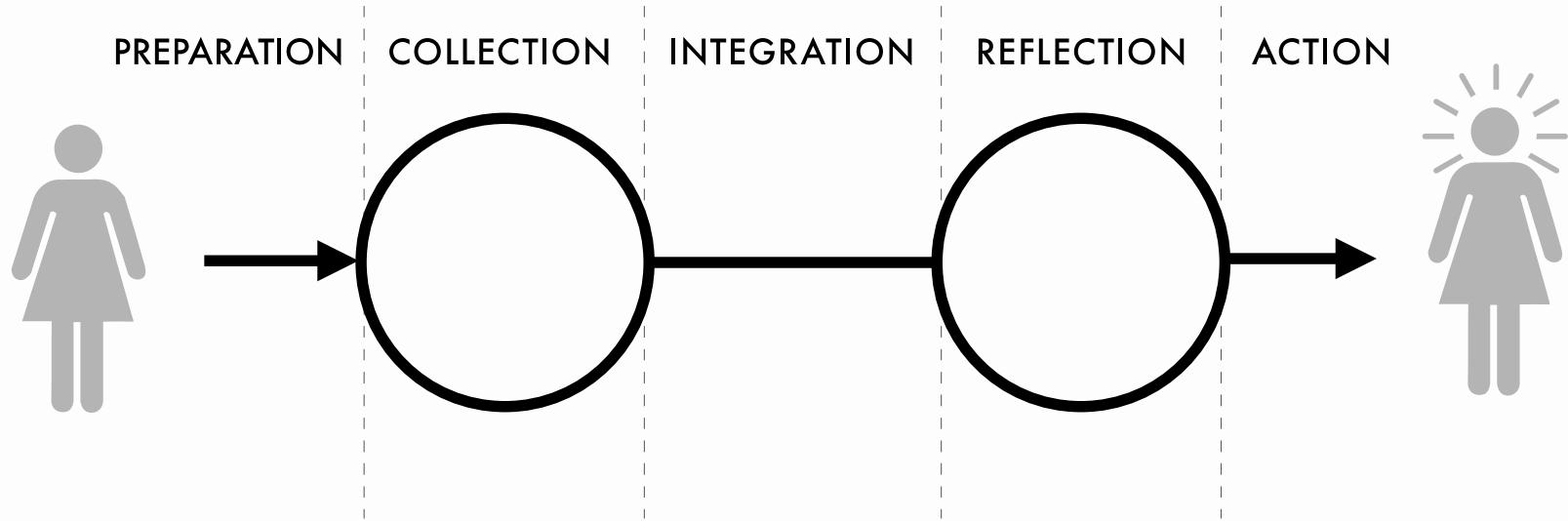
# Reflection



# Action



# Five-Stage Model of Personal Informatics



# What is the Problem?

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

The screenshot shows the Quantified Self website. At the top, there's a large 'QS' logo and the text 'Quantified Self' with the tagline 'self knowledge through numbers'. Below the header are links for 'ABOUT', 'VIDEOS', and 'FORUMS', along with social media icons for Twitter, Facebook, LinkedIn, and Google+. A search bar is also present.

The main content area features a video thumbnail for 'Mark Moschel on Tracking and Dunking', posted on January 30, 2014, by Ernesto Ramirez. The video description notes that Mark Moschel has been a basketball fan since childhood and discusses his self-tracking journey. Below the video is a play button and a Vimeo logo.

At the bottom of the main content, there are sharing options for Twitter, Facebook, Google+, Tumblr, LinkedIn, and Email. A caption below the video reads: 'Posted in Videos | Tagged basketball, dunking, gstop, strength | Leave a comment'.

To the right of the main content, there's a sidebar for the 'Quantified Self Europe Conference' featuring a night view of a modern building complex by a canal, with the text 'May 10-11, 2014 • Amsterdam'. Below that is a section for 'Make a Sparktweet' with a blue bar graphic. The sidebar also lists 'QS Meetup Groups' with links to various cities: Canada (Toronto, Vancouver), USA - WEST (Montreal, Bay Area, QSX - SF, Silicon Valley, San Diego), and USA - EAST (Ottawa, London, Ontario).

# Quantified Self Talk Format

vs.

**What I Learned**

- What a good nights sleep looks like and what affects that for me

Your sleep pattern asleep active  X

**zzzz**

**YOUR SLEEP EFFICIENCY 97%**

11pm 12am 1am 2am 3am 4am

Time to fall asleep: 11min Times awakened: 5 You were in bed for: 8hrs 27min

Actual sleep time: 8hrs 1min

Your sleep pattern asleep active

**zzz**

11pm 12am 1am 2am 3am 4am 5am 6am 7am 8am

Time to fall asleep: 11min Times awakened: 10 You were in bed for: 8hrs 5min Actual sleep time: 8hrs 1min

**1. What I did**

**2. How I did it**

**3. What I learned**

Analyzed 52 videos

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”

# Questions about the Quantified Self



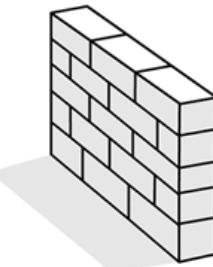
Profile



Motivation



Tools



Challenges



Workarounds



Visualizations

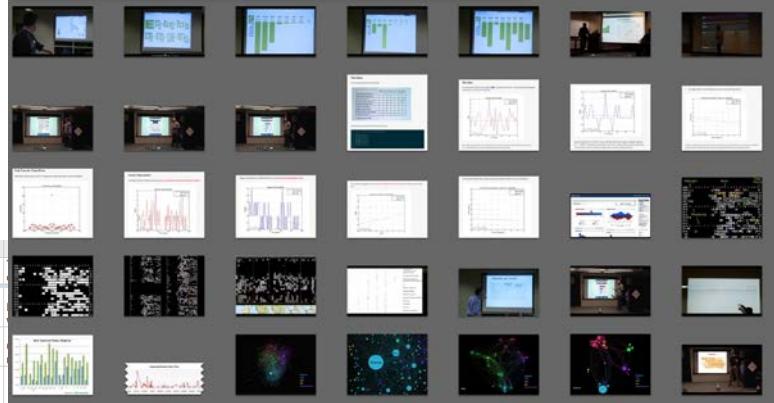
# Analysis



## Themes

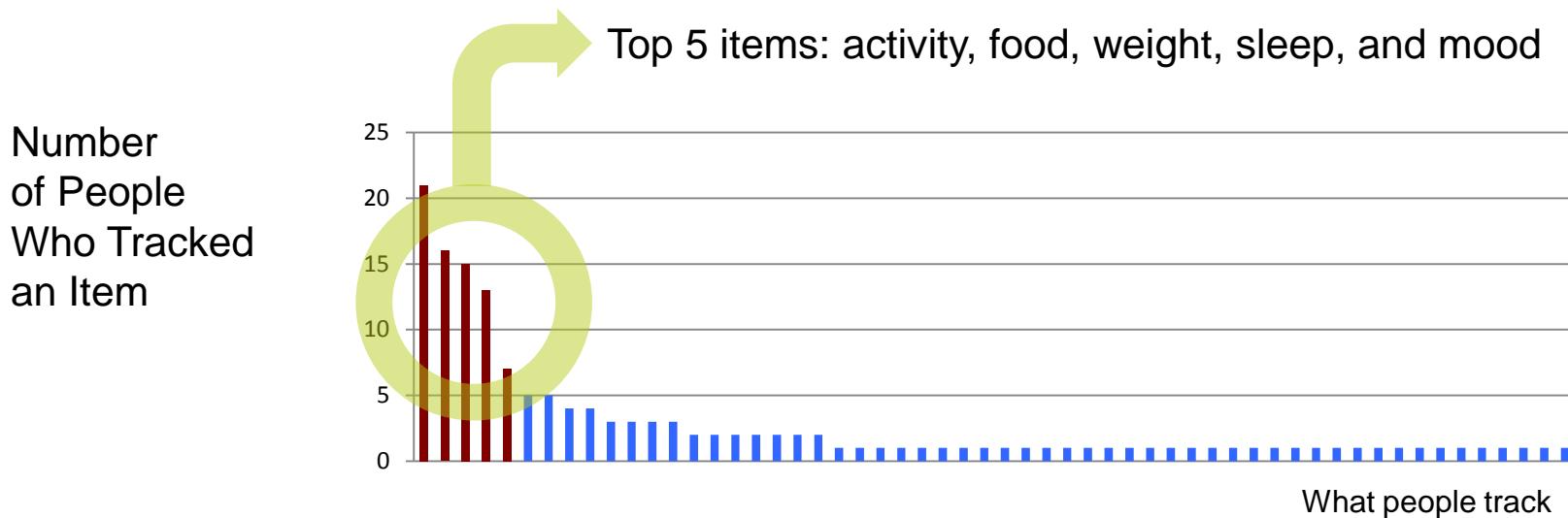
	C	E	F	G	H
1	City	Gender	Working in a tech company?	Background	Data type
2	San Francisco	Male	Microsoft	Data analytics Data analytics, financial modeling, tech startup	Activity, Food, Sleep, Weight, Body fat, mood
3	San Francisco	Male	startup		Glucose
4	London	Male	no	electronics engineer	Exercise, Food, Supplements, Medication, biomedical data, body fat, weight, blood pressure
5	Seattle	Male	startup	interface designer, VP of product, web development	heart rate monitor, pen and paper, Excel scale, Fitbit, RescueTime (productivity measuring tool)
6	London	Male	startup	software engineer, network engineer	cancer
7	San Francisco	Male	startup	robotics, software, product development	6 years
8	Beirut	Female		mechanical engineer	Commercial
9	Toronto	Male	Rogers	programmer, performance manager, big data	Weight, Food, Sleep, Productivity rowing strokes, distance rowed, time rowed, calories
					proximity to cars, location
					arduino, spreadsheet
					overweight
					smartphone, sonar custom heart rate monitor
					1 year
					user-generated
					user-generated
					20 years

## Visualizations



## Profiles

# What do they 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

# Movies Seen in Theatres Since 2001



# Clothing Log

Clothing   Logs   Analysis   Missing information

## Clothing logs

Clothing 2012-07-06 1 Save

The interface displays a grid of clothing items from July 2012. The grid is organized by date, with rows representing specific dates and columns representing individual items. Each item is shown on a hanger. Some items have question marks over them, indicating missing or unknown information. The dates in the grid range from 2012-06-11 to 2012-07-06.

Date	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14	Item 15	Item 16	Item 17	Item 18	Item 19	Item 20	Item 21	Item 22	Item 23	Item 24	Item 25	Item 26	Item 27	Item 28	Item 29	Item 30	Item 31	Item 32	Item 33	Item 34	Item 35	Item 36	Item 37	Item 38	Item 39	Item 40	Item 41	Item 42	Item 43	Item 44	Item 45	Item 46	Item 47	Item 48	Item 49	Item 50	Item 51	Item 52	Item 53	Item 54	Item 55	Item 56	Item 57	Item 58	Item 59	Item 60	Item 61	Item 62	Item 63	Item 64	Item 65	Item 66	Item 67	Item 68	Item 69	Item 70	Item 71	Item 72	Item 73	Item 74	Item 75	Item 76	Item 77	Item 78	Item 79	Item 80	Item 81	Item 82	Item 83	Item 84	Item 85	Item 86	Item 87	Item 88	Item 89	Item 90	Item 91	Item 92	Item 93	Item 94	Item 95	Item 96	Item 97	Item 98	Item 99	Item 100	Item 101	Item 102	Item 103	Item 104	Item 105	Item 106	Item 107	Item 108	Item 109	Item 110	Item 111	Item 112	Item 113	Item 114	Item 115	Item 116	Item 117	Item 118	Item 119	Item 120	Item 121	Item 122	Item 123	Item 124	Item 125	Item 126	Item 127	Item 128	Item 129	Item 130	Item 131	Item 132	Item 133	Item 134	Item 135	Item 136	Item 137	Item 138	Item 139	Item 140	Item 141	Item 142	Item 143	Item 144	Item 145	Item 146	Item 147	Item 148	Item 149	Item 150	Item 151	Item 152	Item 153	Item 154	Item 155	Item 156	Item 157	Item 158	Item 159	Item 160	Item 161	Item 162	Item 163	Item 164	Item 165	Item 166	Item 167	Item 168	Item 169	Item 170	Item 171	Item 172	Item 173	Item 174	Item 175	Item 176	Item 177	Item 178	Item 179	Item 180	Item 181	Item 182	Item 183	Item 184	Item 185	Item 186	Item 187	Item 188	Item 189	Item 190	Item 191	Item 192	Item 193	Item 194	Item 195	Item 196	Item 197	Item 198	Item 199	Item 200	Item 201	Item 202	Item 203	Item 204	Item 205	Item 206	Item 207	Item 208	Item 209	Item 210	Item 211	Item 212	Item 213	Item 214	Item 215	Item 216	Item 217	Item 218	Item 219	Item 220	Item 221	Item 222	Item 223	Item 224	Item 225	Item 226	Item 227	Item 228	Item 229	Item 230	Item 231	Item 232	Item 233	Item 234	Item 235	Item 236	Item 237	Item 238	Item 239	Item 240	Item 241	Item 242	Item 243	Item 244	Item 245	Item 246	Item 247	Item 248	Item 249	Item 250	Item 251	Item 252	Item 253	Item 254	Item 255	Item 256	Item 257	Item 258	Item 259	Item 260	Item 261	Item 262	Item 263	Item 264	Item 265	Item 266	Item 267	Item 268	Item 269	Item 270	Item 271	Item 272	Item 273	Item 274	Item 275	Item 276	Item 277	Item 278	Item 279	Item 280	Item 281	Item 282	Item 283	Item 284	Item 285	Item 286	Item 287	Item 288	Item 289	Item 290	Item 291	Item 292	Item 293	Item 294	Item 295	Item 296	Item 297	Item 298	Item 299	Item 300	Item 301	Item 302	Item 303	Item 304	Item 305	Item 306	Item 307	Item 308	Item 309	Item 310	Item 311	Item 312	Item 313	Item 314	Item 315	Item 316	Item 317	Item 318	Item 319	Item 320	Item 321	Item 322	Item 323	Item 324	Item 325	Item 326	Item 327	Item 328	Item 329	Item 330	Item 331	Item 332	Item 333	Item 334	Item 335	Item 336	Item 337	Item 338	Item 339	Item 340	Item 341	Item 342	Item 343	Item 344	Item 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456	Item 457	Item 458	Item 459	Item 460	Item 461	Item 462	Item 463	Item 464	Item 465	Item 466	Item 467	Item 468	Item 469	Item 470	Item 471	Item 472	Item 473	Item 474	Item 475	Item 476	Item 477	Item 478	Item 479	Item 480	Item 481	Item 482	Item 483	Item 484	Item 485	Item 486	Item 487	Item 488	Item 489	Item 490	Item 491	Item 492	Item 493	Item 494	Item 495	Item 496	Item 497	Item 498	Item 499	Item 500	Item 501	Item 502	Item 503	Item 504	Item 505	Item 506	Item 507	Item 508	Item 509	Item 510	Item 511	Item 512	Item 513	Item 514	Item 515	Item 516	Item 517	Item 518	Item 519	Item 520	Item 521	Item 522	Item 523	Item 524	Item 525	Item 526	Item 527	Item 528	Item 529	Item 530	Item 531	Item 532	Item 533	Item 534	Item 535	Item 536	Item 537	Item 538	Item 539	Item 540	Item 541	Item 542	Item 543	Item 544	Item 545	Item 546	Item 547	Item 548	Item 549	Item 550	Item 551	Item 552	Item 553	Item 554	Item 555	Item 556	Item 557	Item 558	Item 559	Item 560	Item 561	Item 562	Item 563	Item 564	Item 565	Item 566	Item 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900	Item 901	Item 902	Item 903	Item 904	Item 905	Item 906	Item 907	Item 908	Item 909	Item 910	Item 911	Item 912	Item 913	Item 914	Item 915	Item 916	Item 917	Item 918	Item 919	Item 920	Item 921	Item 922	Item 923	Item 924	Item 925	Item 926	Item 927	Item 928	Item 929	Item 930	Item 931	Item 932	Item 933	Item 934	Item 935	Item 936	Item 937	Item 938	Item 939	Item 940	Item 941	Item 942	Item 943	Item 944	Item 945	Item 946	Item 947	Item 948	Item 949	Item 950	Item 951	Item 952	Item 953	Item 954	Item 955	Item 956	Item 957	Item 958	Item 959	Item 960	Item 961	Item 962	Item 963	Item 964	Item 965	Item 966	Item 967	Item 968	Item 969	Item 970	Item 971	Item 972	Item 973	Item 974	Item 975	Item 976	Item 977	Item 978	Item 979	Item 980	Item 981	Item 982	Item 983	Item 984	Item 985	Item 986	Item 987	Item 988	Item 989	Item 990	Item 991	Item 992	Item 993	Item 994	Item 995	Item 996	Item 997	Item 998	Item 999	Item 1000
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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

# Motivations for Tracking

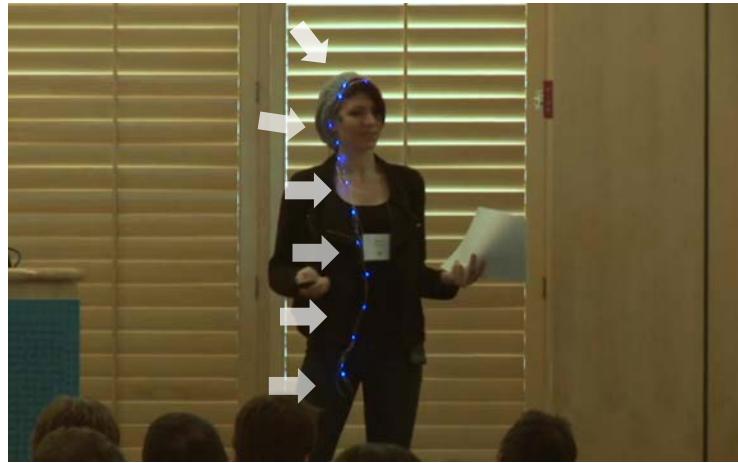
Motivations	Sub-categories
To improve health	To cure or manage a condition To achieve a goal To find triggers To answer a specific question To identify relationships To execute a treatment plan To make better health decisions To find balance
To improve other aspects of life	To maximize work performance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

# Data Collection and Exploration Tools

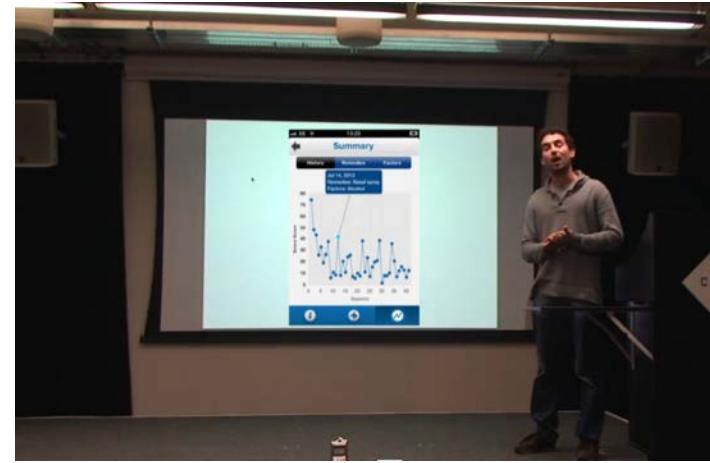
Data Collection Tool	% (#)
Commercial hardware	56% (29)
Spreadsheet	40% (21)
Custom software	21% (11)
Pen and paper	21% (11)
Commercial software	19% (10)
Commercial website	10% (5)
Camera	6% (3)
Open-source platform	6% (3)
Custom hardware	4% (2)
Other	10% (5)

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)

# Building Custom Tools

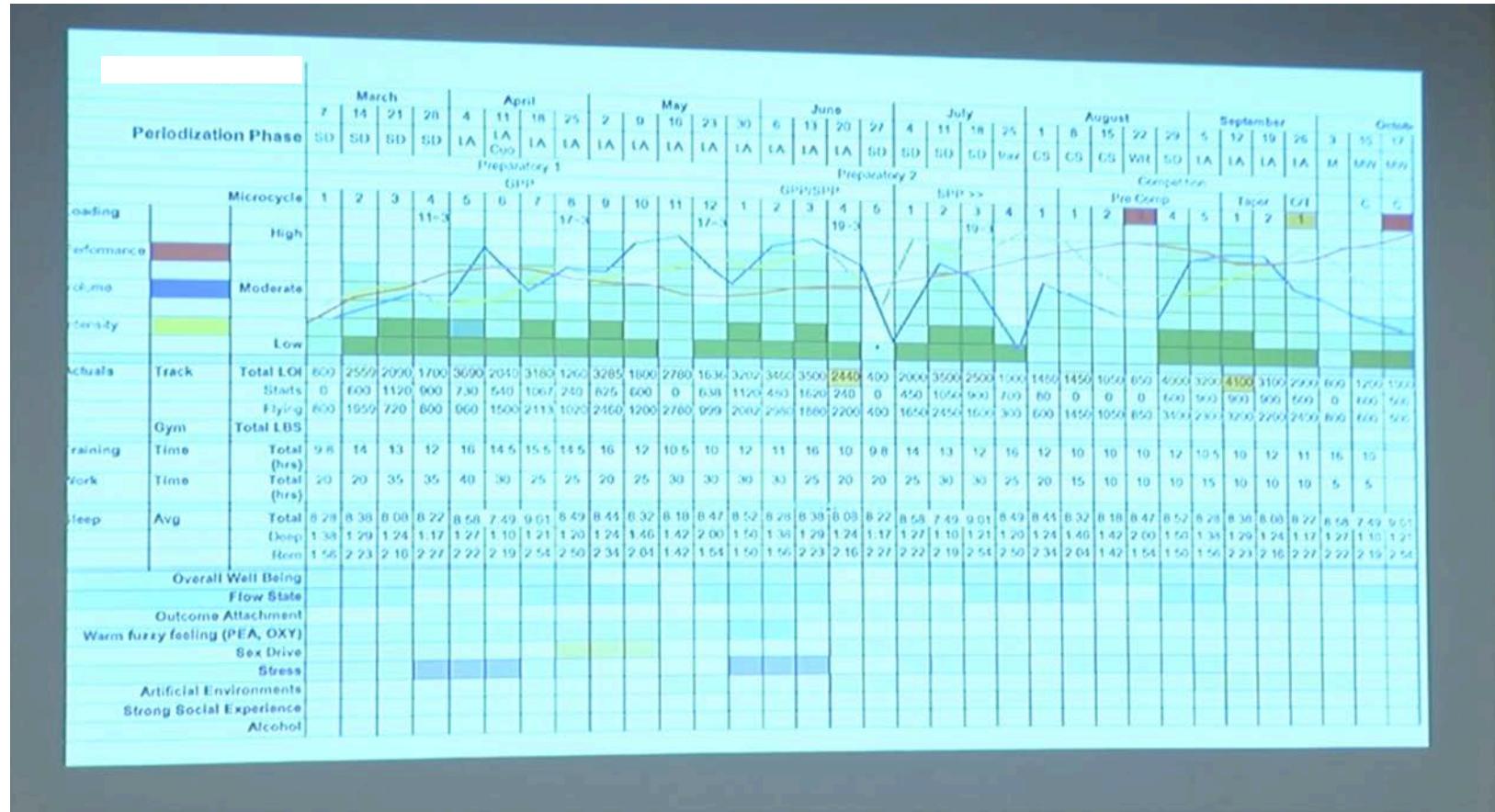


Captures smile via wearable sensing  
Provides real-time feedback

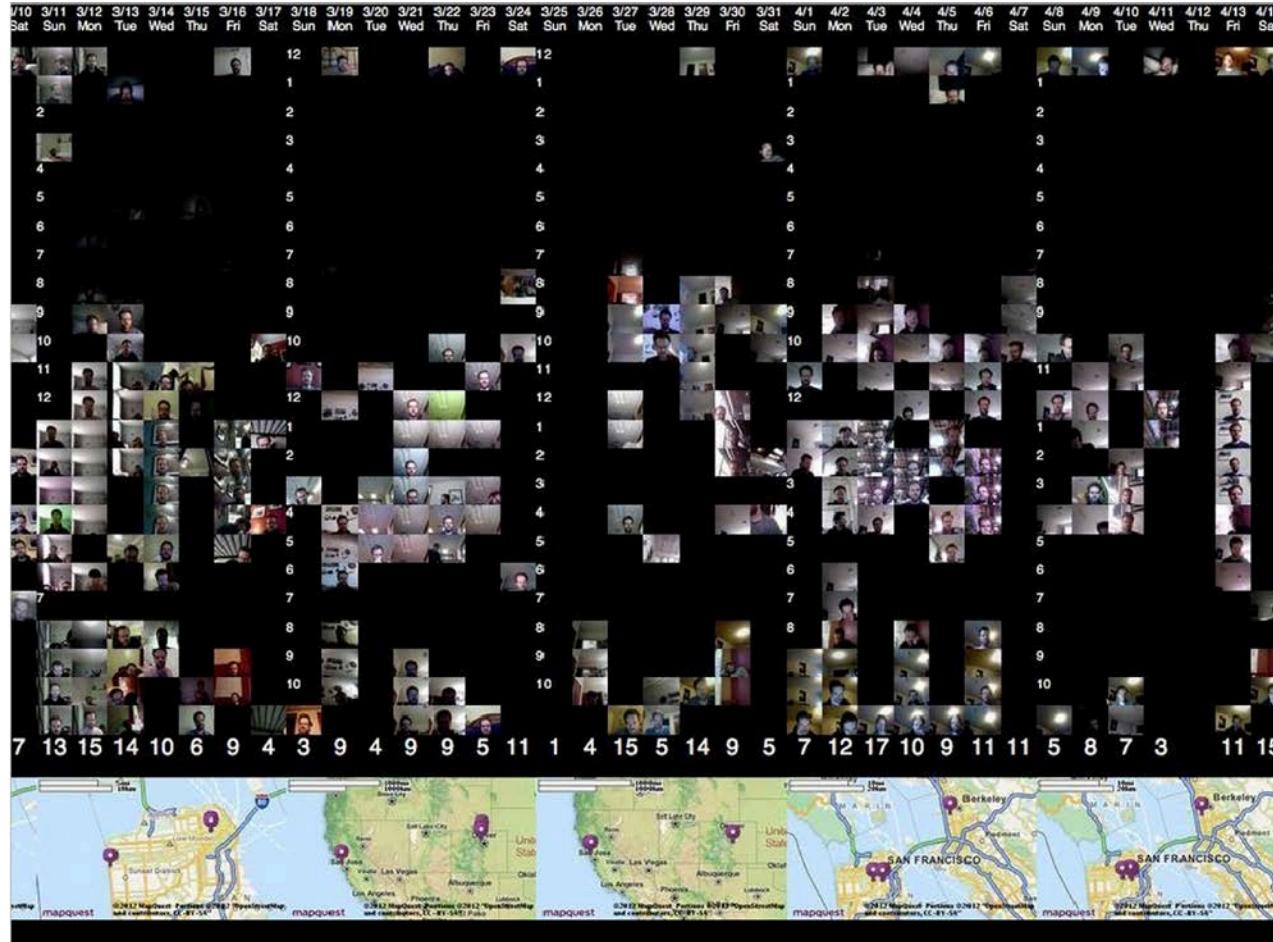


Captures snoring via mobile app  
Provides data visualization

# Custom Visualizations



# 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”

# 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

# 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

# Not Tracking Triggers and Context

“I was trying to track all these symptoms  
and I was completely ignoring the cause...”

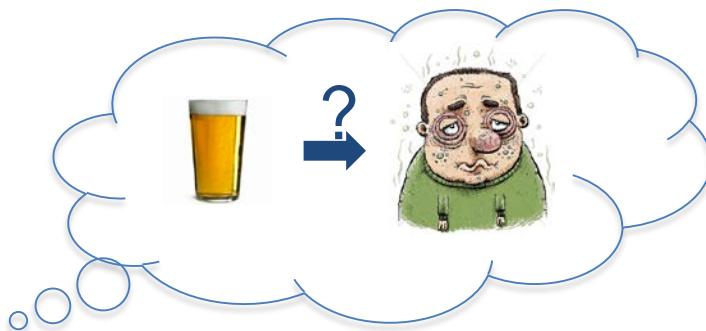
People lack clues on what to track

Miss information on how to improve outcome

They track the wrong information

# Lacking Scientific Rigor

Conduct self-experimentations without control  
or without addressing confounding factors



And they conduct flawed experiments

# Your Challenge

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

# 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