



HCIN720

# Designing User Experiences for Internet-Connected Devices

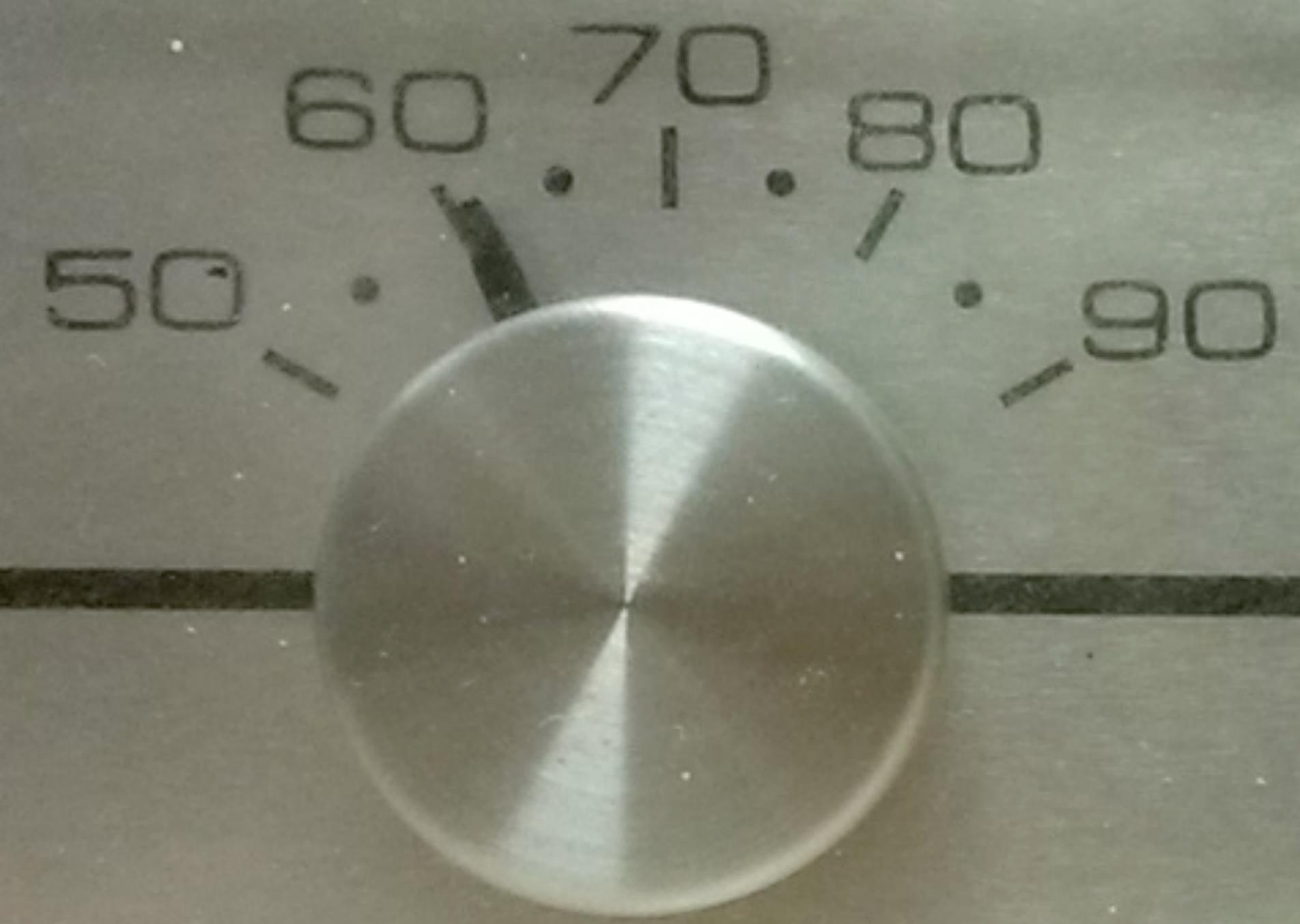
Dr. Daniel Ashbrook

# Today

- GP1
  - Tell me your groups
  - Tell me what you plan on doing
  - Do you need any stuff?
- Lecture & discussion about service avatars

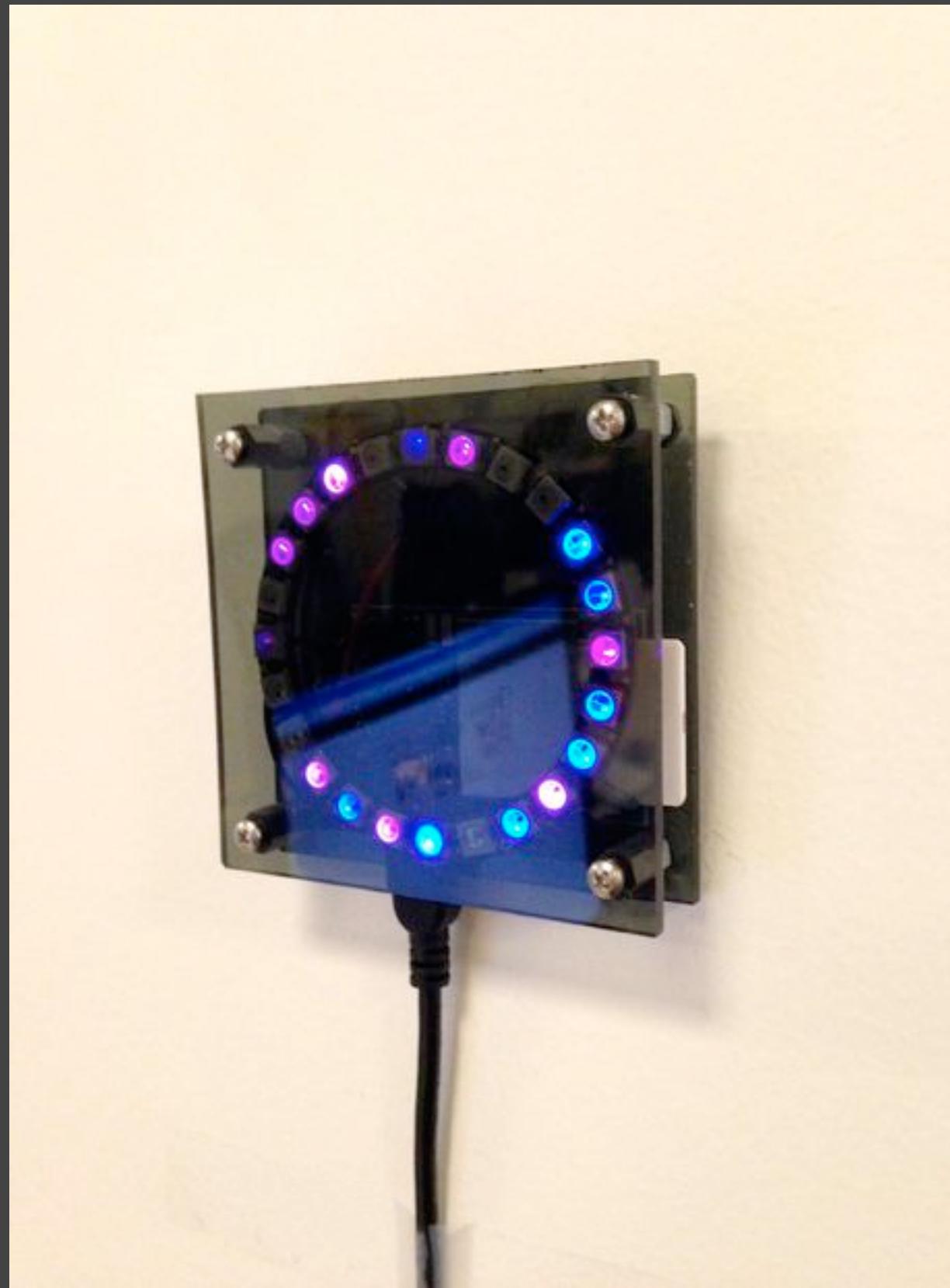
# Devices as service avatars





WHITE-RODGERS  
HEAT PUMP THERMOSTAT









# Types of avatars



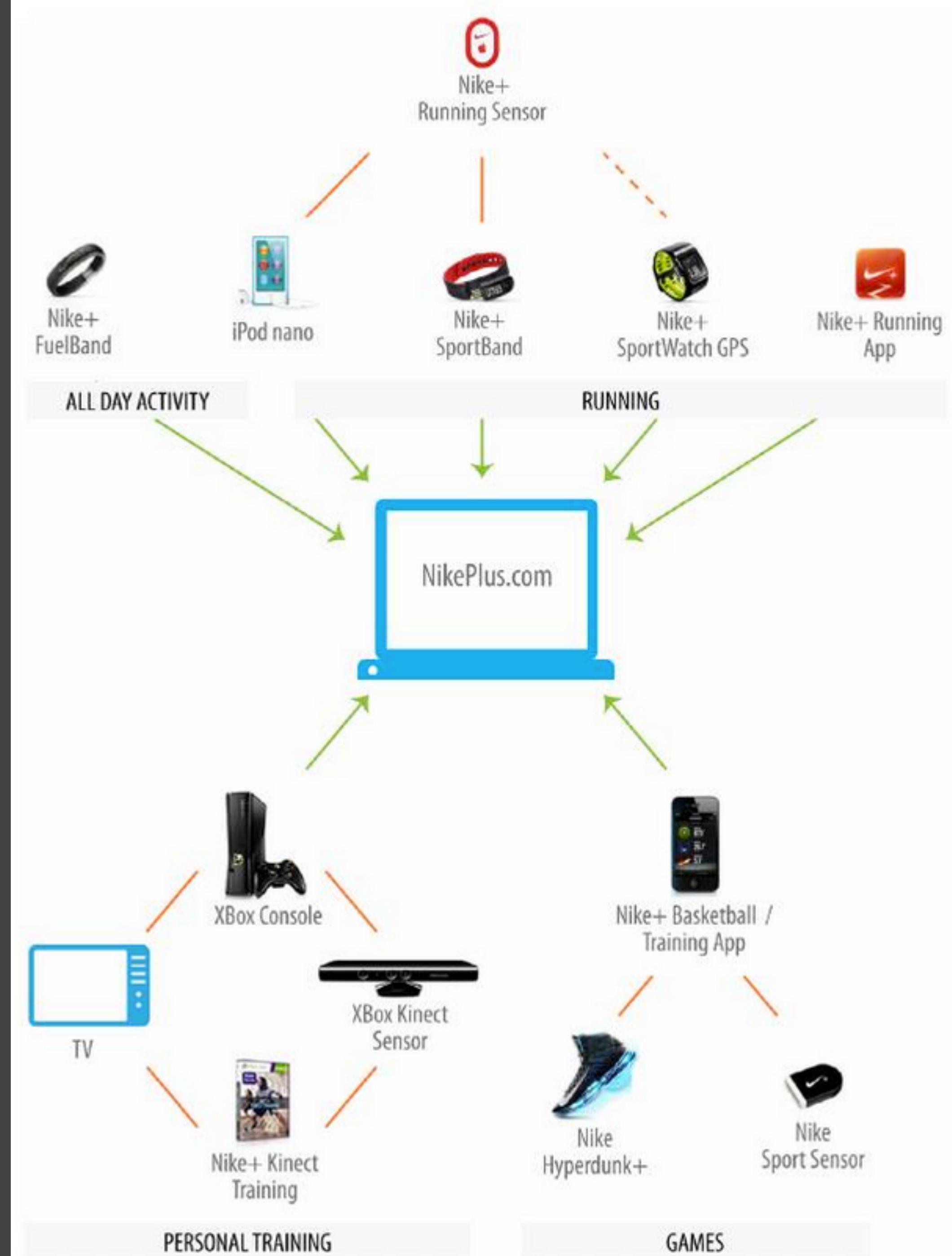
Porthole



Handle



Slice



Boards

TFW 1:54 PM 84%

class

Learning objectives

- Main questions for the course
  - The focus of this class is on prototyping physical artifacts that are connected to the Internet: allowing things sensed about the physical world to be acted on in the cloud, and to allow things happening on the Internet to be reflected in the physical world.
- understand breadth and specific examples of devices
  - understand history of ubicomp, calm computing, pervasive, tangible, etc
  - understand types of interactions with devices
    - understand core HCI issues with non-screen devices
    - understand skills needed to develop UX for devices
  - learn basic prototyping skills for a wide range of device types
- Add a card...

Notes

- Internet of Things + Wearables
- MakeyMakey is cool; make it in class?
- DIY IFTTT?
- Written weekly project updates
- iOS/Android notifications to hardware?
- IFTTT has Maker channel now
- node.js as thread through class?
- Exhibit good projects at Imagine RIT
- Sensors and actuators list
- Smartphone as interface or web as interface
- Sketch interface for different devices, eg Facet
- How to evaluate new kinds of devices?
- Vertical / horizontal prototyping
- In-class activity: break down flow of existing IoT device—figure it out by watching videos, reading manuals, etc. Sketch it out.
- Set up Trello board for class to swap hints etc with each other?
- plotly
- node red
- Add a card...

Inspirations

- fif
- NYU ITP Phy
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## understand skills needed to develop UX for

Add card

Trello

1:54 PM

1:53

Everyware

- Sense something in the real world using Arduino and reflect it on the screen of the phone
- Definitions of ubicomp
- Questions for designing ubicomp systems
- Sense something in the real world using Arduino and reflect it on the screen of the computer
- Sense something on the phone and reflect it in the real world
- Privacy and intention to interact
- Unintended consequences
- Sense something on the Internet and reflect it in the real world
- Sense something with the Arduino and output it on the Arduino
- Sense something on the Internet in one place and output it on the Internet in another place
- Learn all about and critique the UX of an existing internet-connected device

Assignment progression

- Add a card...

Individual Assignments

- Individual assignments should be relatively simple, and teach new skills or reflect the skills they have been taught.

Multi-person assignments

- Multiperson assignments should be more complex and involve integration of skills with HCI topics, and (in the case of the final project at least) involve learning outside of class.

Possible hardware/software

- IA1: Visualize data
- IA2: Publish sensor data
- IA3: Put it in a box
- Add a card...

Assignments again

- IA1: Visualize data
- IA2: Publish sensor data
- IA3: Put it in a box
- Add a card...

sparkfun

ESP8266

Punchthrough LB Bean

Sewing machine for conductive fabric

Blynk - app to control IoT things

P5.js

Paper.js

Capacitive sensing

Browser-based head tracking

Raspberry Pi

In-browser circuit simulator

TinkerCad

Amazon voice service (Alexa) integration

pubnub.com

Add a card...

+ Daniel Ashbrook

Show Menu

Ques assign

How cloud

How Ardu

Visua

Req JS/H

What

Allow

How

3D e

Integ Bear

Add a



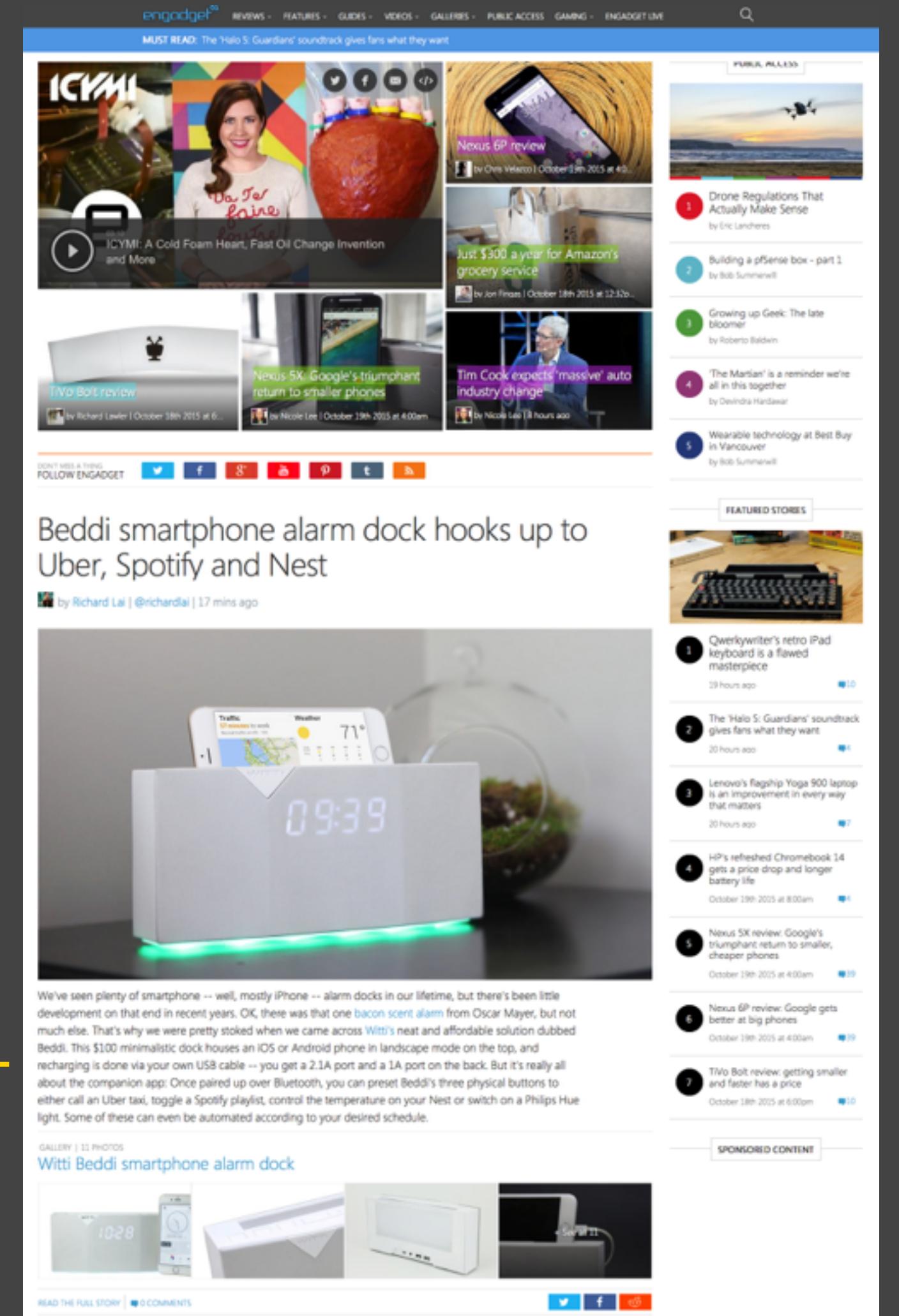
# Ecology design framework

- Consistency
- Continuity
- Complementarity

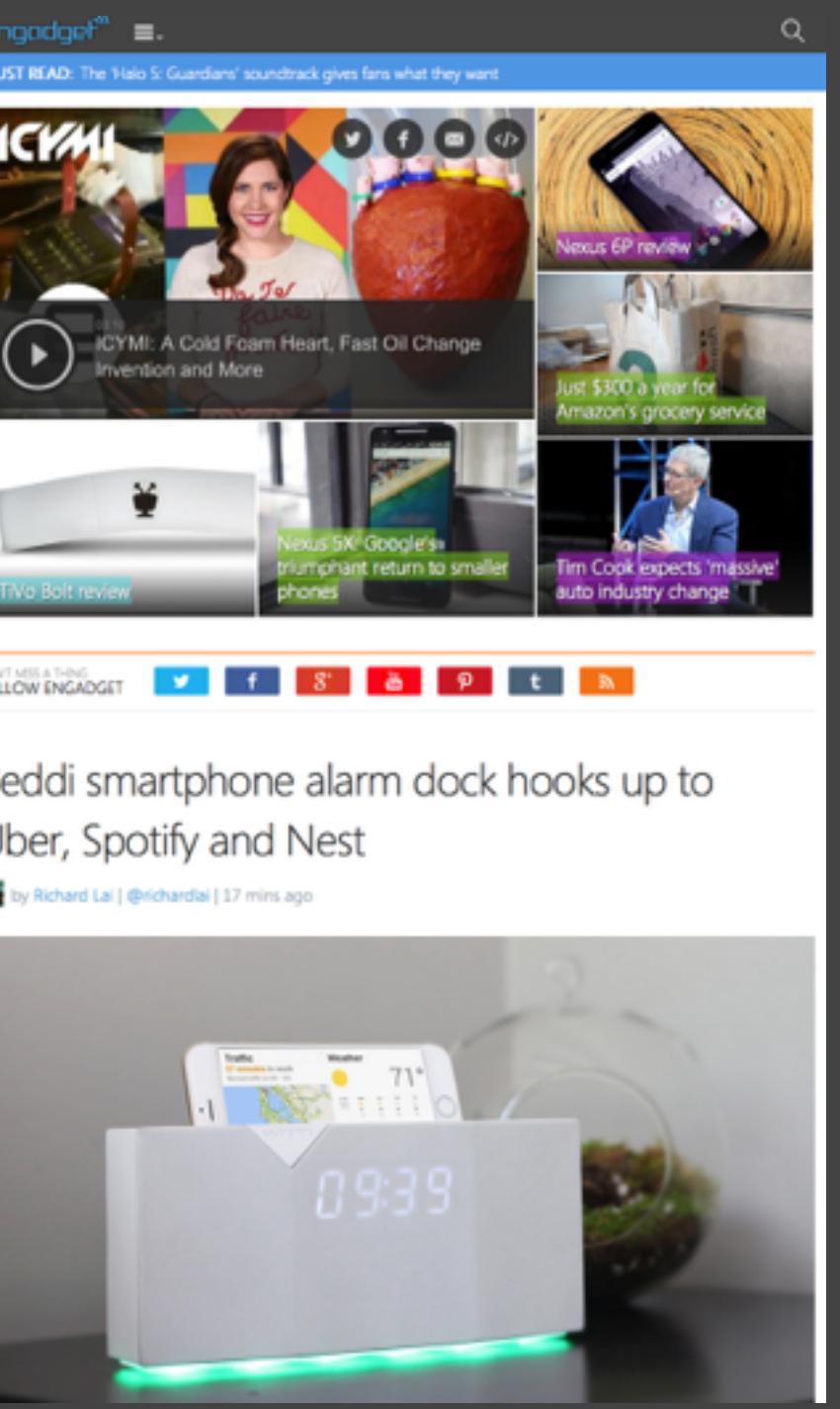
# Consistent design

- Provide same essential experience on multiple devices
  - Same content and features
  - Same “look and feel”
- Example: responsive design
- *Consistent doesn't mean identical!*

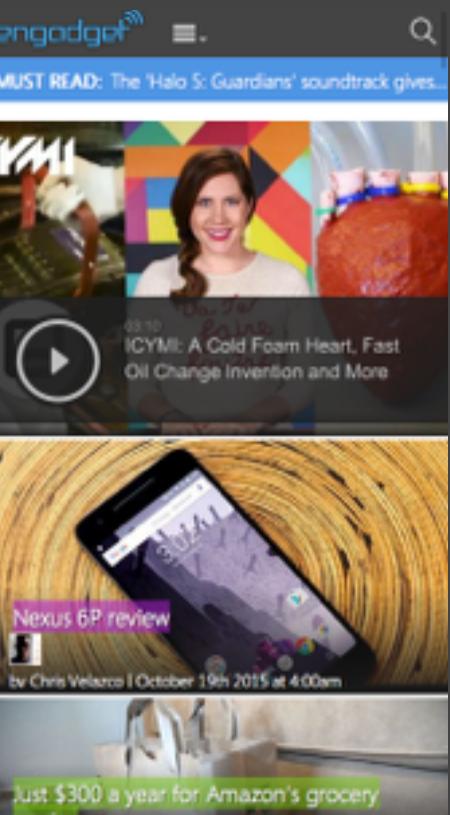
Desktop



Tablet

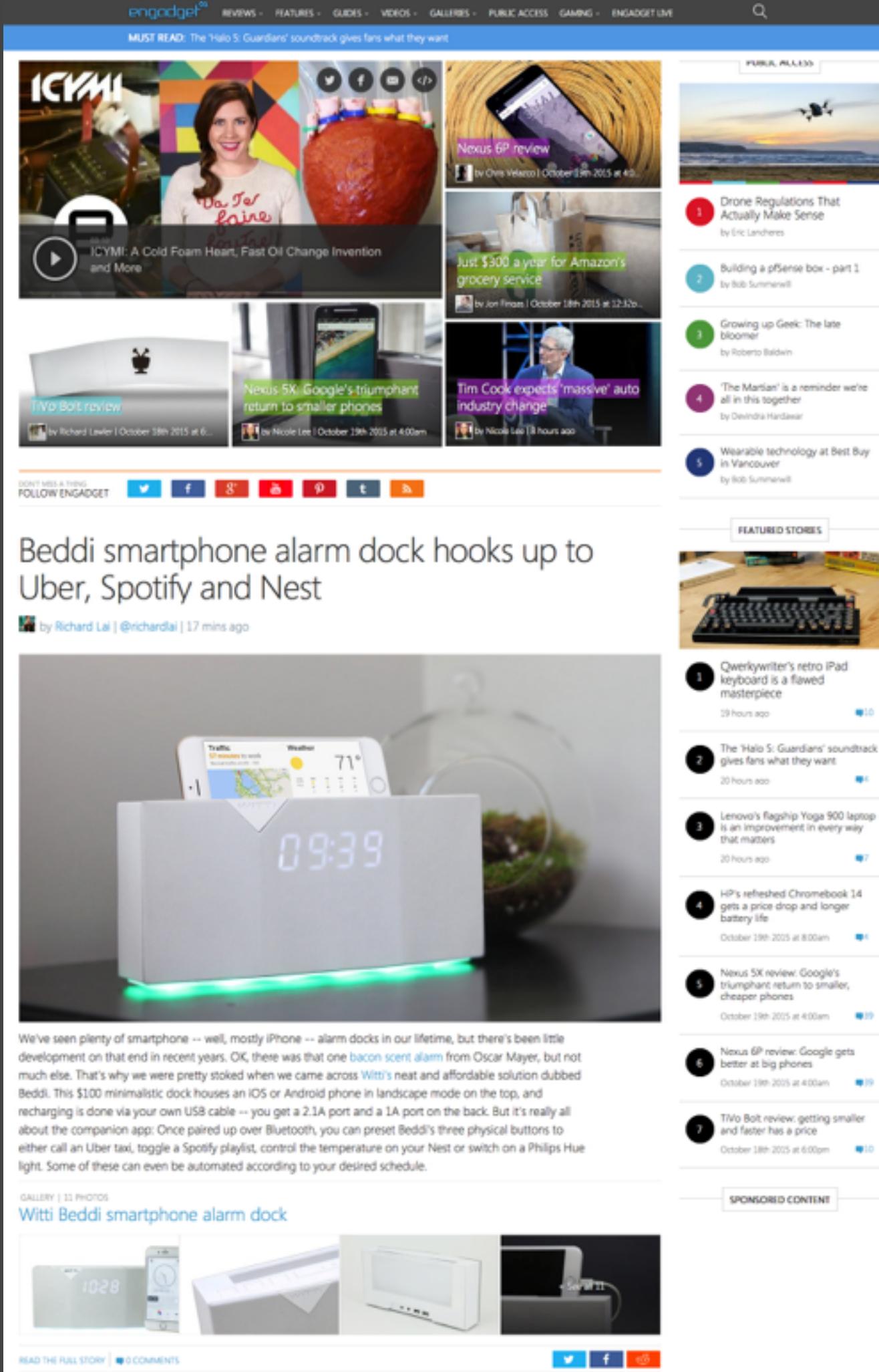


Phone



# Consistent design

Desktop



Beddi smartphone alarm dock hooks up to  
Uber, Spotify and Nest

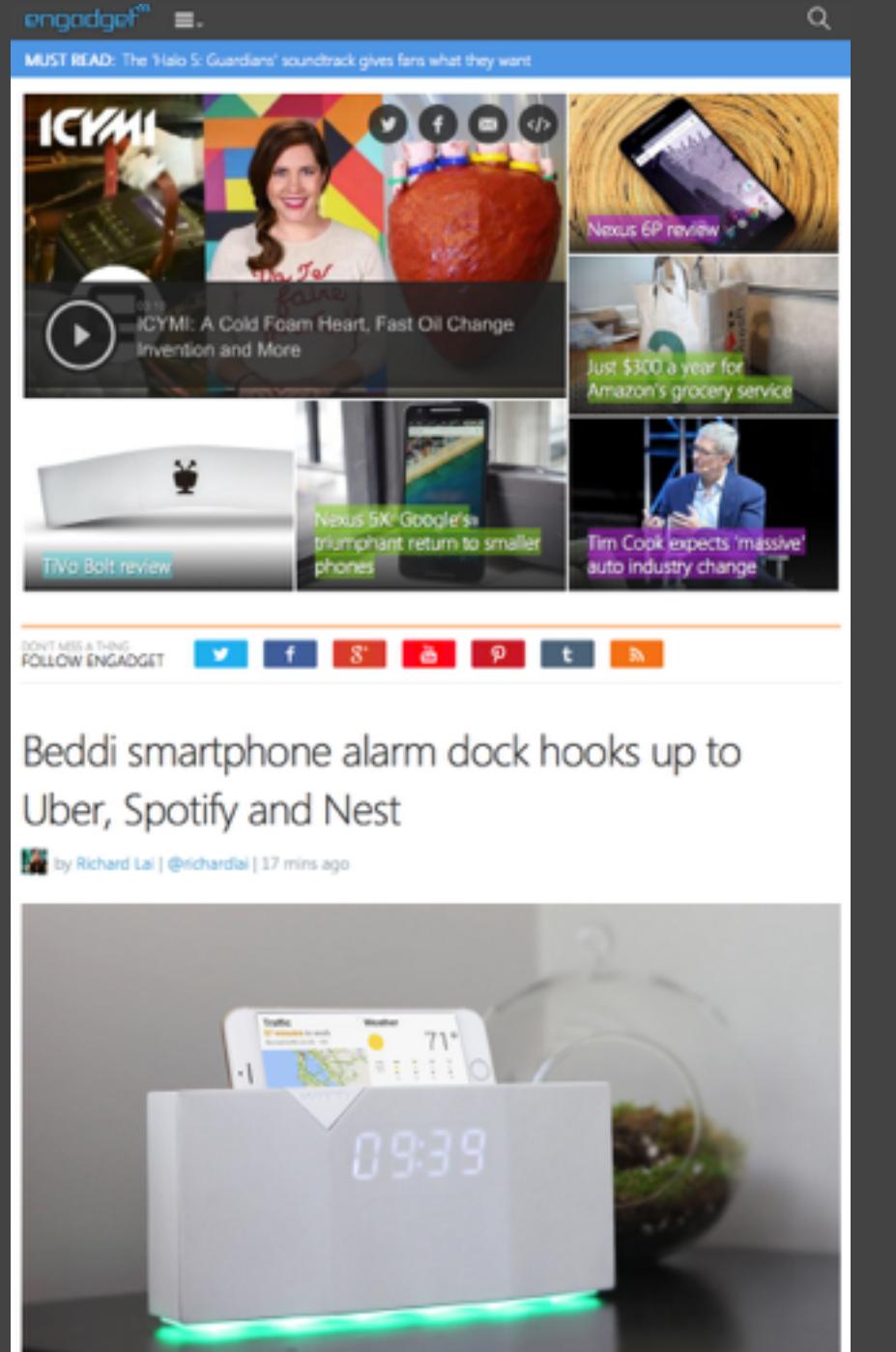


We've seen plenty of smartphone -- well, mostly iPhone -- alarm docks in our lifetime, but there's been little development on that end in recent years. OK, there was that one bacon scented alarm from Oscar Mayer, but not much else. That's why we were pretty stoked when we came across Witti's neat and affordable solution dubbed Beddi. This \$100 minimalist dock houses an iOS or Android phone in landscape mode on the top, and recharging is done via your own USB cable -- you get a 2.1A port and a 1A port on the back. But it's really all about the companion app: Once paired up over Bluetooth, you can preset Beddi's three physical buttons to either call an Uber taxi, toggle a Spotify playlist, control the temperature on your Nest or switch on a Philips Hue light. Some of these can even be automated according to your desired schedule.

GALLERY | 11 PHOTOS  
Witti Beddi smartphone alarm dock



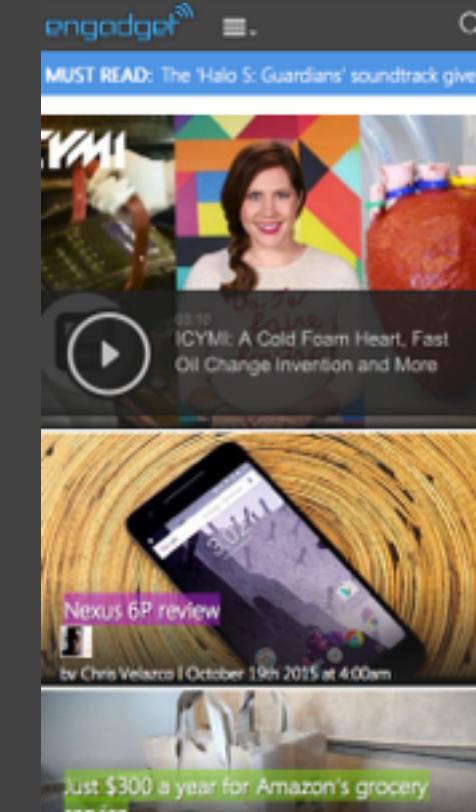
Tablet



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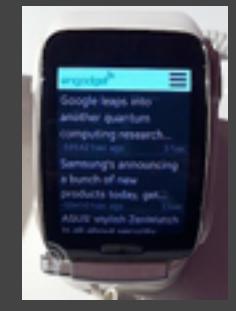


Phone



Nexus 6P review

Watch



- Screen size
- Mouse vs touch
- Device speed
- Context of use (motion, time available)

# Consistent Information Architecture



# Continuous design

Provide different “views” into the same flow of a user activity

- Single activity: reading a book
  1. Read a book



# Continuous design

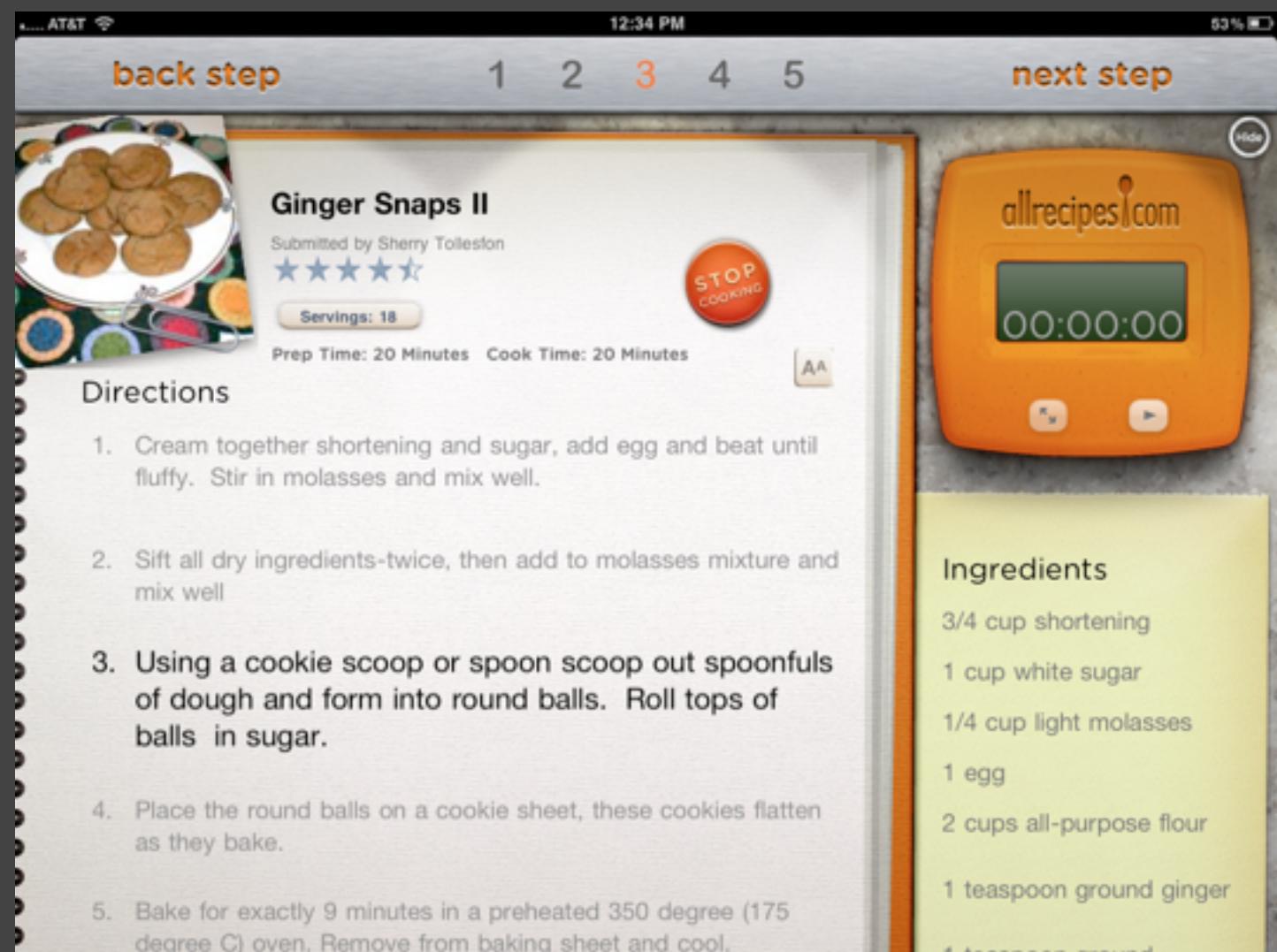
Provide different “views” into the same flow of a user activity

- Single activity: reading a book
  1. Read a book
- Sequenced activity: cooking
  1. Decide what to cook
  2. Shop for groceries
  3. Cook

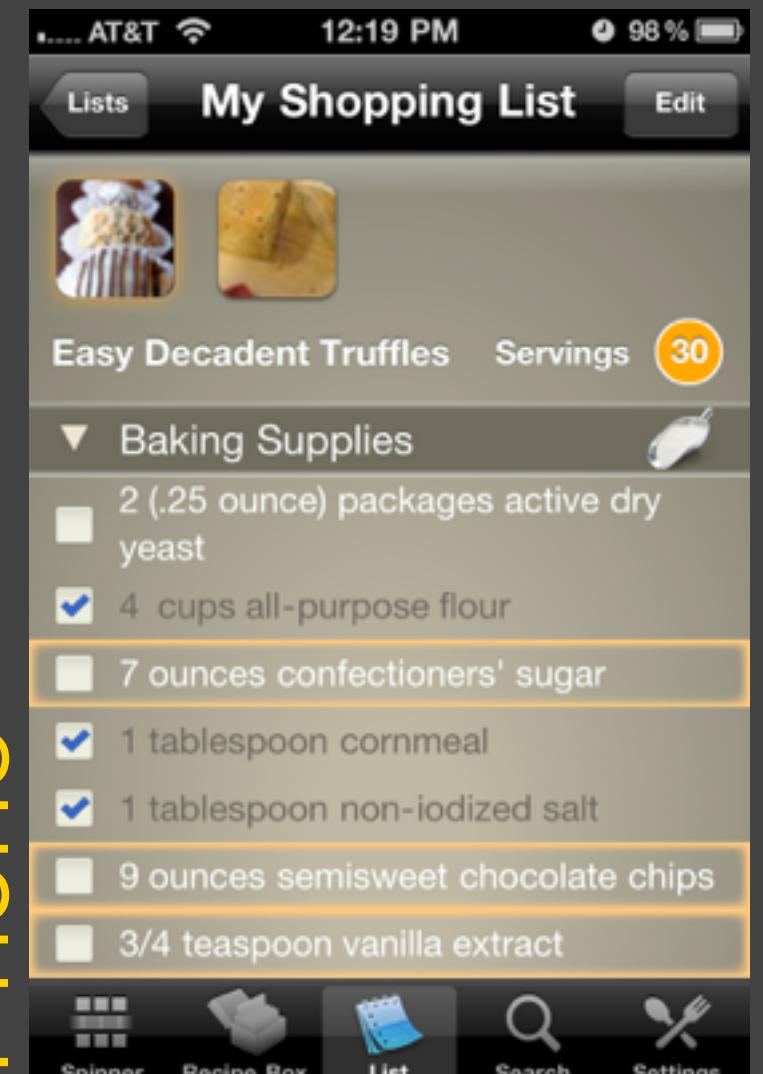
Tablet



Tablet



Phone



# Complementary design

- Different devices work together
- Relationships
  - Collaboration
  - Control
- Optional-ity of devices
  - Essential
  - Nice-to-have

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*Real Racing 2—Party Play mode*

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*Heineken Star Player app*

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# In-class exercise

- Get into your GP1 groups
- Visit <http://iotlist.co>
- Pick an interesting IoT device
- Analyze it according to the principles we've discussed so far
- How can the system be changed or improved based on your observations?

## Challenges in designing ubicomp systems

- Revealing interaction possibilities
- Directing actions
- Establishing connections
- Providing feedback
- Avoiding and correcting mistakes
- Managing privacy and security

## Shadows & avatars

- Information shadow links object to its origin
- Avatar is one or more representations of a service

## Proxemics

- Intimate: 0–1.5'
- Personal: 1.5–4'
- Social: 4–12'
- Public: 12'+

## Ubicomp principles

- invisibility
- manual override
- feedback
- adaptability

## Ecology design framework

- Consistent design
- Continuous design
- Complementary design

[bit.ly/720survey](https://bit.ly/720survey)