Edwin Samuel Cho

Carnegie Mellon University
Design Portfolio 2019
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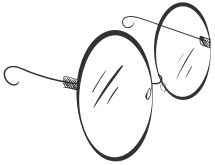

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Education History

Master of Arts in Design
Carnegie Mellon University
2018 - 2020

BS in Aerospace Engineering
University of Illinois at UC
2011 - 2015

Work History

Carnegie Mellon University | Research Lab Assistant
August 2018 - Ongoing

Ascent PGM | Graphic Designer (Intern+Contract)
April 2018 - Ongoing

Luci Creative | Graphic Designer (Contract)
October 2017 - January 2018

University of Illinois at Urbana-Champaign | 3D Lab Assistant
August 2016 - October 2017

Dun & Bradstreet | Graphic Designer (Intern)
May 2016 - August 2016

Skills

Design
Adobe Photoshop
Adobe Illustrator
Adobe Indesign
Adobe After Effects
Adobe XD
Invision
Protopie
Axure
Sketch

3D Rendering + Prototyping
Solidworks
Siemens NX
Keyshot
Foam Modeling + Illustration

Coding
MATLAB
Python
HTML

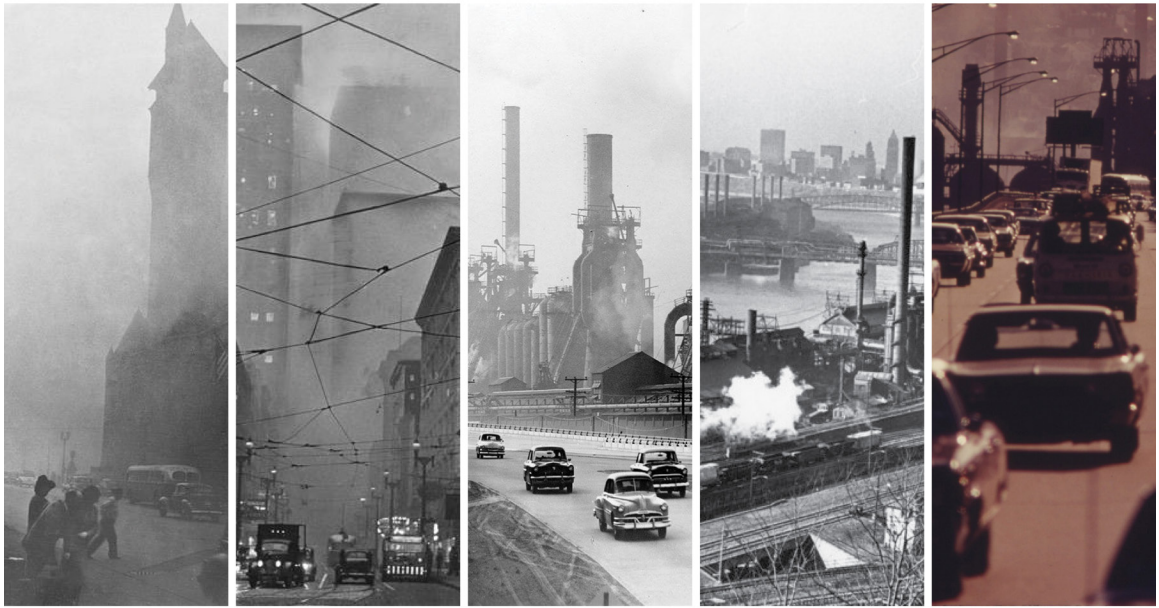

Air
Quality
Field
Notes

1 Environmental Charter School

Final Deliverables	1 year curriculum sample + materials (style guide, teacher+student exercise kit, lesson plans, class philosophy, exhibit concept) to help raise awareness of Pittsburgh's air pollution and encourage social activism amongst the 5th-6th grade loop
Team Size + Role	2 / co-designed with design peer, emphasis on visual/graphic design
Time Frame	1 month (Fall 2018)
Programs Used	Adobe Indesign, Illustrator, Photoshop, Fusion 360
Client	Environmental Charter School

Research

Our initial research included a broad survey. We explored topics like air pollution's negative neurodevelopment effects on school aged children and the connection between identity and pollution. This research informed our decision to work within the school environment to build air quality literacy and advocacy.



Mood Board: Images by decade (1940-1980) that provide a glimpse into Pittsburgh's industrial development and the effect on air quality

DESIGN THINKING

Approach

Our reframe of Design Thinking is Design Feeling: the messy joy of problem solving. This feeling is an internal practice of continuous iteration and action: one that naturally lends itself to civic action.

We chose to nest our curriculum within Design Feeling. This allowed us to fit naturally within ECS practices and provide a level of flexibility for teachers and students.


Pittsburgh
Air Pollution
1950s
1960s
1980s

Prototypes + Final Solution

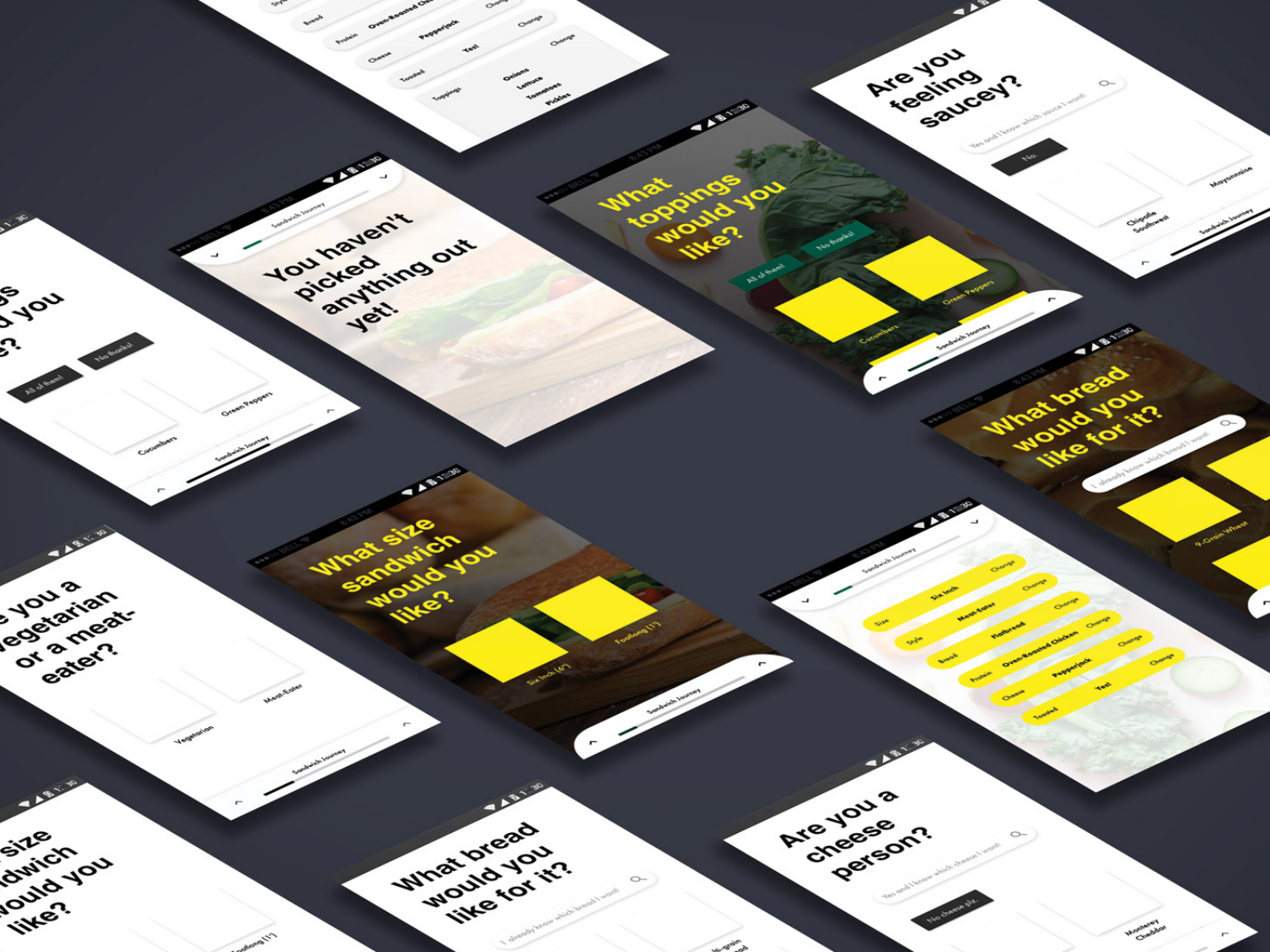
To make air quality concrete, we brainstormed many different sensory experiences. Ideas like projection mapping, tangible data, and edible air were all explored. The most well received idea was a vinyl installation that obscured vision in decades with highest air pollution.

The result of our project included a teacher's guide, student field guide, air magnifier kit, and plans for a vinyl installation. These pieces work in together for an immersive exploration of air quality in Pittsburgh.


Sentio
Design
Thinking
in the Classroom
Teacher's Edition | Cho + Larson
Sentio
Cho + Larson
Air
Quality
Field
Notes
Expo


Sentio
Cho + Larsen


Parent Letter
ecs
Materials + Assembly
Acrylic (top + bottom)
Acrylic (midsection)
Chicago Screws
Iron Filings
Magnetic Pencil
Objective
Learning by doing
Identity through storytelling
Situated knowledge
Civic responsibility and action
Air Magnifier Materials List
2x Acrylic sheets (top + bottom)
1x Acrylic sheet (midsection)
1x tbsp iron filings
Magnetic pencil
Assembly
1. Once students receive their Air Magnifier kit, have the students inventory their materials and discuss properties
2. Peel the protective coating from acrylic
3. Line up holes on all three sheets of acrylic
4. Screw together a Chicago screw set on one corner. Air Magnifier should pivot around one screw.
5. Align bottom two layers of air magnifier, inset receiving tube of Chicago screw through bottom two layers. This will hold layers in alignment while adding iron filings.
6. Deposit 1 tablespoon of iron filings into magnifier. Swivel top acrylic layer and add remaining Chicago screws.
25

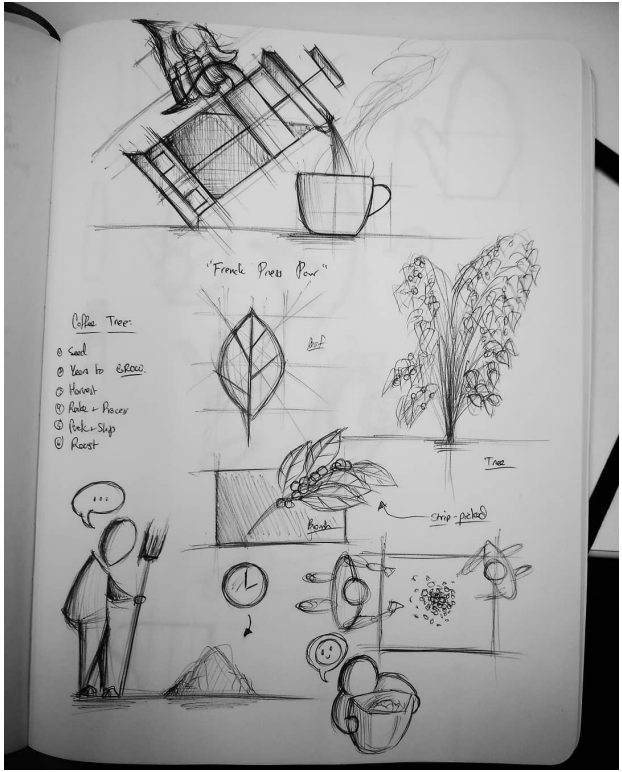

Are you feeling saucey?
Yes and I know which sauce I want
No
Chipotle Southwest
Mayonnaise
Sandwich Journey
What toppings would you like?
All of them!
No thanks!
Cucumbers
Green Peppers
Sandwich Journey
You haven't picked anything out yet!
Sandwich Journey
What bread would you like for it?
already know which bread I want
9 Grain Wheat
Sandwich Journey
What size sandwich would you like?
Six Inch (6")
Footlong (1')
Sandwich Journey
Are you a vegetarian or a meat-eater?
Vegetarian
Meat-Eater
Sandwich Journey
Sandwich Journey
Size
Six Inch
Change
Style
Meat-Eater
Change
Bread
Flatbread
Change
Protein
Oven-Roasted Chicken
Change
Cheese
Pepperjack
Change
Toasted
Yes!
Change
What bread would you like for it?
I already know which bread I want
Are you a cheese person?
Yes and I know which cheese I want
No cheese pls
Monterey Cheddar

2 Digital Sandwich

Final Deliverables	User flow, wireframes, and high fidelity screens of a digital experience that improves upon the current sandwich ordering process at Subway
Team Size + Role	1 / Interaction designer
Time Frame	2 weeks (Winter 2019)
Programs Used	Adobe XD
Client	Carnegie Mellon University

Stressing On Sandwiches

Ordering a sandwich at Subway is an unequivocal nightmare for introverts (me included)! The huge array of choices, methodically made sandwiches, and linear-yet-branching lines of decisions make for a good user experience design challenge: How might we take a process, reduce it down to discrete steps, and bring it to a digital, interactive medium?



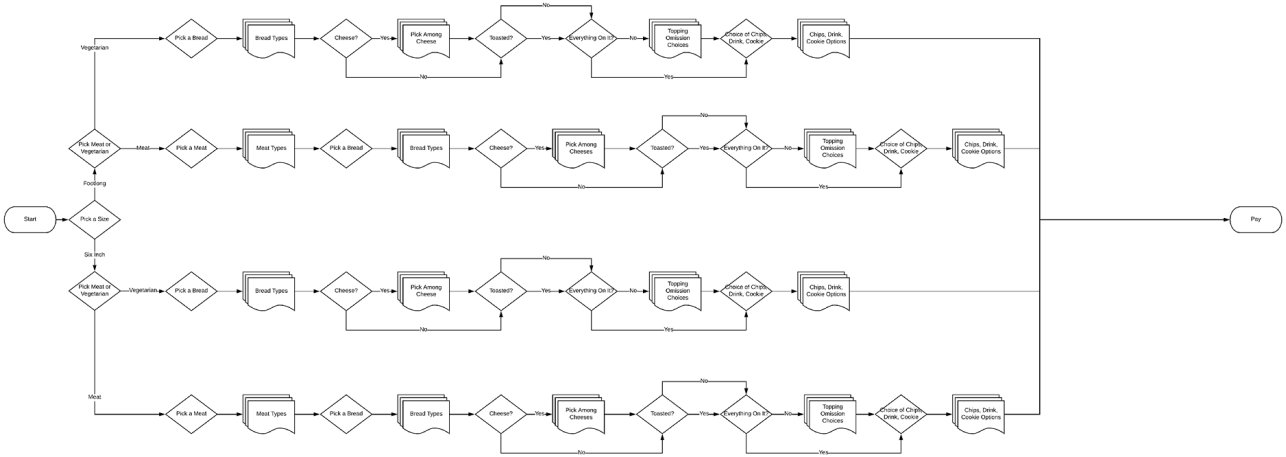
Food Stories: Every consumer good has a story, from coffee to sandwiches - going wide on the steps to get a good cup of coffee or a ready-made sandwich aids in going deep into discrete, system-based steps.

User Flow Study

Although Subway's sandwich-fabricating methods seem linear (literally dragging a tray along a steel conveyor belt), the amount of diverging lines of choice multiply really fast. Observing consumers at the check-out line and then mapping the experience helped to see the entire process, step by step, from a wider vantage point. From there, alternative user flows were proposed to address certain oversights with the current system, such as:

1. Balancing vegetarian vs non-veggie decision making
2. Allowing back-tracking of already-ordered choices
3. Reducing cognitive load

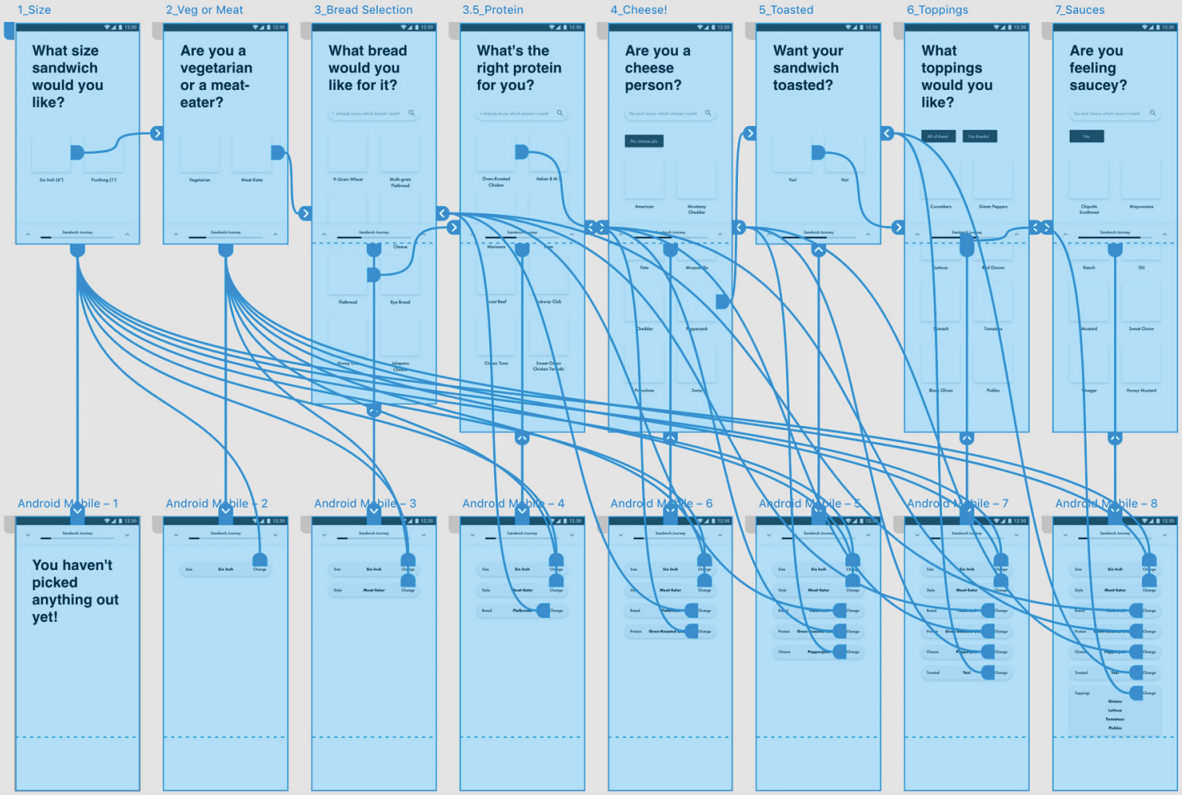
User Flow 2: Subway Sandwich Order (Alternative)

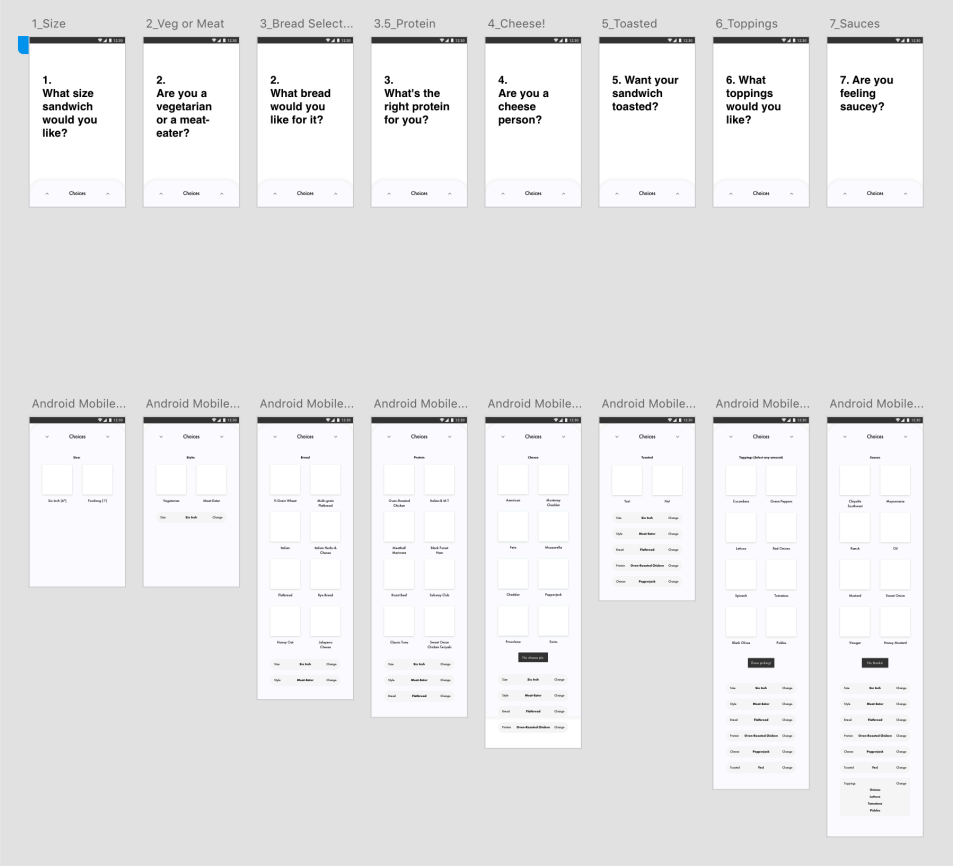


Wireframing

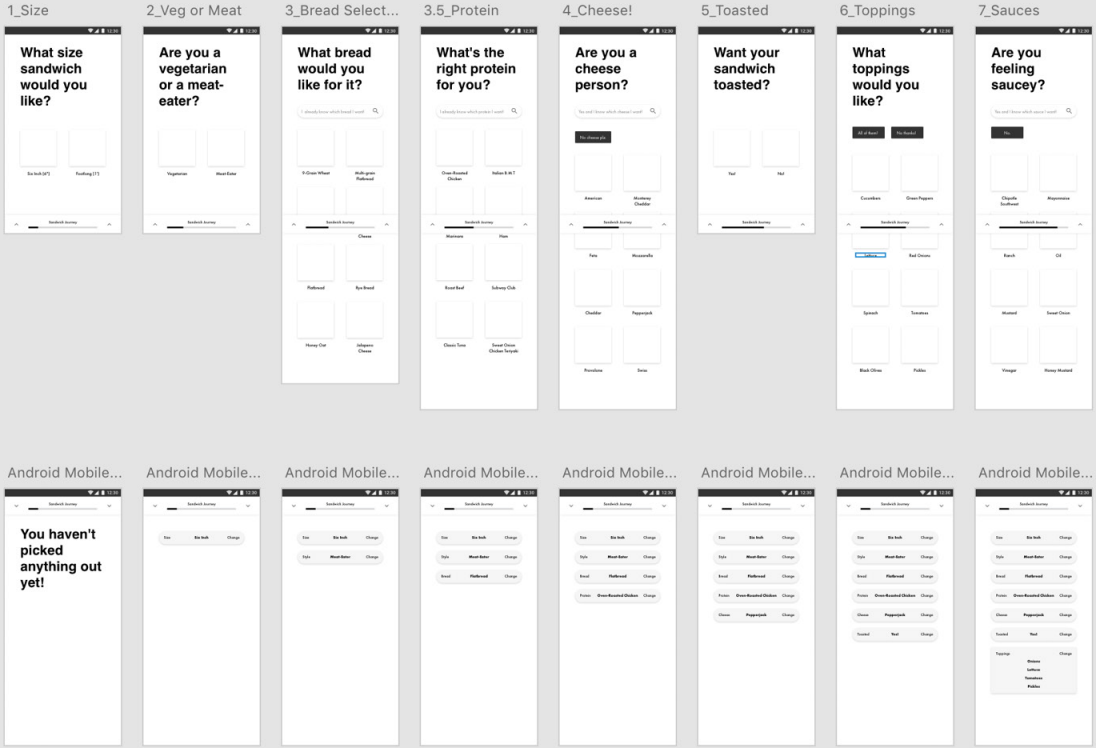
From here, alternative user flows were wireframed out - the brandless prototypes experimented with information architecture and interaction design principles. In particular:

1. Cognitive loading; an environment for tracking past choices
2. Visual representations of items to cut down mistakes
3. Making more steps; reduces confusion and error
4. ‘Saucier’ diction; less sterile experience


1_Size
What size sandwich would you like?
2_Veg or Meat
Are you a vegetarian or a meat-eater?
3_Bread Selection
What bread would you like for it?
3.5_Protein
What's the right protein for you?
4_Cheese!
Are you a cheese person?
5_Toasted
Want your sandwich toasted?
6_Toppings
What toppings would you like?
7_Sauces
Are you feeling saucey?
Android Mobile – 1
You haven't picked anything out yet!
Android Mobile – 2
Android Mobile – 3
Android Mobile – 4
Android Mobile – 6
Android Mobile – 5
Android Mobile – 7
Android Mobile – 8



UI Draft #1: Questions are made bombastic and hard to miss - a tab at the bottom is where choices are selected and history of decisions is displayed. User testing showed that being forced to open the tab every time was too much.



UI Draft #2: This time, choices are presented on the same screen as the question; The “Sandwich Journey” tab on the bottom displays a status bar to indicate progress, and expanding the tab provides history of decisions.


12:30
What size sandwich would you like?
Six Inch (6")
Footlong (1')
Sandwich Journey

Final Interface Decisions

1. Make the vegetarian option more prominent (don't discriminate!).
2. Multiple, simple discrete steps are easier to navigate than a few complex ones.
3. Past decisions and backtrack options are extremely useful.
4. Sarcastic wording of questions goes a long way to make the interface feel more human.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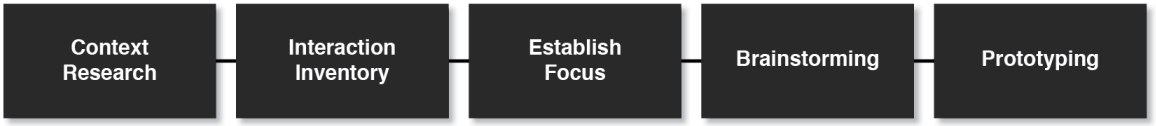
3 Motion Sense UI

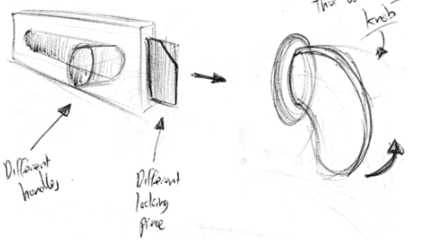
Final Deliverables	Concept for a re-designed public restroom sink motion sensor including physical prototypes, user interface applications, and contextual mock-ups
Team Size + Role	1 / Interaction designer
Time Frame	2 weeks (Winter 2019)
Programs Used	Adobe After Effects/Illustrator/Photoshop/Indesign, Solidworks, Keyshot
Client	Carnegie Mellon University

The Horrors of a Public Bathroom

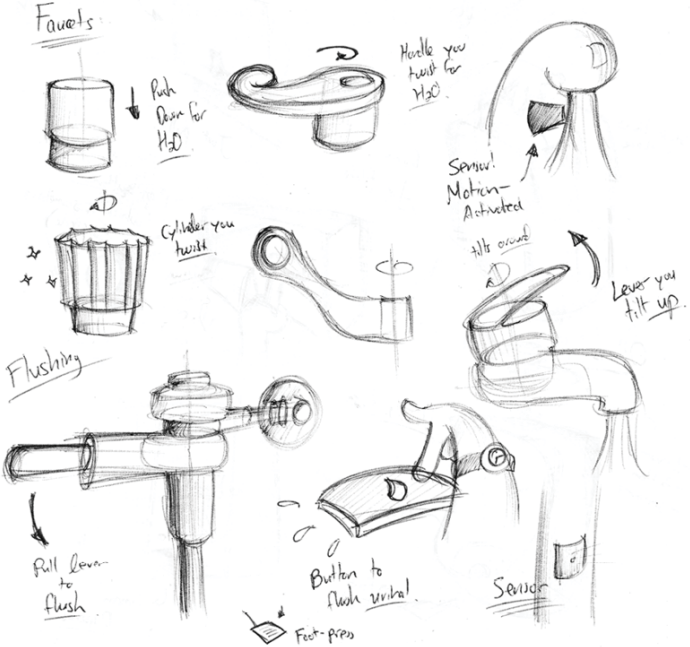
Vastly different from a home bathroom, the general perception is that a public bathroom is dirty, gross, and a place best used as quickly as possible while touching as little as possible.

Taking a more systematic approach to charting out the various interactions was the best way to manage them and analyze how they contribute to the balance of cleanliness and ease of use in public bathrooms.

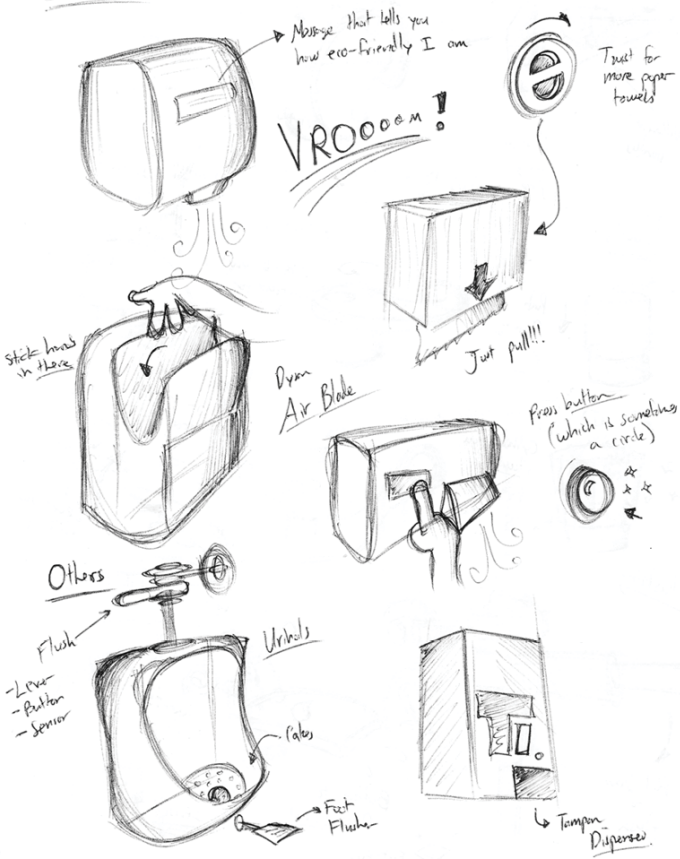




Faucets:



Hand-Dryer / Towels



Research + Interaction Inventory

Through exploring various public bathrooms and taking visual notes, five universal interactions were defined: locking a stall, flushing, washing hands, and two methods of drying hands. For each one, various factors were looked at and recorded, usually by focusing in on one particular control for each interaction.

Because of my own personal experience, along with insights from peers and students, I decided to start running with the interaction of washing one's hands with the control of an infrared motion sensor, since there seems to be a lot of (justifiable) hatred towards that specific public bathroom interaction.

	Control	Affordance	Signifier	Feedback
Drying hands after washing	Motion sensor within dryer (Dyson Airblade)	Activate sensor with hands to turn on dryer	Two shaped contours that imply where hands go	Noise, wind sensation when active
Washing hands in sink	Sensor found underneath faucet head	Activate sensor with hands to turn on water	None; lack of traditional faucets; small sensor	None; water running indicates ‘on’
Flushing the toilet after use	Flushing handle	Press down or pull up to flush the toilet	Cylindrical shape and side-mount implies motion	Handle displacement, sound of water
Locking the bathroom stall	Lock on the stall door	Connect door & stall to prevent opening	Small circular knob; grooves on lock housing	Moving part slides into ‘locked’ position in housing
Dispense paper towels	The paper towels themselves	Pull down on paper towel to remove	Paper towel is half out; arrows and signage	Noise; Second paper towel exiting on dispense

Ideate + Prototyping

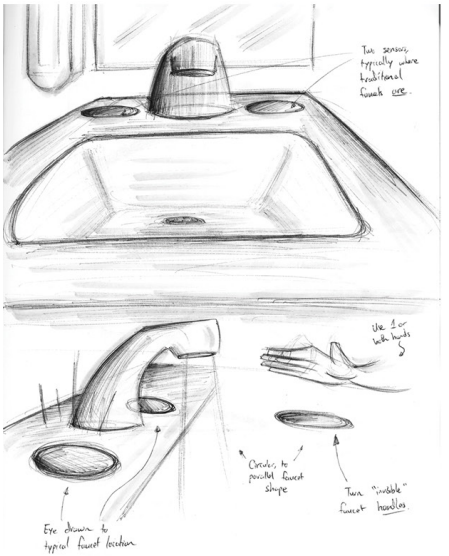
Since a lot of public bathroom controls have transitioned to using motion sensors, observing how those handle signifiers and feedback helped shed light on the control. This led to observing hand dryers, paper towel dispensers, and automatic flushers.

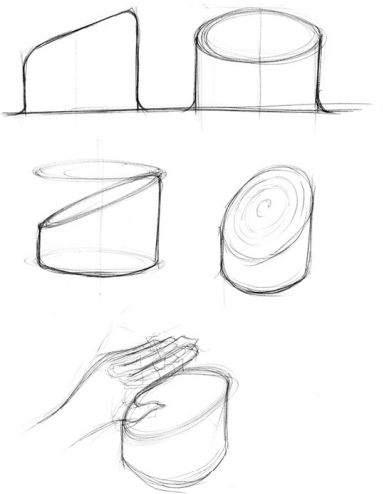
Three problems with current motion sensors in sinks were noticed:

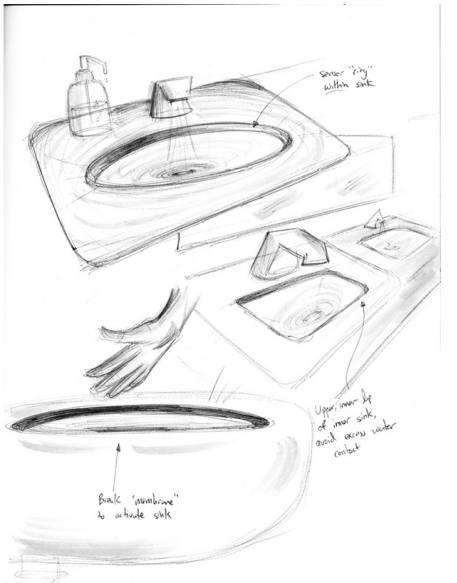
1. Sensors are hard to spot, and thus ambiguous about their field of detection
2. Space of interaction does not map to traditional faucet controls
3. Little to no feedback

From there, ideas were generated by only focusing on two variables:

1. Shape/size of sensor housing
2. Orientation and placement relative to the sink


Two sensors, typically where traditional faucets are.
Use 1 or both hands
Circular, to parallel faucet shape
Two "invisible" faucet handles
Eye drawn to typical faucet location




Sensor "ring" within sink
Upper inner lip of inner sink, avoid excess water contact
Basic "membrane" to activate sink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Final Solution Logic

Taking those two variables, the following goals for the redesign were:

1. Make the sensors easy to discover
2. Map motion controls to traditional sink faucets

From there, two characteristics of a solution are very apparent: Make the sensors a more prominent, larger feature of the sink instead of hiding them away, and map to traditional faucets.

The faucets are the first thing people notice of any sink, as it tells them whether the sink is a traditional one or an automatic. Having two sensors located adjacent to the faucet head not only makes the sensors easy to discover, but also plays off of the perception that the interaction space for turning on a sink is behind the faucet head, which is always true for traditional sinks with faucets. Making the sensors visible also opens the door to information display, which became an aspect of the redesign.


ZURN


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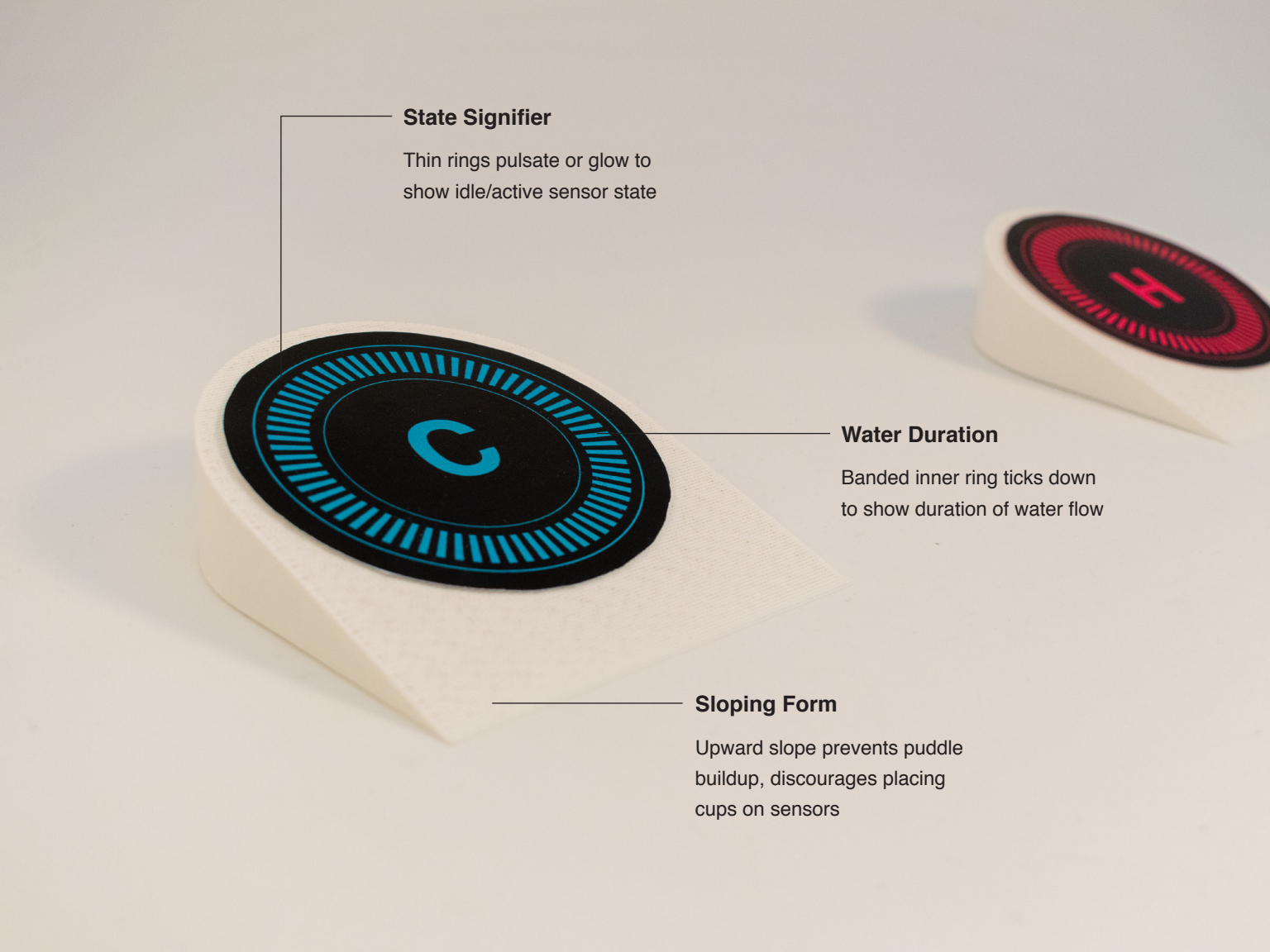
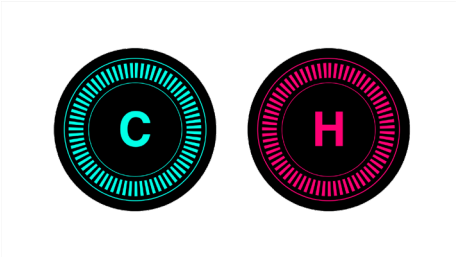
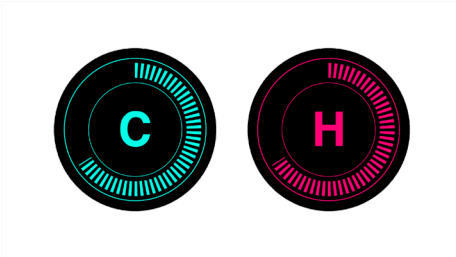
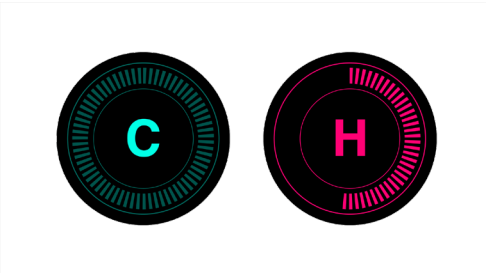

State Signifier
Thin rings pulsate or glow to show idle/active sensor state
Water Duration
Banded inner ring ticks down to show duration of water flow
Sloping Form
Upward slope prevents puddle buildup, discourages placing cups on sensors



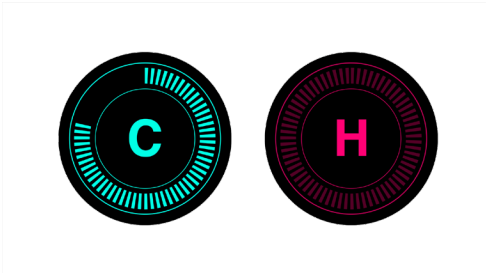
Idle State: Two thin circular bands pulsate to show “ready” state and encourage interaction



Both Sensors Triggered: Medium, temperate water runs, both banded rings tick down to show water run time before shutting off.



Hot Sensor Triggered: Warm water runs, only the hot sensor’s band ticks down. The cold sensor’s banded ring dims while the two thin bands pulse.



Cold Sensor Triggered: Cold water runs, only the cold sensor’s band ticks down. The hot sensor’s banded ring dims while the two thin bands pulse.

See more at:
www.edwinsamuelcho.com