

R for Management
Carnegie Mellon University

HUMAN-CENTERED DESIGN FOR DIGITAL PRODUCTS*

*in the public and social sectors

10.8.18

BROCADE
STUDIO





Hi, I'm Robert.



BROCADE STUDIO



MISSISSIPPI MUSEUM of ART



HARVARD Kennedy School
ASH CENTER
for Democratic Governance
and Innovation



LEGAL AID
JUSTICE CENTER



BRIDGEWAY
CAPITAL
Connect Opportunity with Capital



Who we've worked with.



HARVARD Kennedy School
ASH CENTER
for Democratic Governance
and Innovation

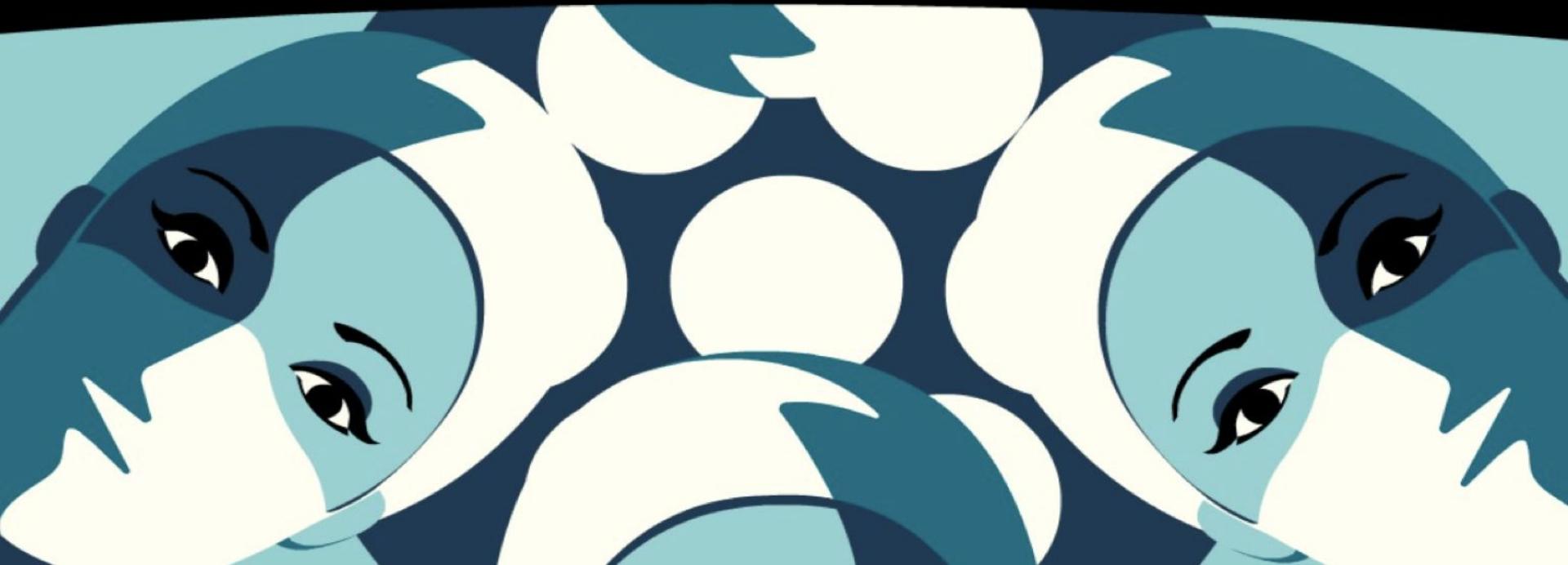
Putting Users First: Human-Centered Approaches in the Data-Smart City



BY ROBERT BURACK • DECEMBER 5, 2017

act one

THE UBIQUITY OF DESIGN



























8

Baggage

Claim

14-15

Baggage

Claim

14-15

WELCOME TO









STOP
HERE
ON
RED

URRAINE

NO
TURN
ON
RED

metrolink

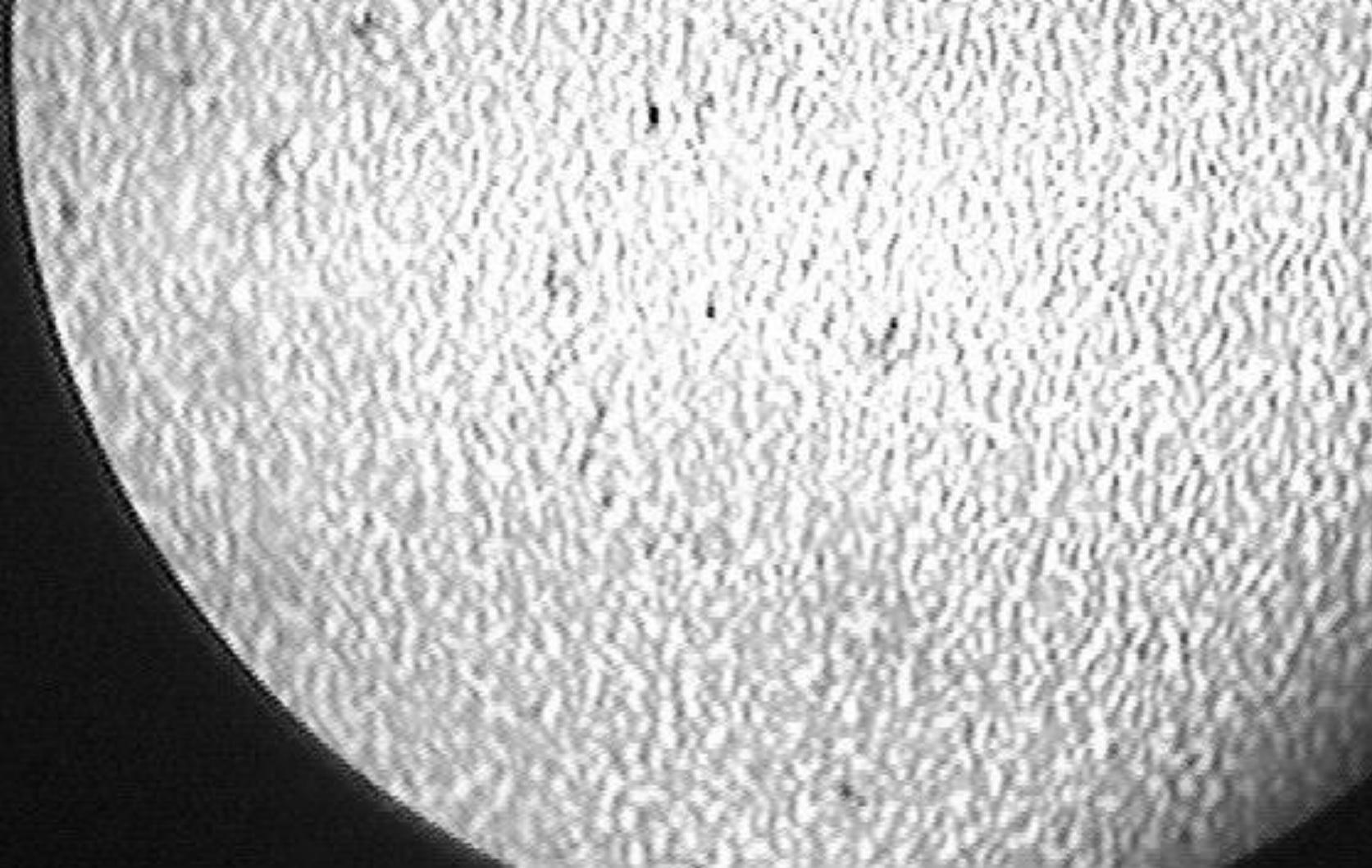
PUSH
BUTTON
FOR
SIGNAL





























EVERYTHING IS DESIGNED

All of this is the work **human decisions** - sometimes intentional, sometimes not, often biased or flawed - and the systems in which those decisions are made.

EVERYTHING IS DESIGNED

As individuals who have a personal ethos +
who are poised to enter the workforce, **you're**
in a position to help design a better world,
with better experiences and outcomes.

QUESTION

WHAT IS ONE WAY IN WHICH DESIGN HAS INFLUENCED YOUR LIFE?

Large or small; recently or as an adolescent; meaningfully or tangentially.

**WHAT IS
HUMAN-CENTERED
DESIGN?**

FRAMEWORK

A framework for developing solutions,
solving problems, developing products,
designing programs,

that involves the perspective of users
clients, residents,

in all steps of the process.

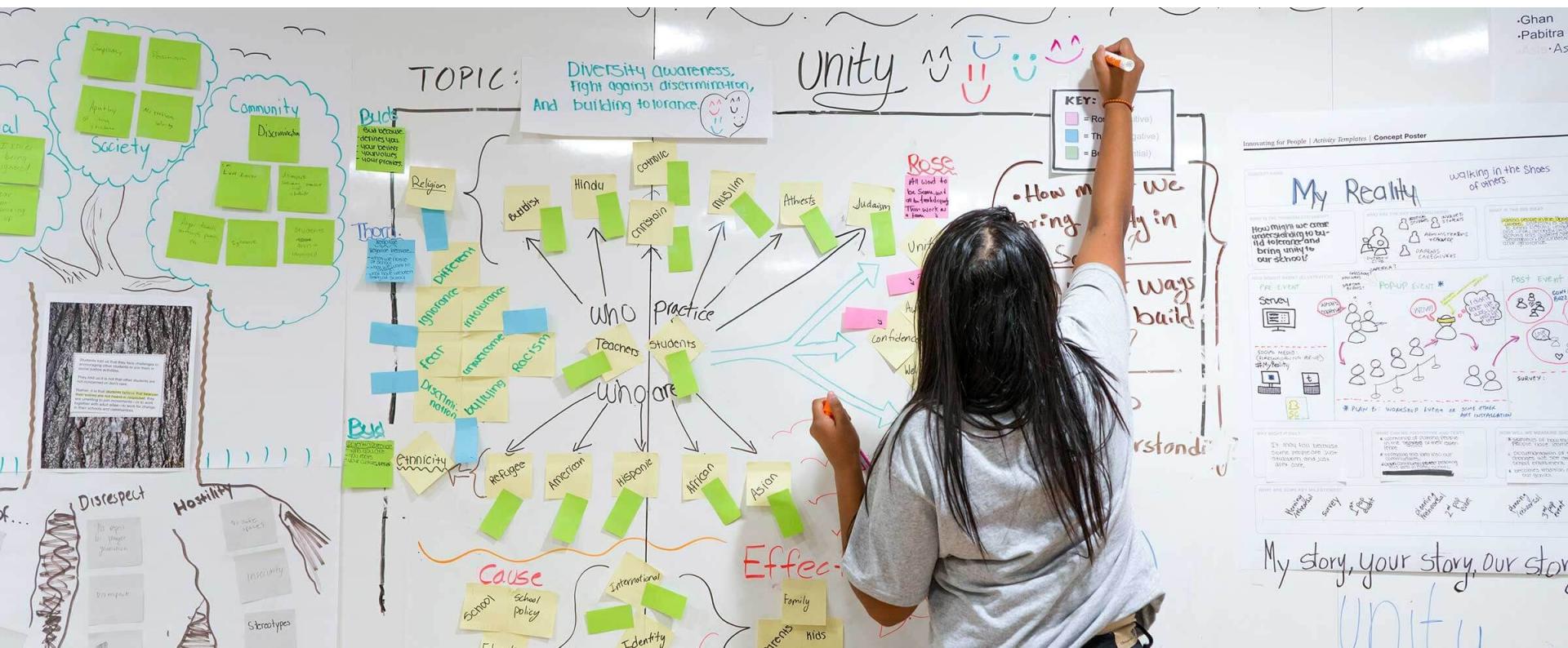
FRAMEWORK

A framework for developing solutions,
solving problems, developing projects,
designing programs,

CONTEXTS,
THOUGHTS,
BELIEFS,
FEELINGS,
EMOTIONS.

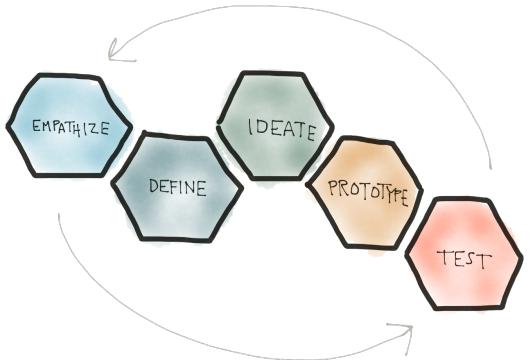
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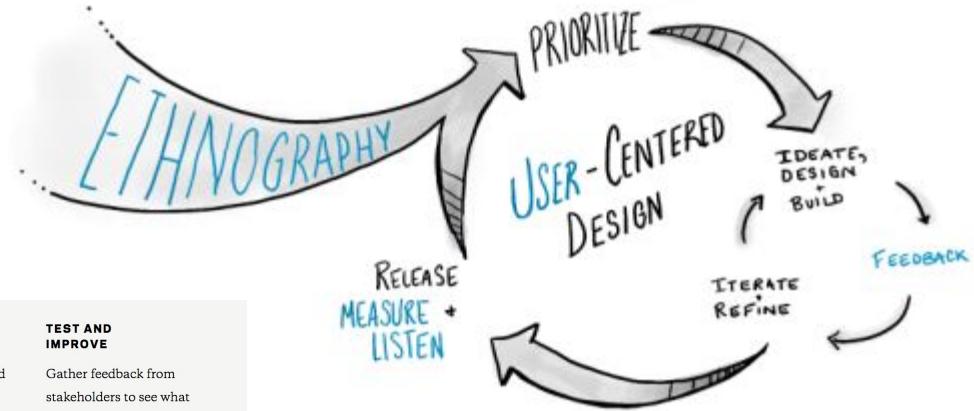
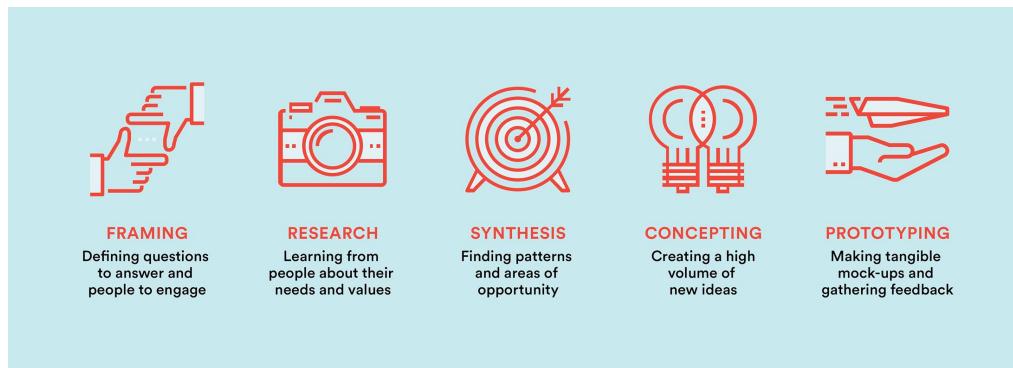


A SYSTEMATIC APPROACH TO PROBLEM SOLVING

ALSO, A TOOLKIT OF APPROACHES.



LOOK, LISTEN AND LEARN	REFLECT AND REFRAME	IMAGINE AND IDEATE	CREATE AND BUILD	TEST AND IMPROVE
Examine the needs and desires of the people in and around the issue/topic, and uncover insights about their lives.	Explore new perspectives based on earlier insights, and identify one or two core challenges to tackle.	Explore all possible and (seemingly!) impossible way to address the challenge, and then further develop and refine this exploration.	Take the best ideas and bring them to life, building prototypes for products, programs, or services.	Gather feedback from stakeholders to see what can be improved. By sharing prototypes with the community, we can gain direct insight into the desirability, feasibility, and viability of the solutions



INSPIRATION

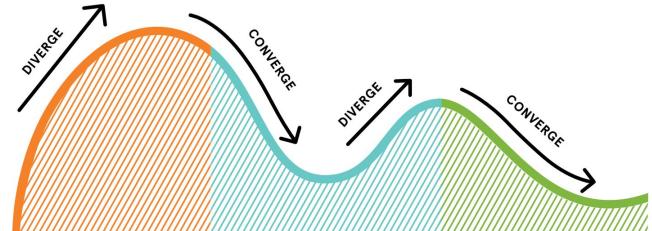
IDEATION

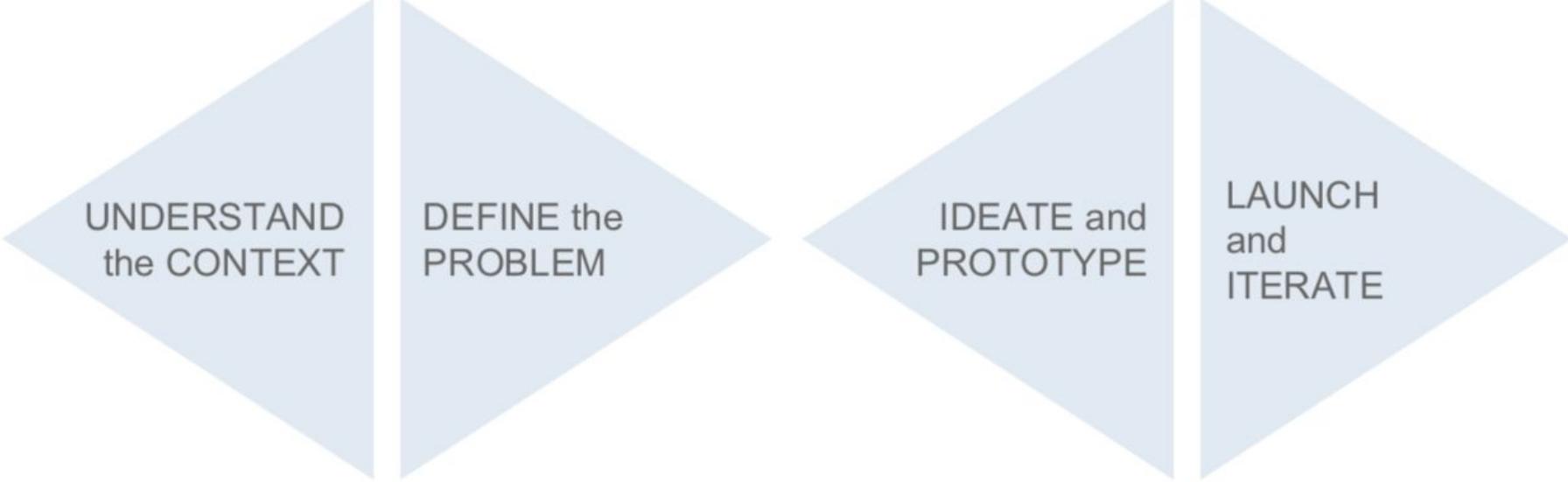
IMPLEMENTATION

INSPIRATION
I have a design challenge.
How do I get started?
How do I conduct an interview?
How do I stay human-centered?
How do I make a prototype?

IDEATION
I have an opportunity for design.
How do I interpret what I've learned?
How do I turn my insights into tangible ideas?
How do I make a prototype?

IMPLEMENTATION
I have an innovative solution.
How do I make my concept real?
How do I assess if it's working?
How do I plan for sustainability?





UNDERSTAND
the CONTEXT

DEFINE the
PROBLEM

IDEATE and
PROTOTYPE

LAUNCH
and
ITERATE

A SYSTEMATIC APPROACH TO PROBLEM SOLVING

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Pittsburgh's Tall Parking Meters Draw Lawsuit

 Like

 Share

35 people like this. Be the first of your friends.

[Contact The Editor](#)

When the City of Pittsburgh began replacing its parking meters, it chose not to go with wheelchair-accessible kiosks. Which is why Debra Stemmler, a wheelchair user, made the case back in October 2013 that since she couldn't access the machine, she shouldn't have to pay the ticket.

After all, she even left a note on her windshield explaining why she didn't pay.

Eventually the City dismissed the ticket. Unfortunately, it also dismissed the problem. This has Stemmler and other wheelchair-using city residents so steamed that they filed a class-action ADA lawsuit on March 9.



"We tried to be nice about it," says Stemmler, 53, a research specialist at the University of Pittsburgh's Graduate School of Public Health. "We even offered possible solutions." For example, the city could adopt a policy of not issuing tickets to people parked at inaccessible meters who have disabled parking placards or plates. Without any kind of policy at all, wheelchair users are forced to

LARGER

PARADIGM

SHIFTS

STEPHEN GOLDSMITH
NEIL KLEIMAN

A New City O/S

THE POWER OF OPEN, COLLABORATIVE,
AND DISTRIBUTED GOVERNANCE



STEPHEN GOLDSMITH
NEIL KLEIMAN

A New City O/S

THE POWER OF OPEN, COLLABORATIVE,
AND DISTRIBUTED GOVERNANCE



Cities must adopt a user-centric orientation that mirrors industry's success in meeting customer needs through user experience.

Requires more fundamental changes to the ways in which our cities operate, and the methods by which they work to understand and meet resident needs.

STEPHEN GOLDSMITH
NEIL KLEIMAN

A New City O/S

THE POWER OF OPEN, COLLABORATIVE,
AND DISTRIBUTED GOVERNANCE



The main insight that drove industrial efficiencies was *standardization*. The opposite insight drives digital efficiencies: **specialization**.

Previously: residents/customers were required to adapt to the standard expectations of a large system. This was the only way to successfully achieve efficiencies of scale.

Digital technology makes that no longer the case. **Digital products** and services have the ability to adapt to the user. They **exist as dynamic experiences that can be designed around the expectations of targeted communities of users**.



18F partners with federal agencies to help you deliver exceptional digital experiences that address your strategic initiatives. Each engagement is structured as a close partnership between an 18F team and your agency. Our work together is guided by understanding the needs of users, testing to validate hypotheses, shipping often, and making our work open to the public. Learn a little bit more below or find more information in the [18F Partnership Principles](#) and the [U.S. Digital Services Playbook](#).

Our principles



Building partnerships

Civil servants have tremendous knowledge about what it takes to achieve their agency's mission. We build successful partnerships by pairing our technical expertise with your experience.



Human-centered design

We listen to real users to understand their needs and build things that will be useful to them — without sacrificing technical or regulatory requirements.



Agile methods

We use proven private-sector techniques to test assumptions, make



OUR SERVICES

We partner with government organizations looking for new approaches to address their most complex challenges. With a focus on building design capacity, we have unique insights from our experience implementing public sector design for innovation across the Federal Government. We use human-centered design to help organizations respond to difficult challenges by putting people at the center of our problem solving process. Our three main goals are to serve as leaders, doers, and teachers of human-centered design in order to build an innovative Federal workforce ready to solve public sector challenges.

CITY of **BOSTON**

Mayor Martin J. Walsh

NEW URBAN MECHANICS

As the City's civic research and development team, we pilot experiments that aim to improve the quality of life for Boston's residents.

the **MAYOR'S OFFICE** *of*
NEW URBAN
MECHANICS
PHILADELPHIA



www.nyc.gov/civic-service-design

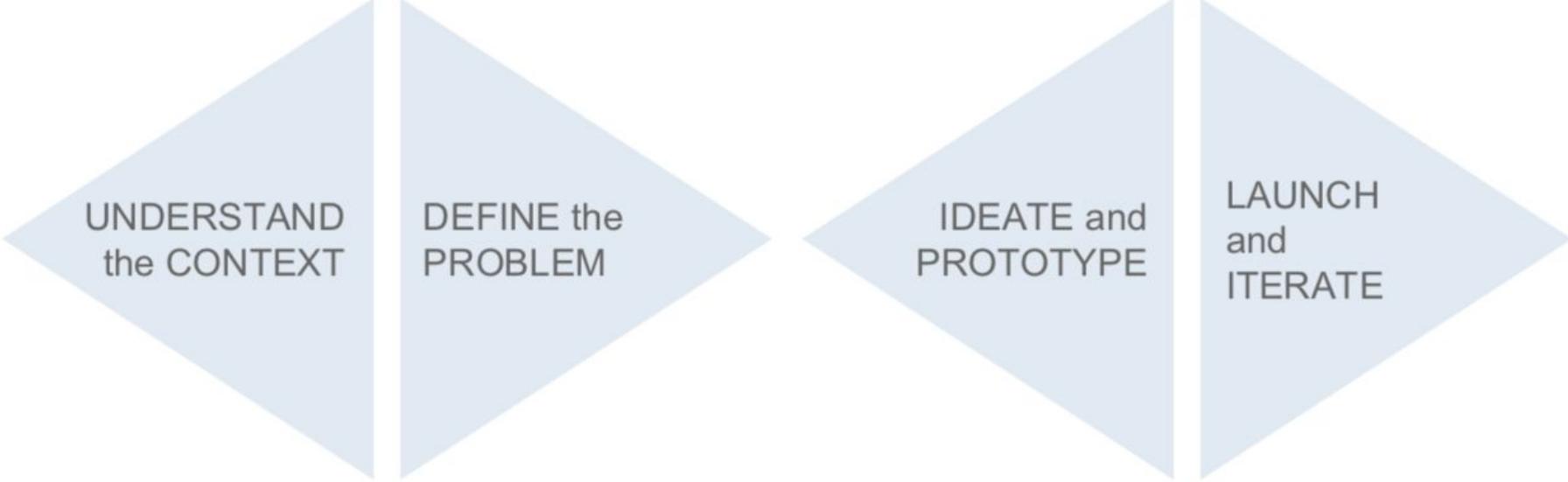
The screenshot shows a web browser window with the URL www.nyc.gov/civic-service-design. The page features a header with a blue and orange circular logo containing the text "Civic Service Design". To the right of the logo, the words "Tools + Tactics" are displayed next to a stylized blue and white geometric icon. The main content area has a white background. On the left, large dark blue text reads "Making public services more effective, accessible and simple for all New Yorkers." A large black downward-pointing arrow is positioned below this text. To the right, there is a vertical column with a purple header featuring a stylized eye icon, followed by a pink section featuring a horizontal slider icon.

Making public services more effective, accessible and simple for all New Yorkers.

GET STARTED

Governments are embracing design — not as a trend, but as a way to transform how we deliver services and information to the public.

Civic Service Design Tools + Tactics is an introduction to service design for



UNDERSTAND
the CONTEXT

DEFINE the
PROBLEM

IDEATE and
PROTOTYPE

LAUNCH
and
ITERATE

A SYSTEMATIC APPROACH TO PROBLEM SOLVING

UNDERSTAND

CONTEXT



STAKEHOLDER/COMMUNITY MAP

UNDERSTAND CONTEXT <



INTERVIEWING

UNDERSTAND CONTEXT <

DYNAMIC CONVERSATION:

Choose your method(s).
Develop and test questions.
Build rapport before you begin.
Transparency about what will be done with the information.
Build rapport once you begin.
Actively listen.
Be aware of non-verbals.
Seek to understand.
Ask one question at a time.
There are no "stupid" questions.
Unpack jargon.
Leave room for silence.
Avoid assumptions - seek clarity.
Restate if you're confused.
Avoid judgement and aim for neutrality.
Be prepared to share what's next.



INTERVIEWING

UNDERSTAND CONTEXT <

DYNAMIC CONVERSATION

DIRECTED STORYTELLING

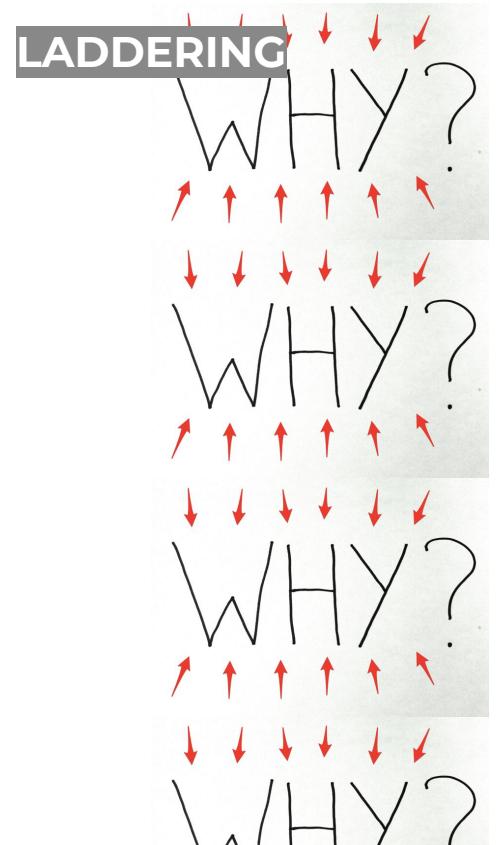


INTERVIEWING

UNDERSTAND CONTEXT <

DYNAMIC CONVERSATION

DIRECTED STORYTELLING





What people say,
what people do, and
what people say they
do are entirely
different things.
- (boiled down) Margaret Mead

OBSERVATION + CONTEXTUAL INQUIRY

UNDERSTAND CONTEXT <

emotional needs

+ rational wants.

DEFINE THE

PROBLEM

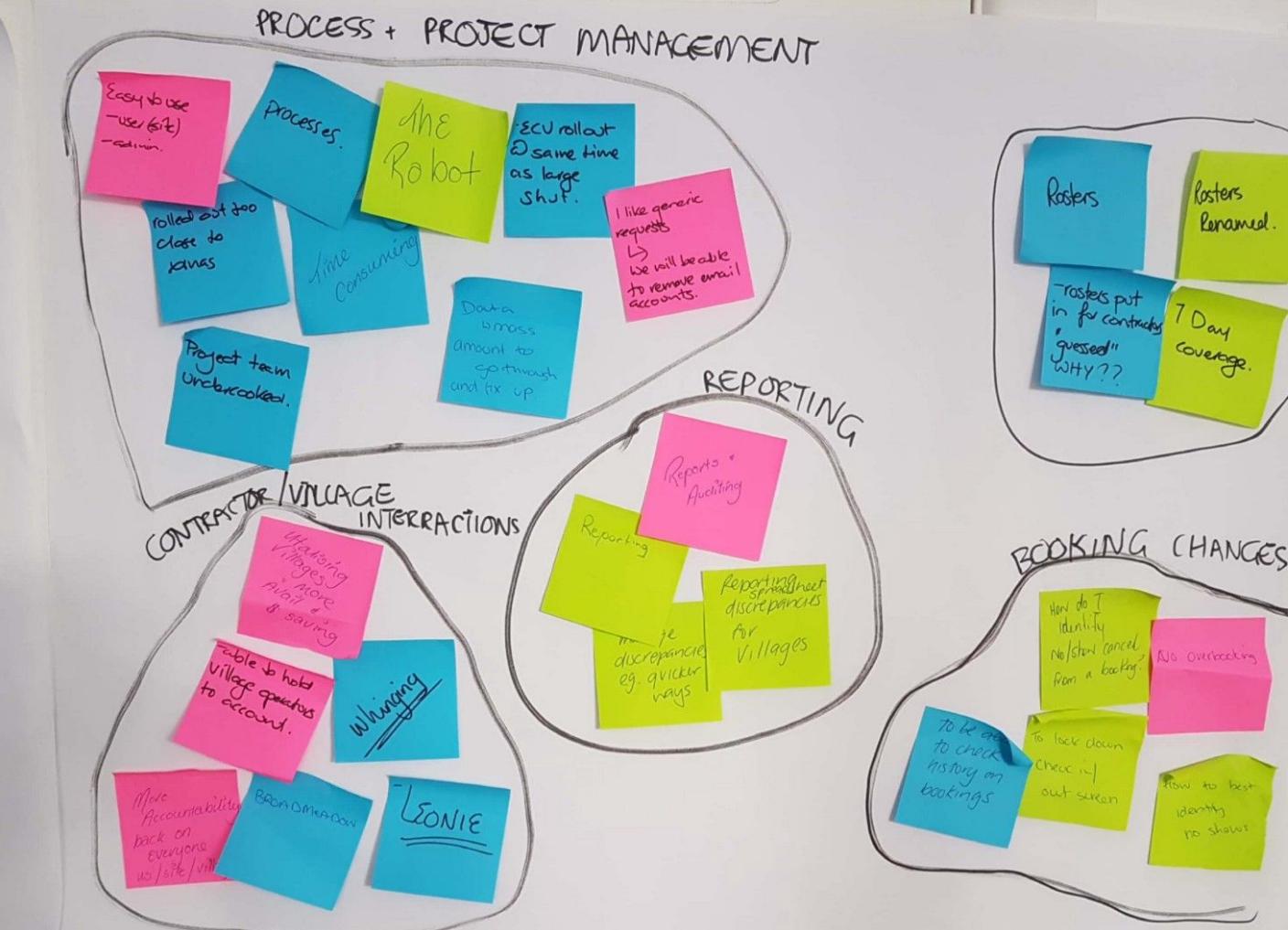
(OR OPPORTUNITY)



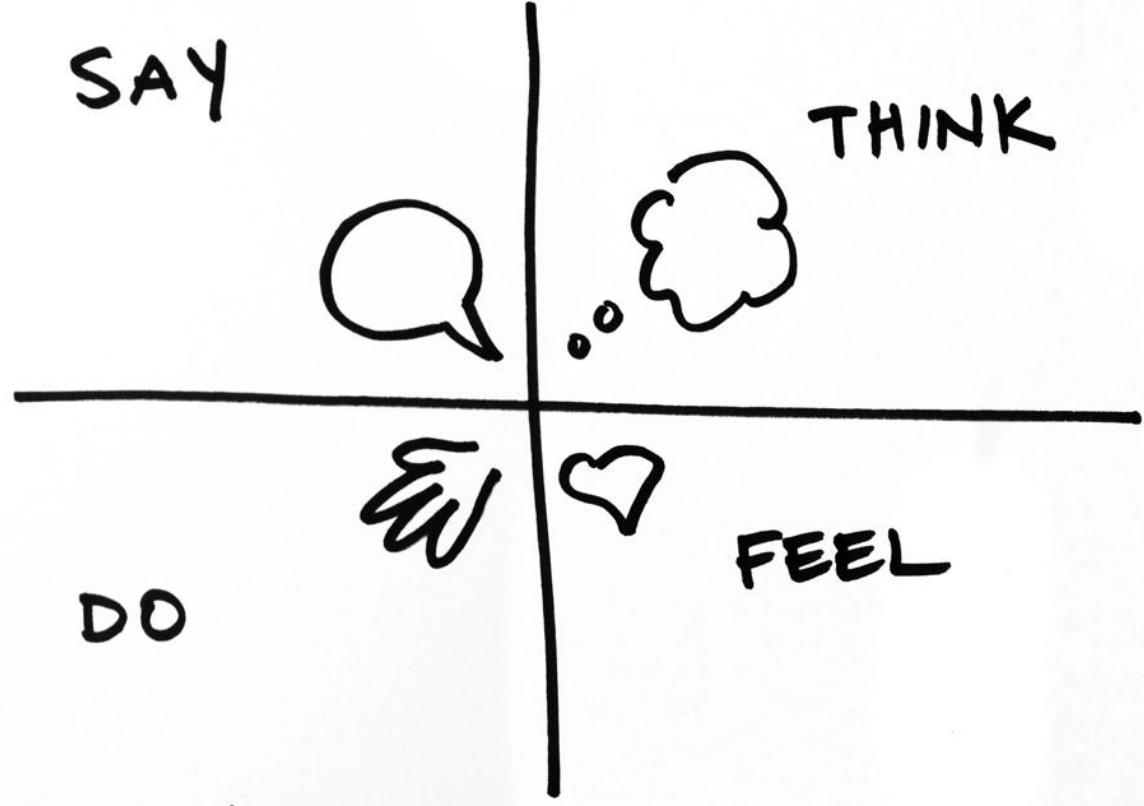
UNDERSTAND
the CONTEXT

DEFINE the
PROBLEM

SYNTHESIZE DEFINE <>



SYNTHESIZE
DEFINE <>



observed <.....> inferred

SYNTHESIZE

DEFINE <>



QUALITATIVE DATA

(QUOTES/OBSERVATIONS/ETC) TO

THEMES/CLUSTERS TO

INSIGHTS (INSIGHT STATEMENTS) TO

OPPORTUNITY STATEMENTS

SYNTHESIZE

DEFINE <>



How's

Might

We?

FRAME THE PROBLEM/OPPORTUNITY

DEFINE <>

The South Mall Visitor Journey

SUMMARY OF VISITOR MOMENTS



JOURNEY + EXPERIENCE MAPPING

DEFINE <>



We were allowed to select a partner for this project

We spent a couple days in class designing a lot of our own rubric

We had a while to create our own "museum artifacts" to utilize in our later presentation of our project

We had a chance to see our entire class's presentations and we got to present in a museum format to more people

My partner and I got good grades



We had about a week to take all of our notes and find good primary sources

(which kept us from wasting time, but went very quickly)

We had to also quickly draft our entire presentation outside of class

We filled out some basic feedback/partner evaluation forms

Our topic selection was competitive/ done online with the entire grade

We only got 1 chance to rehearse with our partners in class

(which is understandable, but made practicing harder to coordinate)

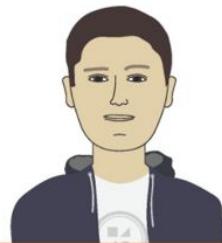
JOURNEY + EXPERIENCE MAPPING

DEFINE <>

Meet the users of NYC's open data.

CURRENT
OPEN DATA USERS

POTENTIAL
OPEN DATA USERS



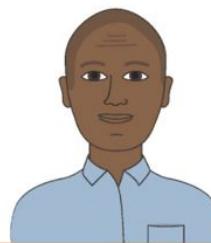
KENT
Meticulous
Mapper



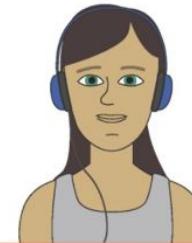
ROMAN
Local
Liason



JUNE
Influential
Interpreter



MARCUS
Equipped
Explorer



SARAH
Busy
Bystander

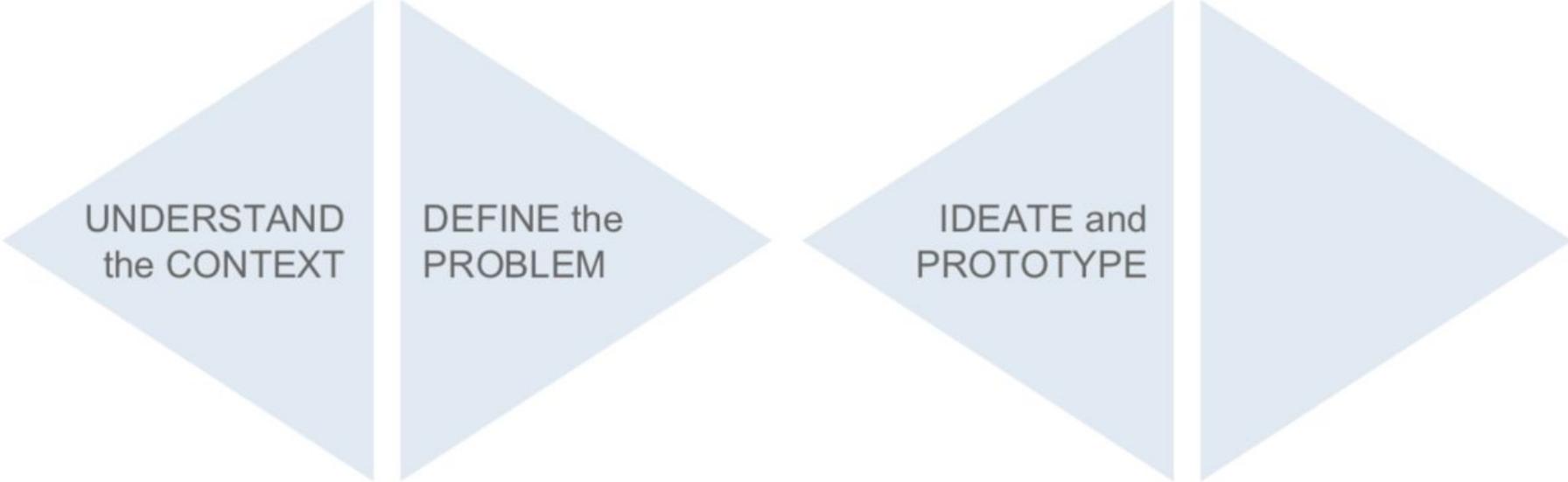


ALANA
Community
Champion

PERSONAS

DEFINE <>

**IDEATE AND
PROTOTYPE**



UNDERSTAND
the CONTEXT

DEFINE the
PROBLEM

IDEATE and
PROTOTYPE

	CLIENTS	PROGRAMS	BAR GROUPS	VA SUPREME COURT	LEGISLATURE	BANKERS ASSOC.
WHAT DOES NEED FROM LSCV?	Appropriate Representation	#	Appropriate Representation	Interim Representation for clients in need of representation	VA legislature to be represented	VA legislature to be represented
WHAT CAN LSCV OFFER TO ?	CLIENT representatives available	CLIENT representatives available	CLIENT representatives available	CLIENT representatives available	CLIENT representatives available	CLIENT representatives available
WHAT CAN OFFER TO LSCV?	CLIENT representatives available	CLIENT representatives available	CLIENT representatives available	CLIENT representatives available	CLIENT representatives available	CLIENT representatives available
WHAT WOULD YOU ASK ?	CLIENT representatives available	CLIENT representatives available	CLIENT representatives available	CLIENT representatives available	CLIENT representatives available	CLIENT representatives available
WHAT DO WE THINK WE KNOW ABOUT ?	CLIENT representatives available	CLIENT representatives available	CLIENT representatives available	CLIENT representatives available	CLIENT representatives available	CLIENT representatives available

STRUCTURE IDEA GENERATION

IDEATE + PROTOTYPE <><

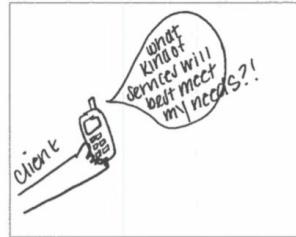


PRIORITIZE IDEAS

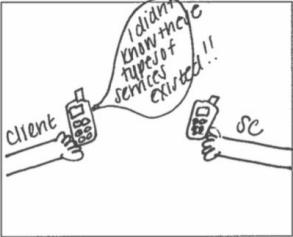
IDEATE + PROTOTYPE <><



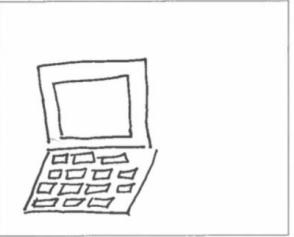
Storyboarding



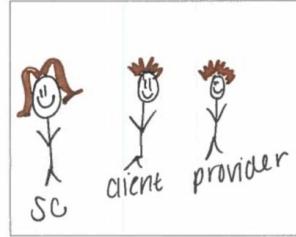
client calls the SC
looking for some resources



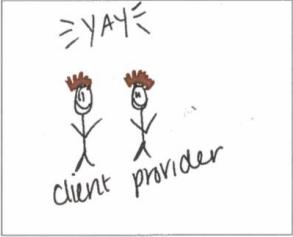
we discuss what kind of
resources the client is looking
for/what's needed/wanted.



The JC researcher
discusses services that may fit
the client's needs with their team.
They will discuss w/ the client



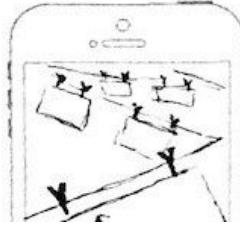
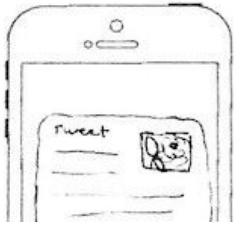
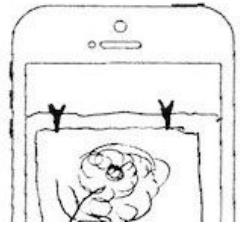
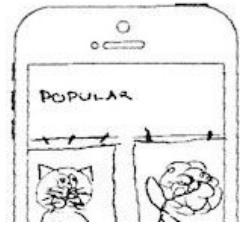
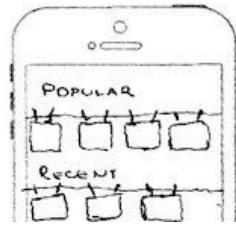
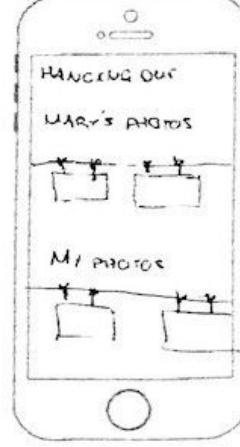
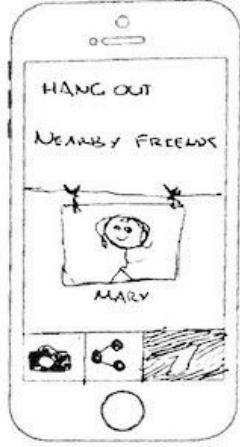
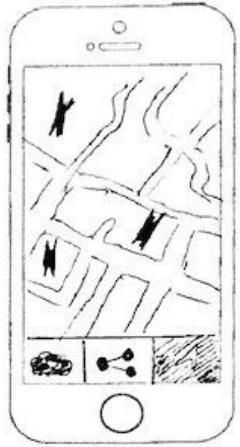
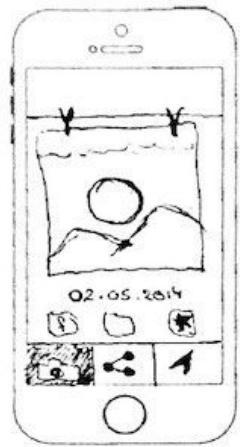
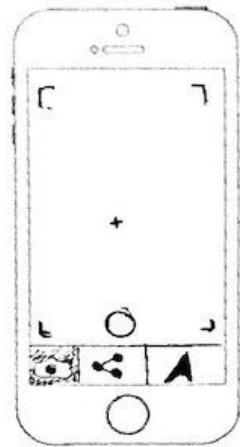
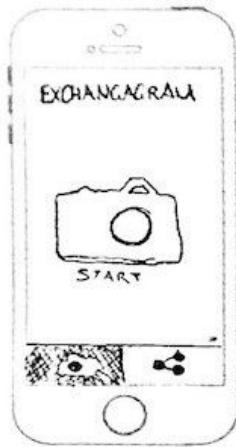
The JC meets w/ the client
& chosen provider to see
if the services are a
good fit to get things
started.



YAY!
client provider
services are started

STORYBOARDING

IDEATE AND PROTOTYPE <><



PHYSICAL PROTOTYPING

IDEATE + PROTOTYPE <><



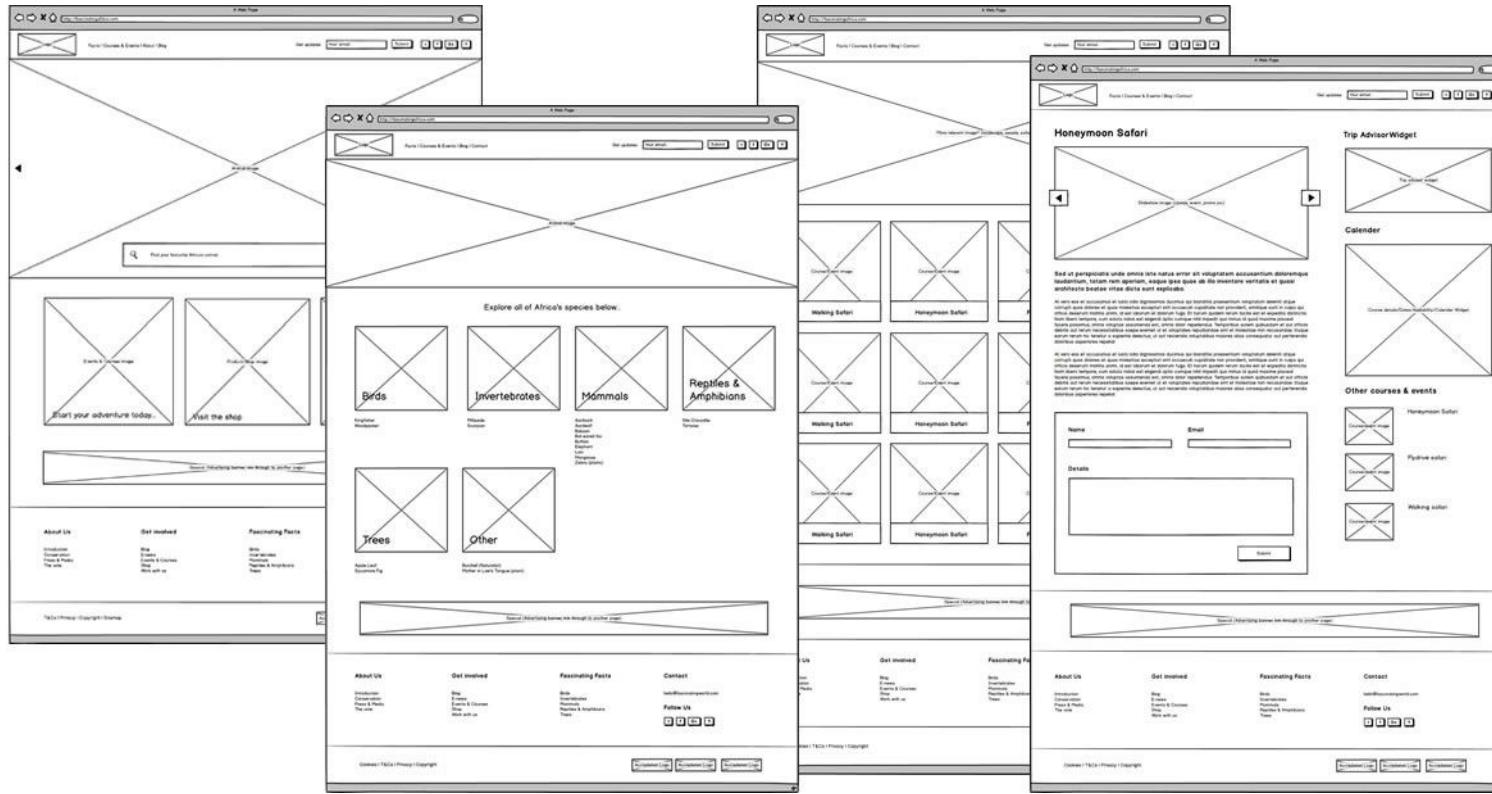
PHYSICAL PROTOTYPING

IDEATE + PROTOTYPE <><



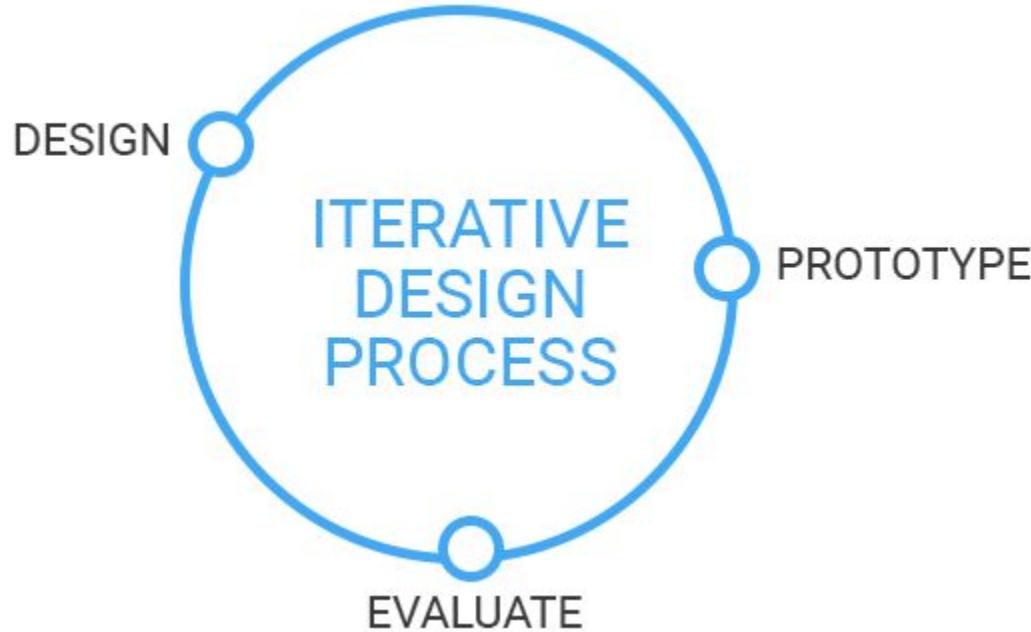
BODYSTORMING

IDEATE + PROTOTYPE <><



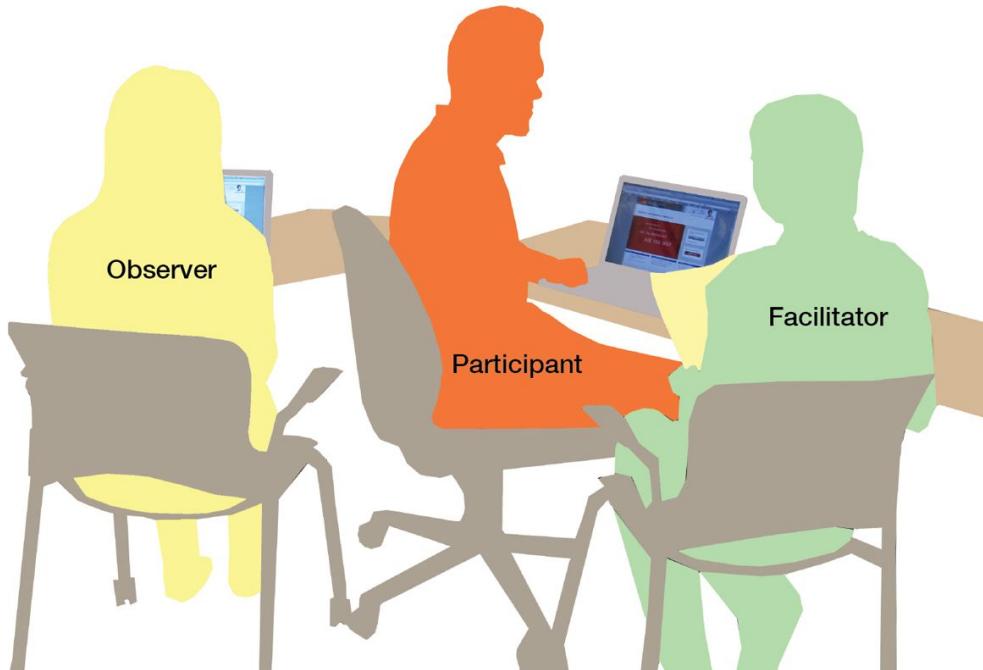
WIREFRAMING

IDEATE + PROTOTYPE <><



REFLECTIVE PROTOTYPING

IDEATE + PROTOTYPE <><



COGNITIVE WALKTHROUGH

IDEATE + PROTOTYPE <><

UX

UX is, simply, user experience.

UX design is the process of designing (digital or physical) products that are useful, easy to use, and delightful to interact with.



Minimum
Viable
Product



Minimum
Delightful
Product

Ensuring that (digital or physical) products are useful, easy to use, and delightful to interact with.

“A method to assess how easy it is for your target users to use your product.”

Goal: as intuitive to use and delightful as possible.

Who taught you how to use Facebook?



Questions



Tasks



Scenarios



Questions

Discover problems.

Measure effectiveness.

Understand satisfaction.

They have clear objectives,
but are not prescriptive.

*Do not require the user to
have special knowledge.*



Goal: Review of a homepage.

~~Do you like this homepage?~~

Questions

Review the homepage.



What do you think this website does? Who do you think is the target audience?



Tasks

Ask you to accomplish something.

Relatively concise.

Based on user research.

Can be clear or ambiguous.

Do not require the user to have
special knowledge.



Tasks

Goal: Determine whether a task is easy to complete.

~~Click the “data” link and select the “crime dataset”, then sort by date and find the most recent incident.~~

Find the most recent incident of crime.
What happened?



Scenarios

The user (or test subject) inhabits a scenario and interacts with the product, application, or service accordingly.

Based on user research.

Do not require the user to have special knowledge.



Script

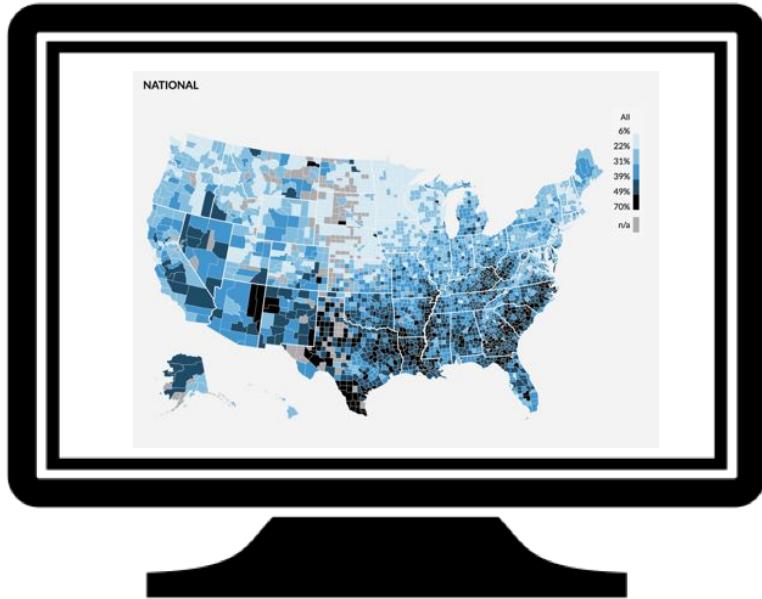
Why. "We want to make getting a
building permit easy..."



Script

What.

"We'll ask you to do a few tasks. As you do each one, talk out loud – everything you're thinking – even if it's as small as *what's that word mean?* or *I'm going to click...* – the more you say, the more we'll learn – it's a test you can't fail... in fact, anything that's confusing is actually helpful."

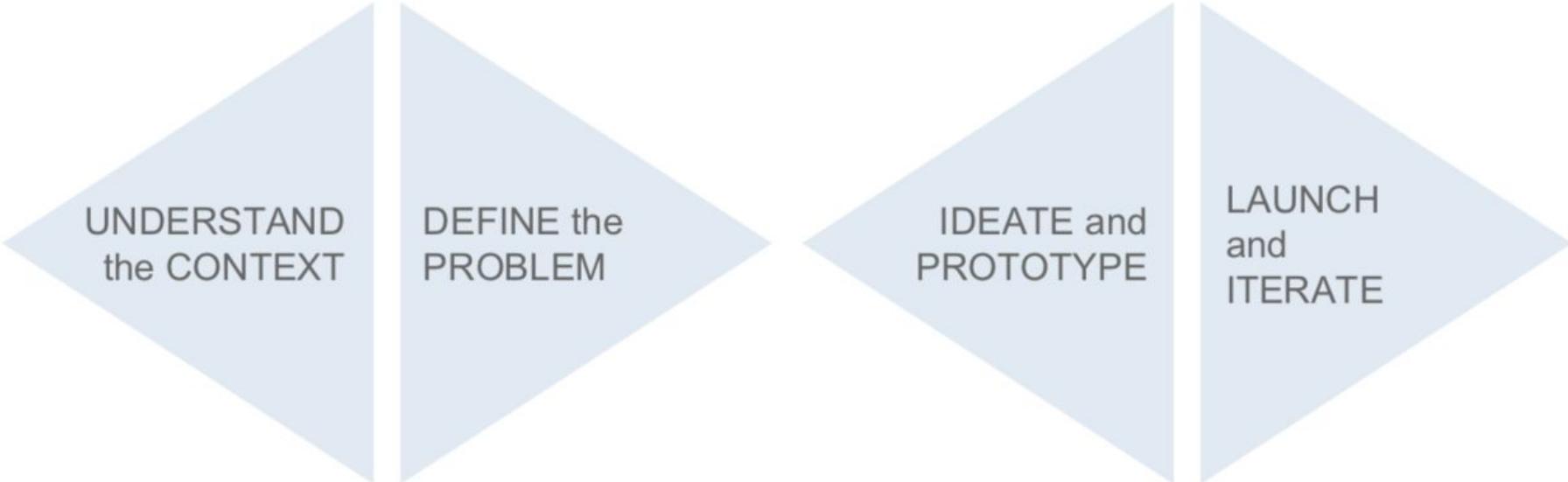


Try it out.

What would you expect to happen if you clicked on the map?
What type of information might you find?

LAUNCH

AND ITERATE



UNDERSTAND
the CONTEXT

DEFINE the
PROBLEM

IDEATE and
PROTOTYPE

LAUNCH
and
ITERATE

RStudio

File Edit Code View Plots Session Project Build Tools Help

Untitled1* | Source on Save | Run | Source | Values | R Script | Fitting Linear Models | Description | Usage | Arguments

```
1 rm(list = ls())
2 N <- 1000
3 u <- rnorm(N)
4 x1 <- -2 + rnorm(N)
5 x2 <- 1 + x1 + rnorm(N)
6 y <- 1 + x1 + x2 + u
7 r1 <- lm(y ~ x1 + x2)
8
9
10 |
```

10:1 (Top Level) :

Console ~/

Tapez <Entrée> pour voir le graphique suivant :
Tapez <Entrée> pour voir le graphique suivant :
Tapez <Entrée> pour voir le graphique suivant :
>
> ?lm
> rm(list = ls())
> N <- 1000
> u <- rnorm(N)
> x1 <- -2 + rnorm(N)
> x2 <- 1 + x1 + rnorm(N)
> y <- 1 + x1 + x2 + u
> r1 <- lm(y ~ x1 + x2)
> |

Workspace History Import Dataset Values Files Plots Packages Help R: Fitting Linear Models Find in Topic lm [stats] R Documentation

1000 lm[12] numeric[1000] numeric[1000] numeric[1000] numeric[1000]

Fitting Linear Models

Description

lm is used to fit linear models. It can be used to carry out regression, single stratum analysis of variance and analysis of covariance (although [aov](#) may provide a more convenient interface for these).

Usage

```
lm(formula, data, subset, weights,
method = "qr", model = TRUE, x =
singular.ok = TRUE, contrasts =
```

Arguments

DEVELOP

LAUNCH AND ITERATE <><>

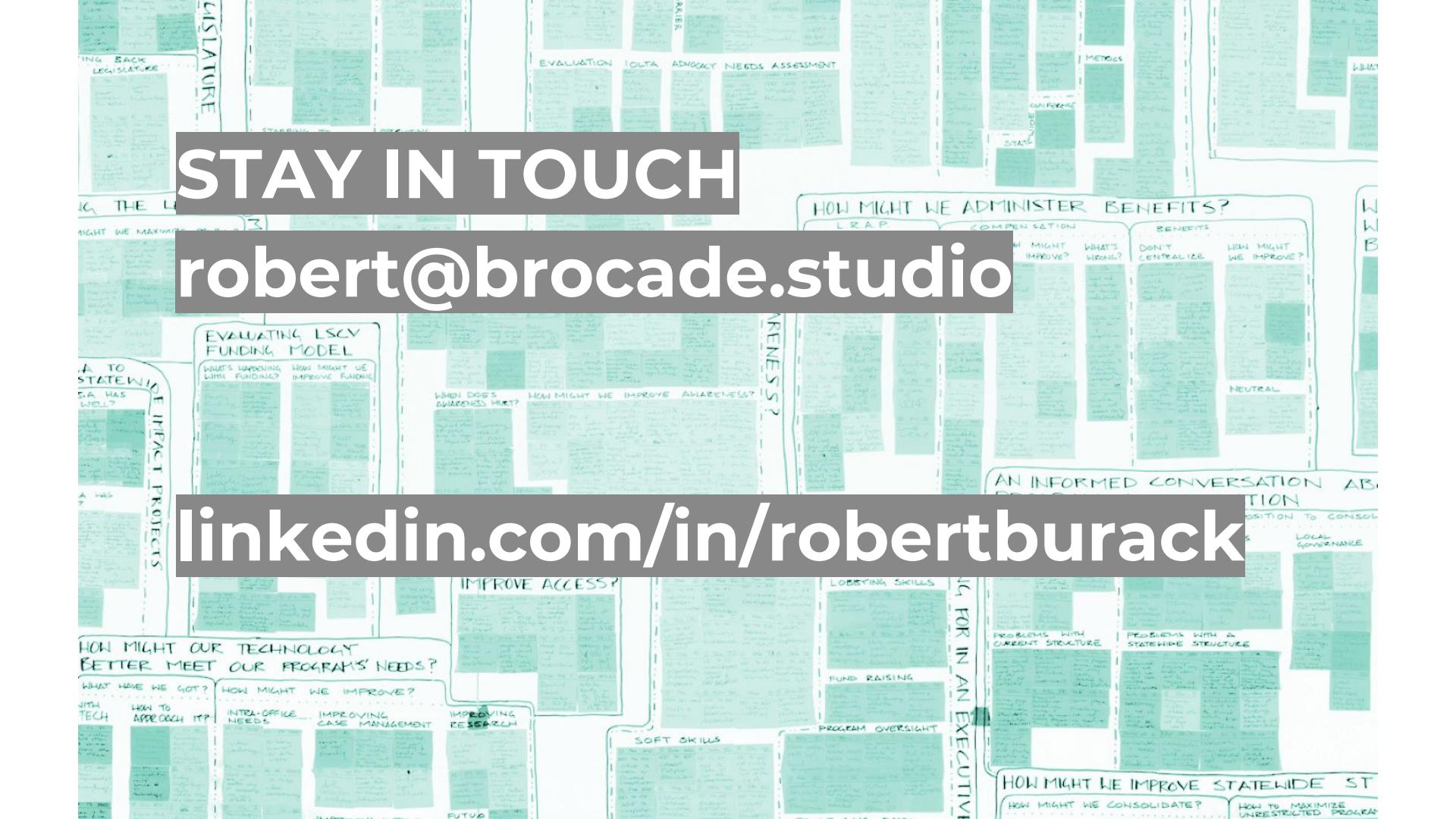


SOCIALIZE

LAUNCH AND ITERATE <><>

**WHAT QUESTIONS DO
YOU HAVE FOR ME
AND FOR EACH
OTHER?**





STAY IN TOUCH

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R for Management
Carnegie Mellon University

HUMAN-CENTERED DESIGN FOR DIGITAL PRODUCTS*

*in the public and social sectors

10.8.18

BROCADE
STUDIO

