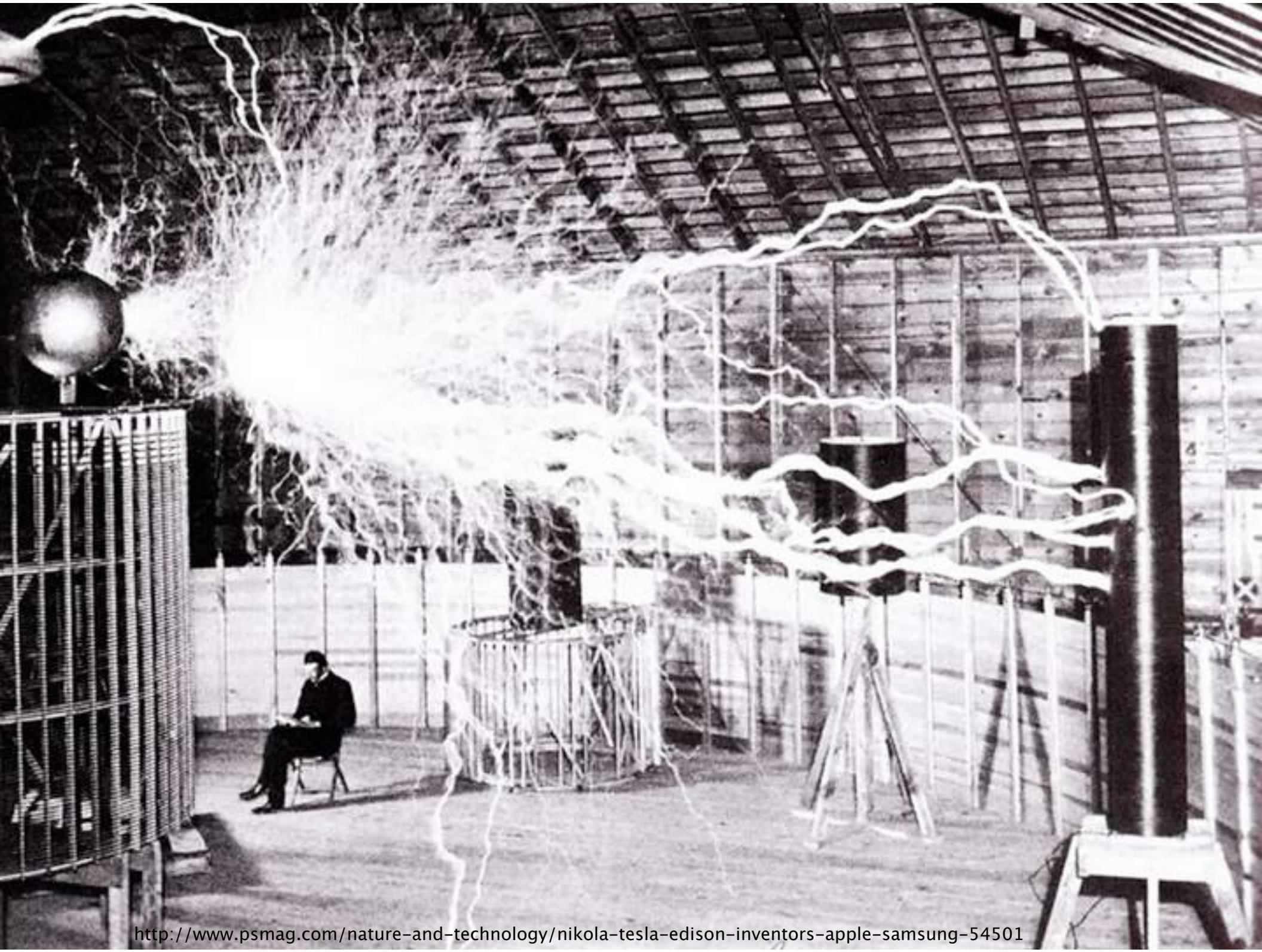
Advancing Collective Innovation

for business and civics

Steven Dow and Narges Mahyar
UC San Diego's Design Lab
January 25, 2017



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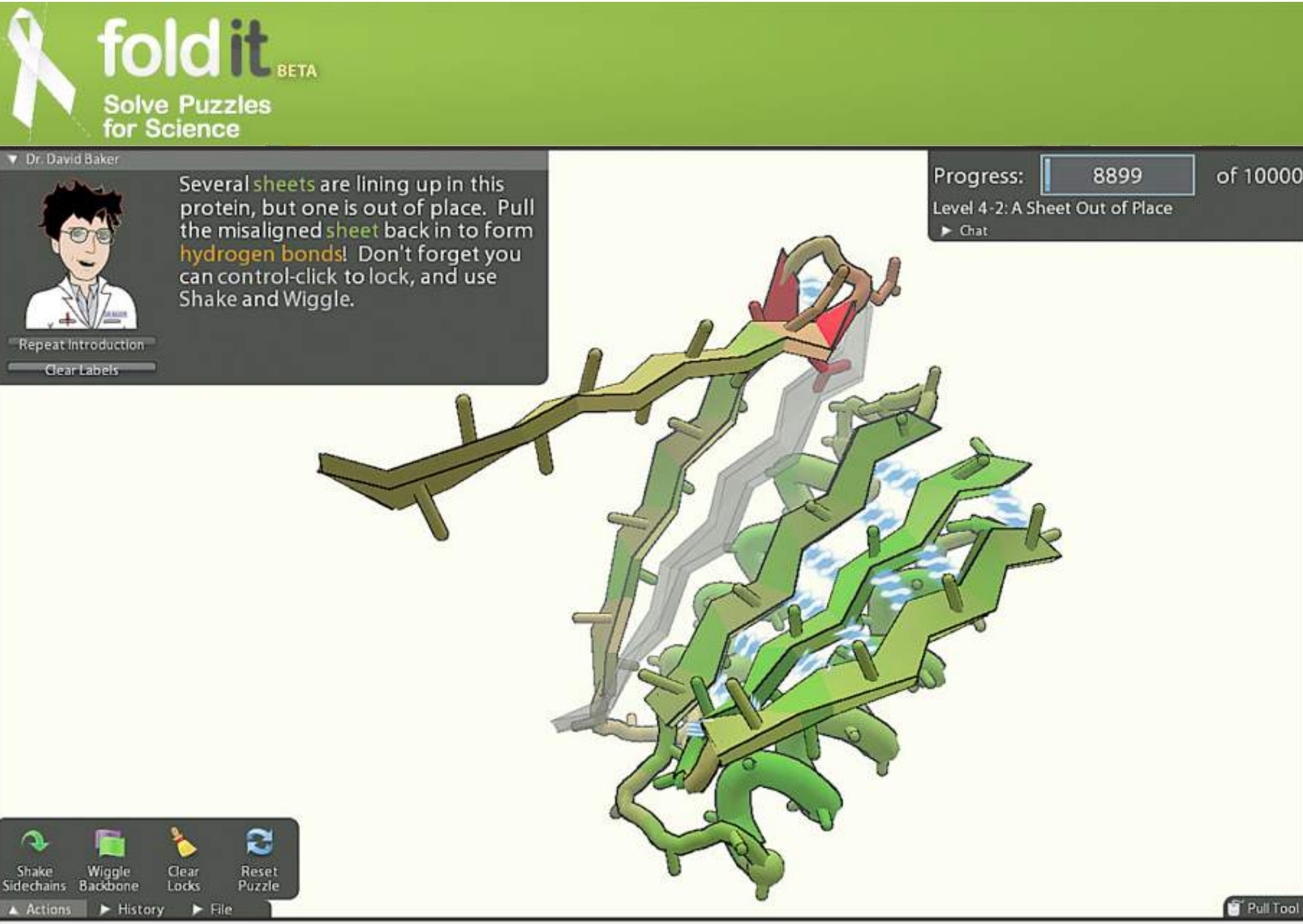
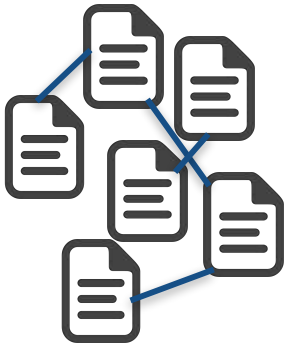

foldit BETA
Solve Puzzles for Science
Dr. David Baker
Several sheets are lining up in this protein, but one is out of place. Pull the misaligned sheet back in to form hydrogen bonds! Don't forget you can control-click to lock, and use Shake and Wiggle.
Repeat Introduction
Clear Labels
Progress: 8899 of 10000
Level 4-2: A Sheet Out of Place
Chat
Shake Sidechains
Wiggle Backbone
Clear Locks
Reset Puzzle
Actions
History
File
Pull Tool

Collective Innovation

How can we harness collective intelligence, energy, and creativity to innovate on complex problems?

Thursday
X01 D Award talks 2400
X02 E 471 Int. Tech. + Dev.
X03 F Panels 481
X04 G 452
X05 A 424
X06 B Larger courses 207
X07 C Larger courses 207
X08 Q 424
X09 H 257
X10 J 400
X11 K 400
X12 L 393
X13 M Smaller courses 47
X14 N Smaller courses 40
X15 O Smaller courses 72
P X16 S16s
9:30-10:50
Award lecture 1201
Panel-110
cr124 From Discourse-based Models to UIs Automatically Optimized for Your Smartphone 1206 Hermann Kaindl
cr102 Agile User Experience and UCD William Hudson 1207
alt.chi 1212
cr125 Cognitive Crash Dummies: Predicting Performance from Early Prototypes Bonnie E. John 1213
cr147 Designing for Persuasion Aaron Marcus 1214
S16 1215
S16 1216
11:30-12:50
Video 1301
Panel-116 Politics, Power, and Passion: Engaging U.S. Policymakers 1303
1306 CR 124 Kaindl
1307 Hudson
alt.chi 1312
S16 1315
S16 1316
14:30-15:50
Panel-101 1403
cr135 1406 Selecting UCD Methods that Maximize Benefits and Minimize Project Risks Nigel Bevan
cr127 1407 Putting Conceptual Models to Work Austin Henderson
1408
1410
1413 S16
1414
1415 S16
1416 S16

CONFERENCE CHAIRS



PROGRAM COMMITTEE

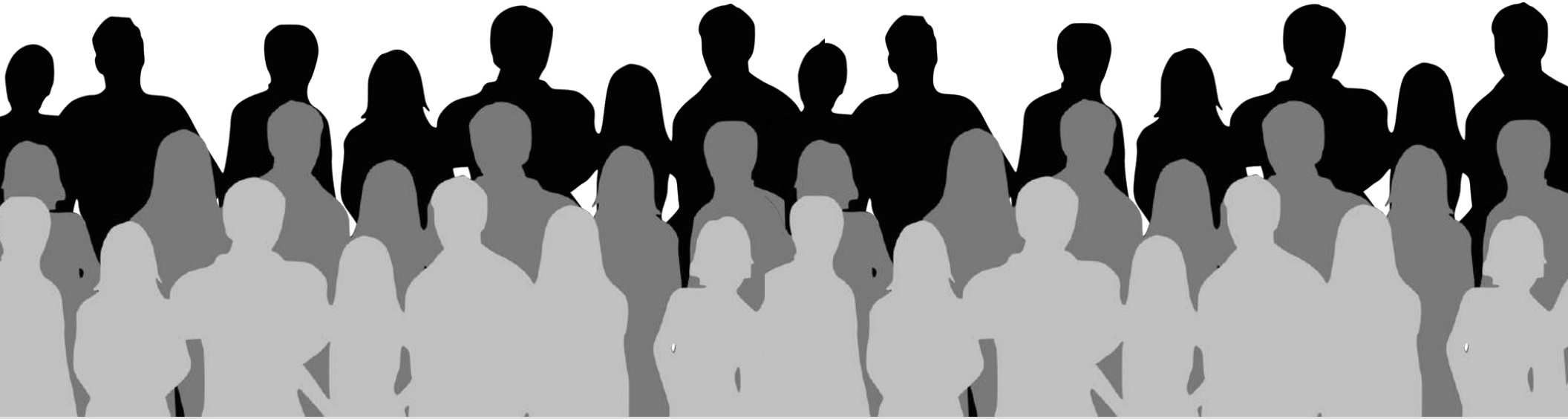
~200 PEOPLE

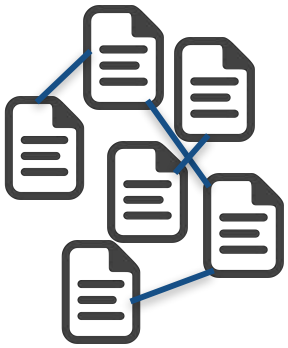
AUTHORS

~1000 PEOPLE

ATTENDEES

~3500 PEOPLE





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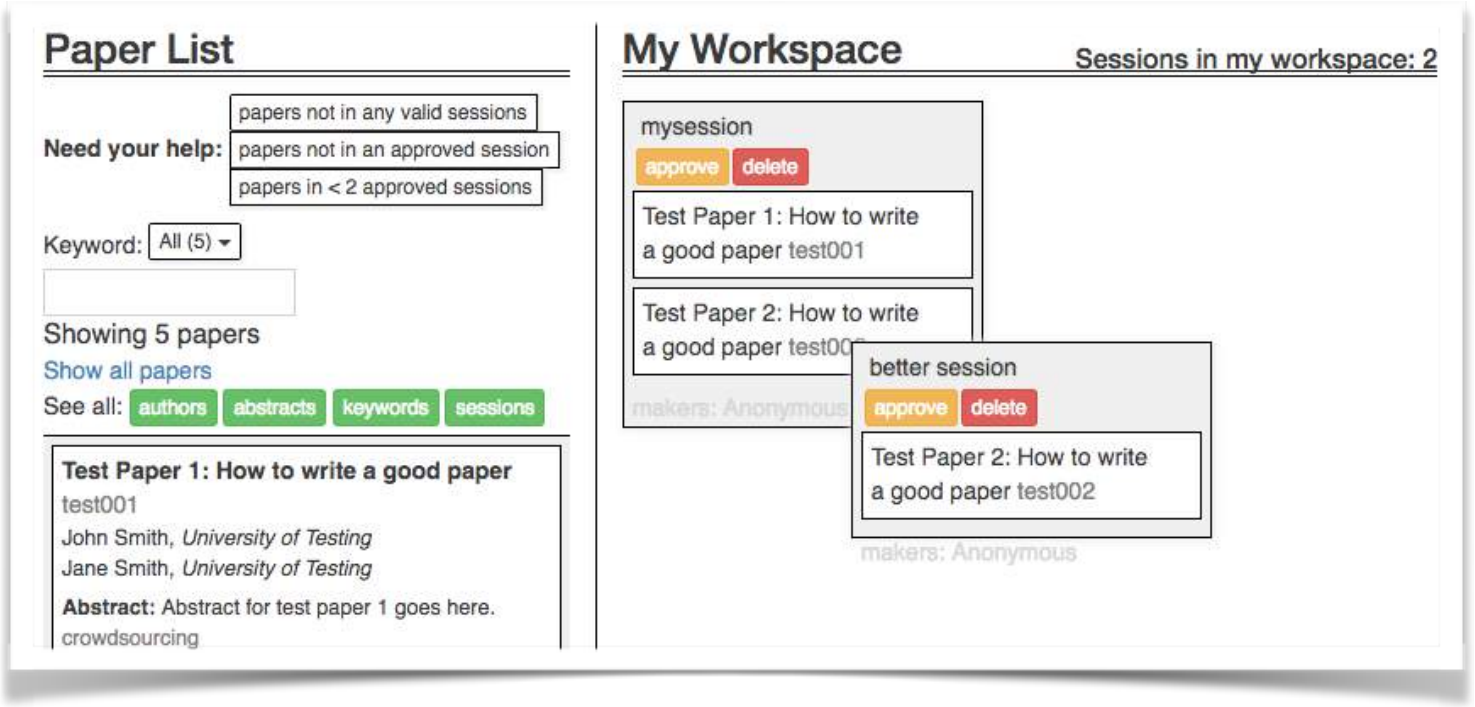

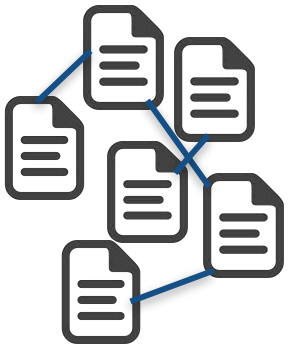

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AUTHORS

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Your Paper: **Revising Learner Misconceptions Without Feedback: Prompting for Reflection on Anomalous Facts**

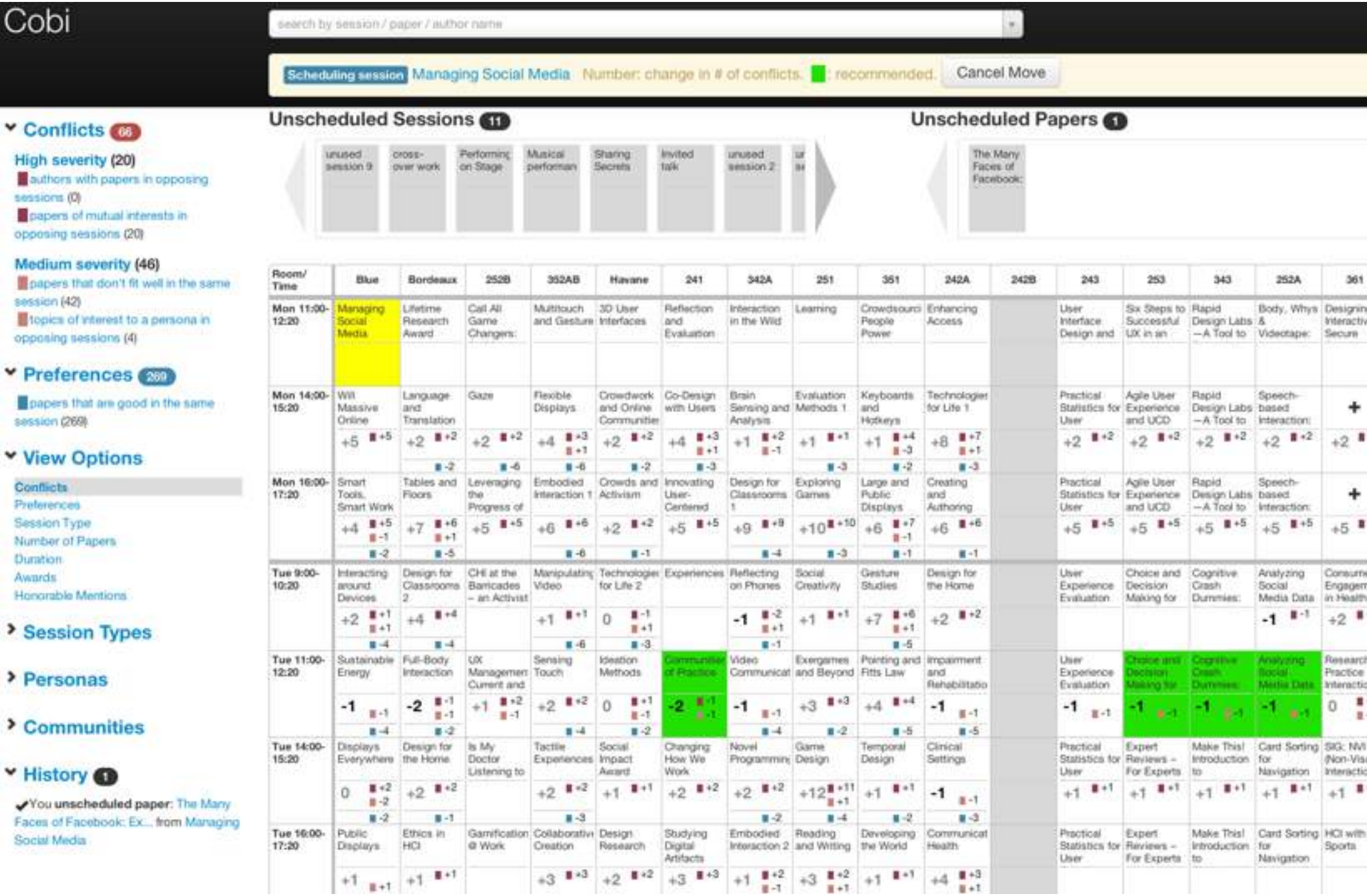
1. Tell us your name: (as it appears in the paper)

2. We've identified 10 papers that may be similar to yours. Tell us how they would fit in a session with your paper:

It's Creepy, But it Doesn't Bother Me [abstract]
- Great in same session
- Okay in same session
- Not sure if it should be in same session
- Should not be in same session

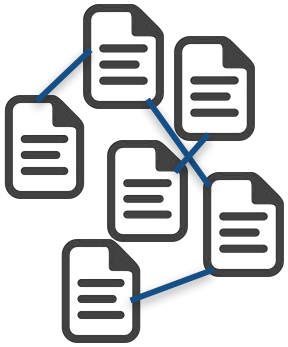
Learning From the Crowd: Observational Learning in Crowdsourcing Communities [abstract]
- Great in same session
- Okay in same session
- Not sure if it should be in same session
- Should not be in same session

Participatory Design through a Learning Science Lens [abstract]
- Great in same session
- Okay in same session
- Not sure if it should be in same session
- Should not be in same session



Cobi: A Community-Informed Conference Scheduling Tool, Juho Kim, Haoqi Zhang, Paul André, Lydia B. Chilton, Wendy Mackay, Michel Beaudouin-Lafon, Robert C. Miller, and Steven P. Dow. In Conference on User Interface Software and Technology, 2013.

CONFERENCE CHAIRS



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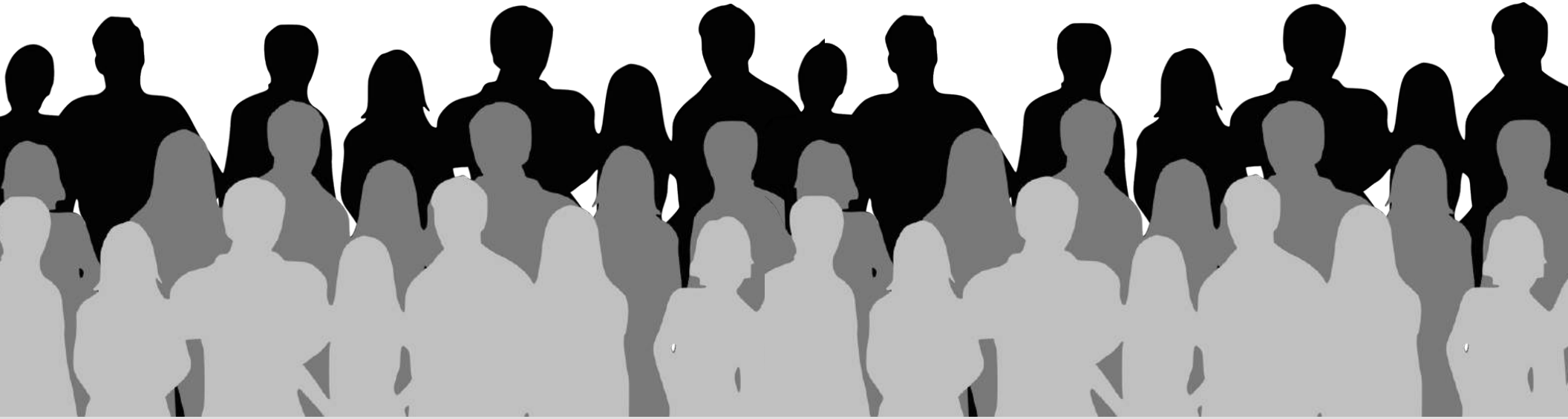


pre 2014 2014 -

projectCOBI.com

Deployments:

Conference on Computer-Human Interaction (CHI) 2013-2017
Conference on Computer-Supported Cooperative Work (CSCW) 2014-2015

Research papers:

Cobi: A Community-Informed Conference Scheduling Tool, Juho Kim, Haoqi Zhang, Paul André, Lydia B. Chilton, Wendy Mackay, Michel Beaudouin-Lafon, Robert C. Miller, and Steven P. Dow. In Conference on User Interface Software and Technology, 2013.

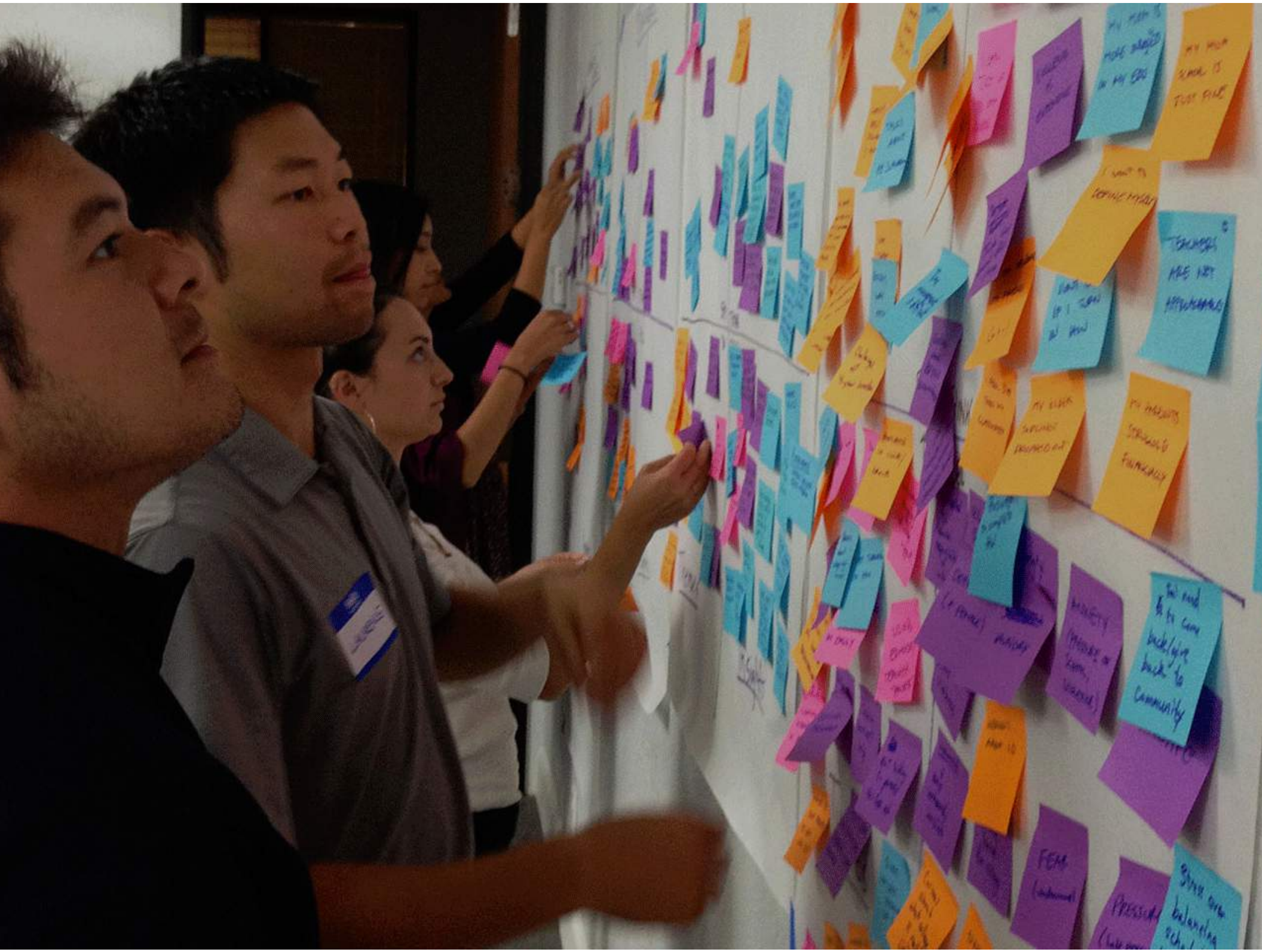
Community Clustering: Leveraging an Academic Crowd To Form Coherent Conference Sessions, Paul André, Haoqi Zhang, Juho Kim, Lydia Chilton, Steven P. Dow and Rob Miller. AAAI Conference on Human Computation and Crowdsourcing, 2013. **(Notable Paper Award)**

Frenzy: Collaborative Data Organization for Creating Conference Sessions, Lydia Chilton, Juho Kim, Paul André, Felicia Cordeiro, James A. Landay, Daniel S. Weld, Steven P. Dow, Robert C. Miller, and Haoqi Zhang. CHI, 2014. **(Honorable Mention Award)**

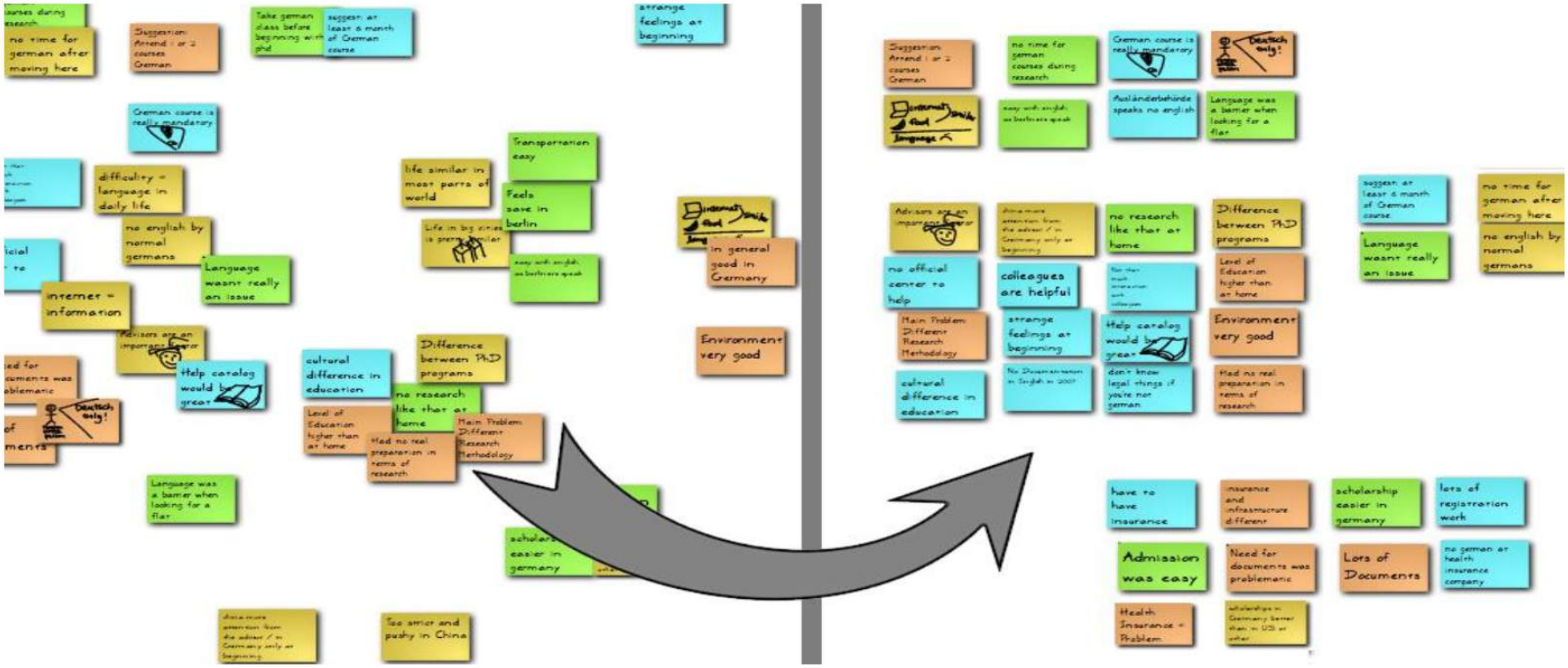
Collaborators:

Collective Innovation

How can we harness collective intelligence, energy, and creativity to innovate on complex problems?



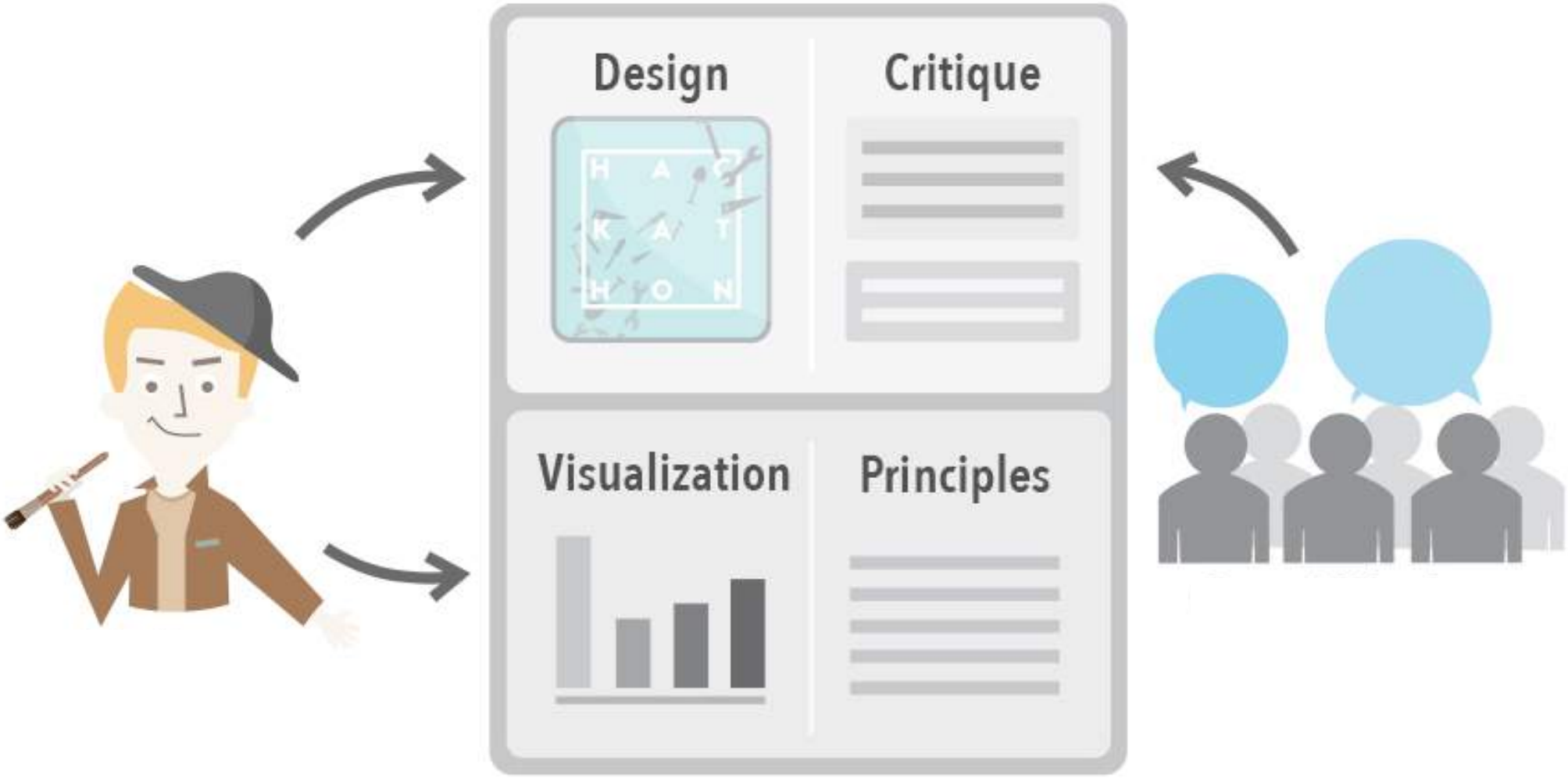
Engage crowds in ideation and synthesis



Crowd Synthesis: Extracting Categories and Clusters from Complex Data, Paul André, Niki Kittur, and Steven P. Dow. ACM Conference on Computer Supported Cooperative Work (CSCW'14), 2014.

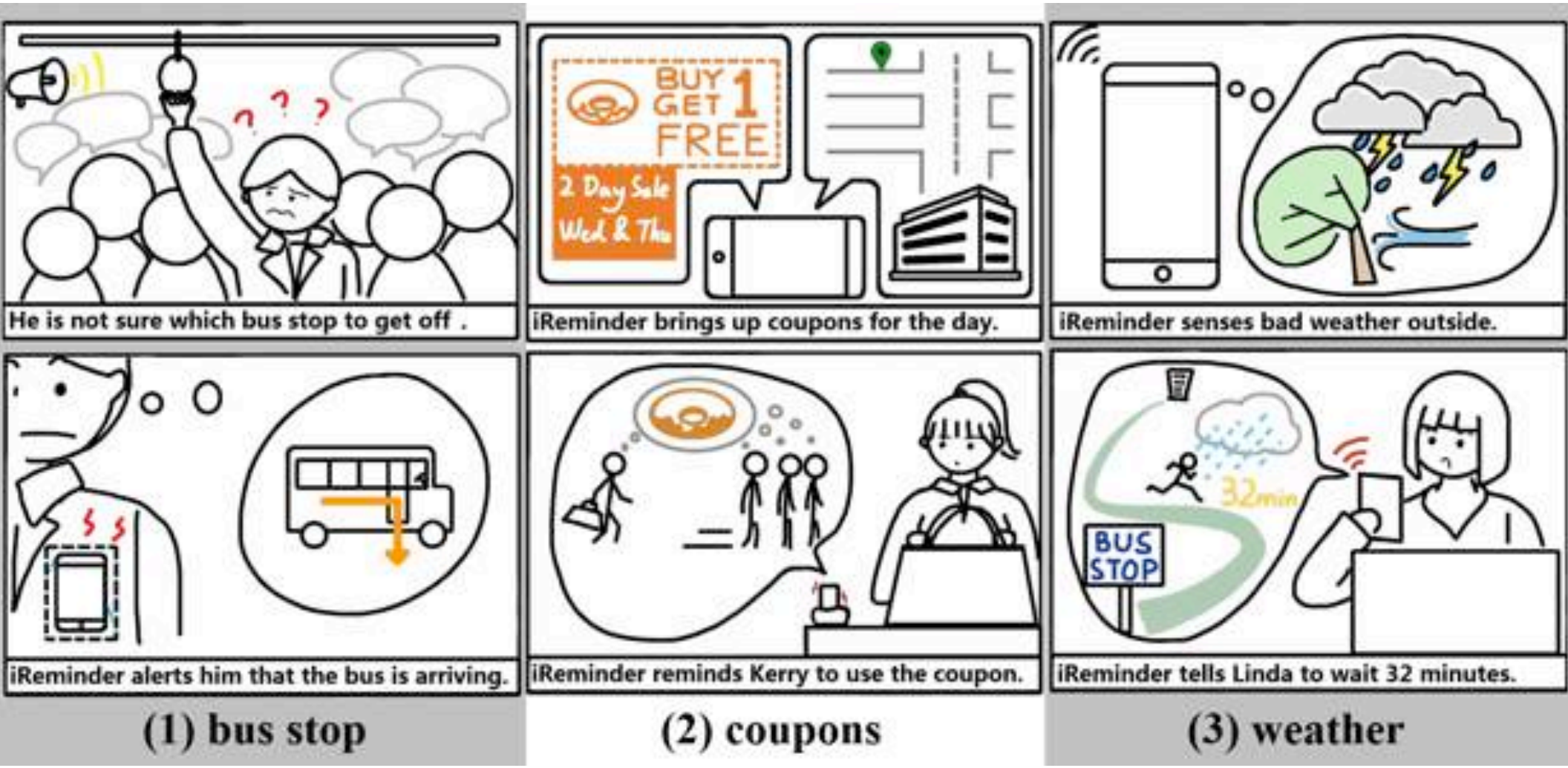
Supporting the Synthesis of Information in Design Teams, Raja Gumienny, Steven P. Dow, and Christoph Meinel. In Conference on Designing Interactive Systems (DIS'14), 2014.

Obtain feedback from multiple stakeholders



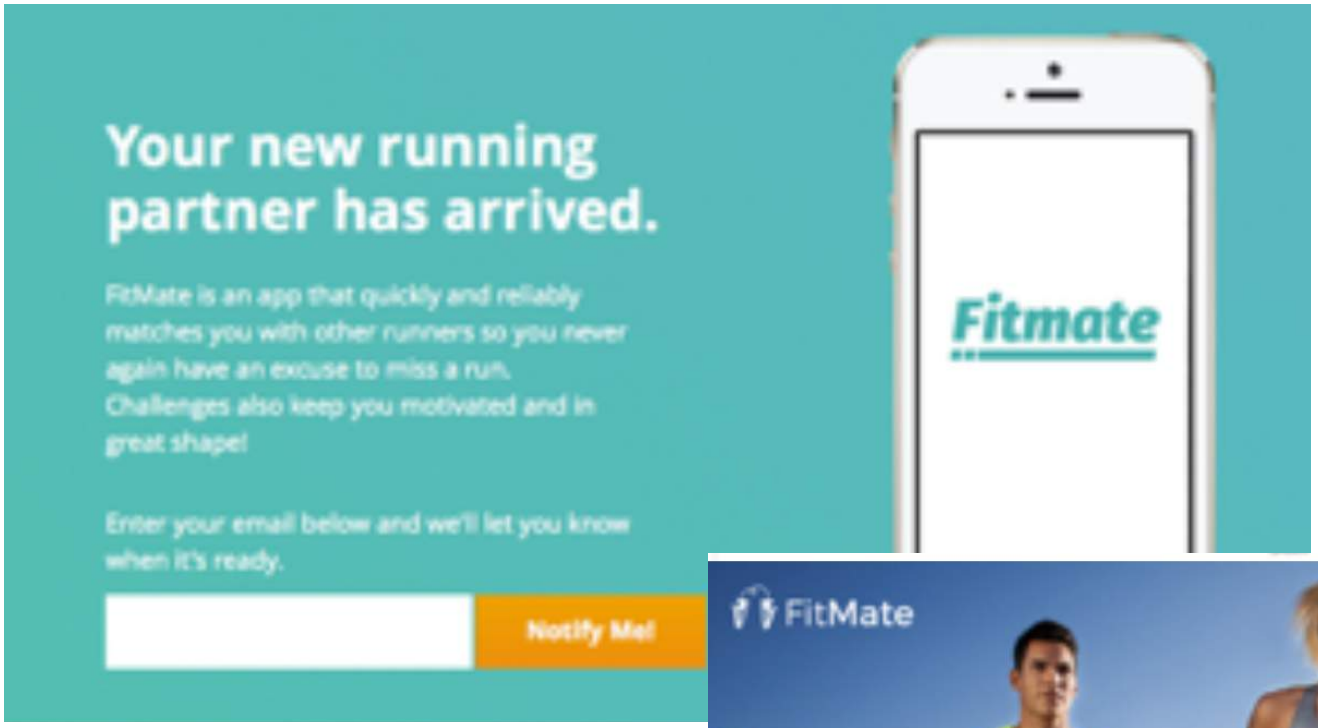
Structuring, Aggregating, and Evaluating Crowdsourced Design Critique, Kurt Luther, Jari-lee Tolentino, Wei Wu, Amy Pavel, Brian P. Bailey, Maneesh Agrawala, Björn Hartmann, and Steven P. Dow. ACM Conference on Computer Supported Cooperative Work and Social Computing, 2015.

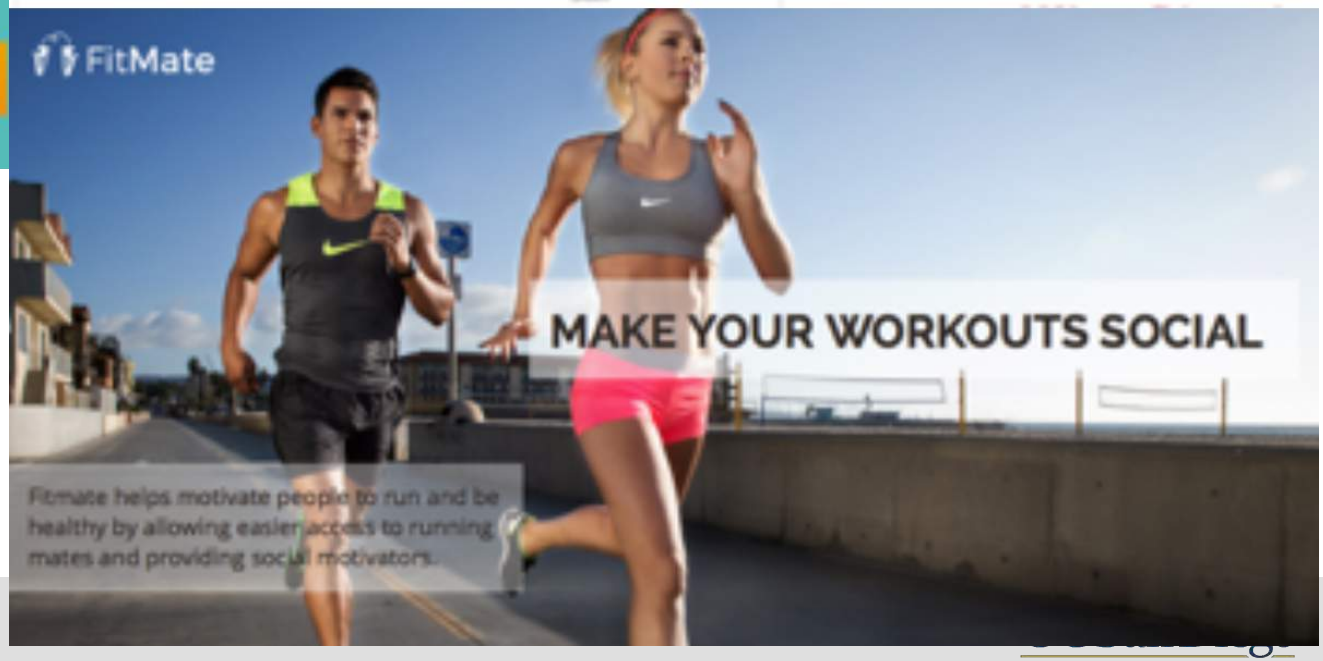
Obtain feedback from multiple stakeholders



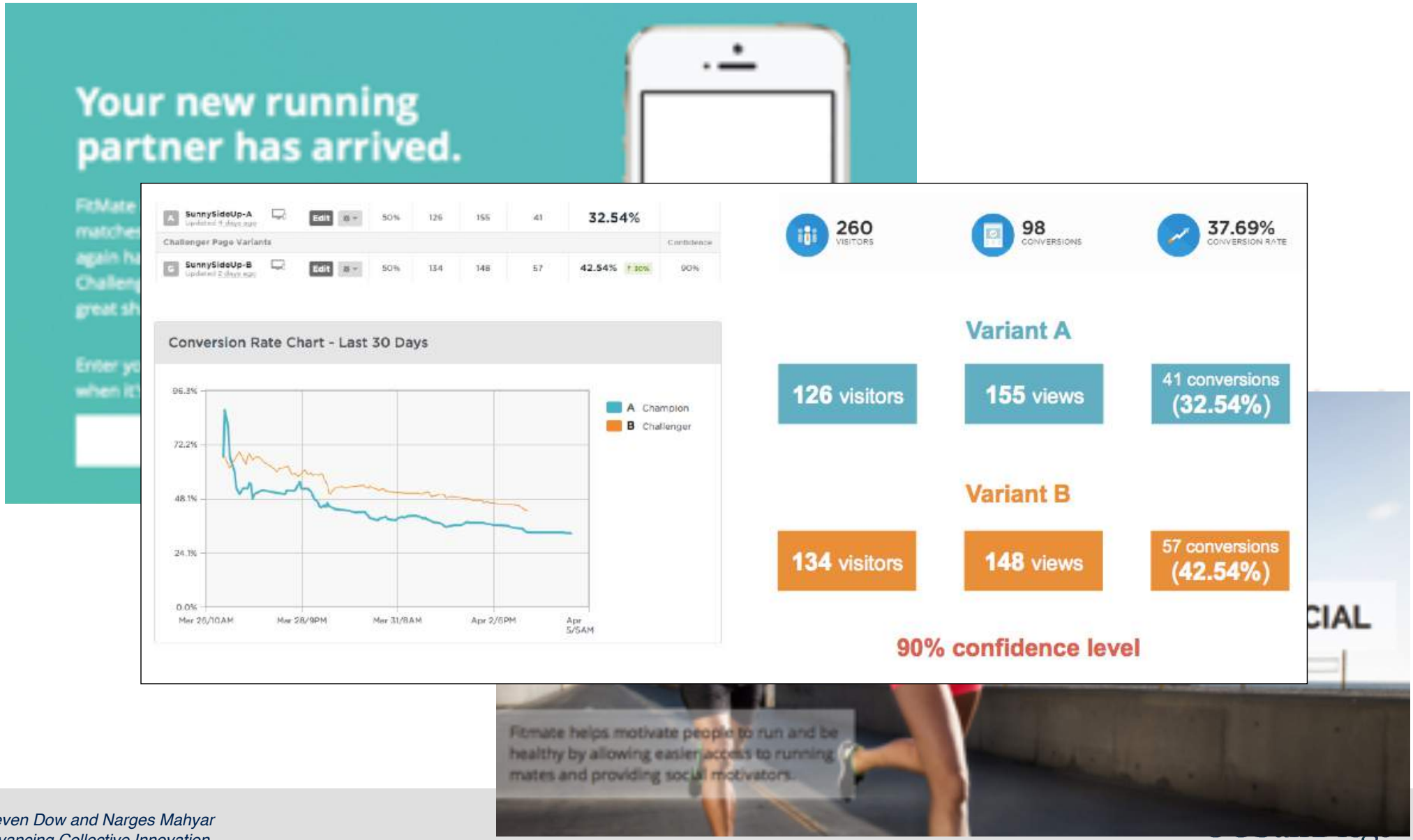
Exiting the Design Studio: Leveraging Online Participants for Early-Stage Design Feedback, Xiaojuan Ma, Yu Li, Jodi Forlizzi, and Steven P. Dow. ACM Conference on Computer Supported Cooperative Work and Social Computing, 2015.

Probe the market to measure potential value





Probe the market to measure potential value



COLLECTIVE INNOVATION FOR CIVICS

HIGHWAY REVOLTS

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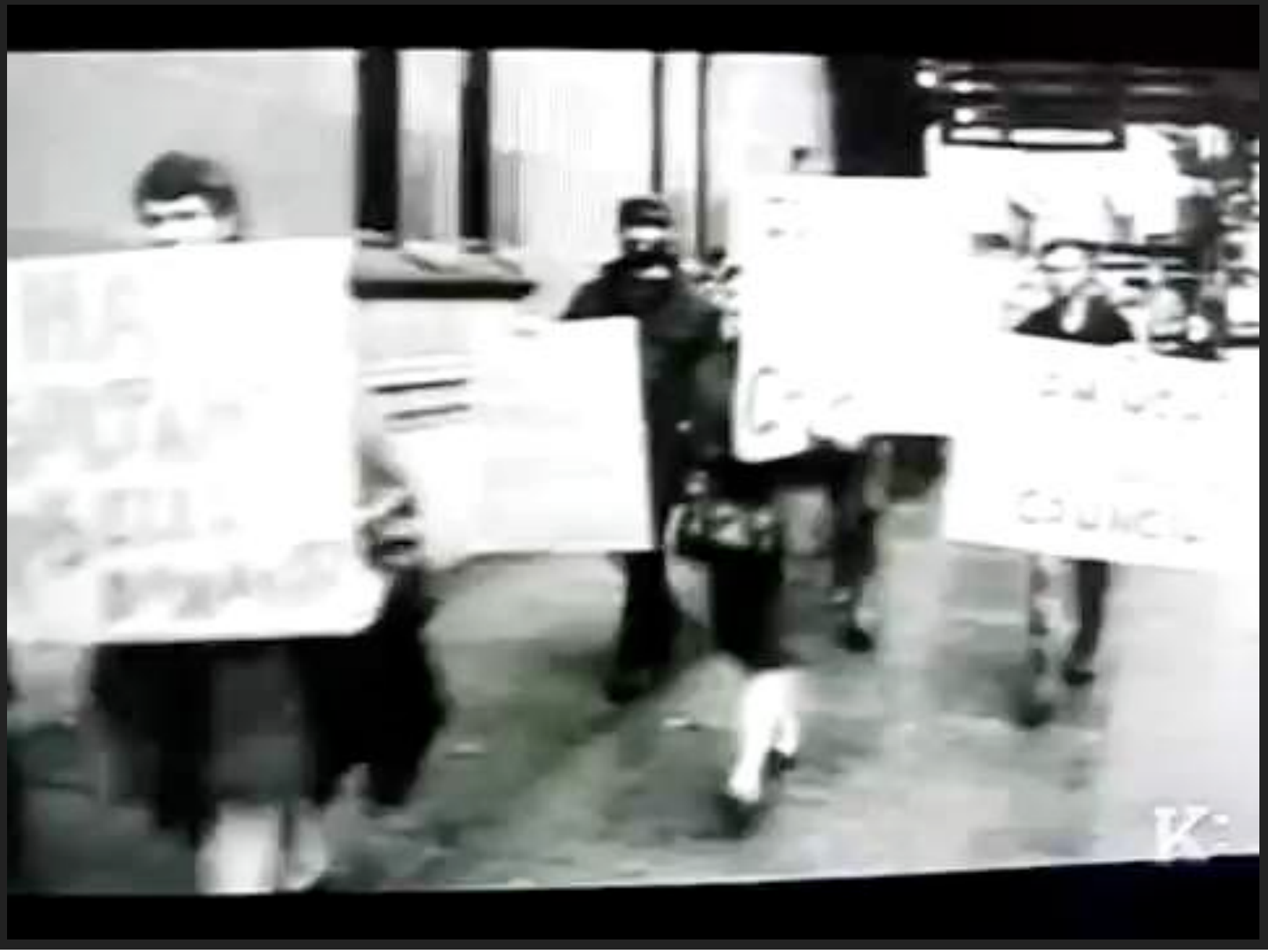
Highway revolts

From Wikipedia, the free encyclopedia

Many **highway revolts** (also **freeway revolts**, **expressway revolts**, **road protests**) took place in developed countries during the 1960s and 1970s, in response to plans for the construction of new freeways, a significant number of which were abandoned or significantly scaled back due to widespread public opposition; especially of those whose neighborhoods would be disrupted or displaced by the proposed freeways, and due to various other negative effects that freeways are

The Cogswell Interchange in Halifax, Nova Scotia, the only remnant of a downtown highway cancelled due to public protest

VANCOUVER 1960'S FREEWAY PROTESTS



GOLDEN FREEWAY, CALIFORNIA STATE ROUTE

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California State Route 480

From Wikipedia, the free encyclopedia

State Route 480 was a state highway in San Francisco, California, United States, consisting of the elevated double-decker **Embarcadero Freeway** (also known as the **Embarcadero Skyway**), the partly elevated Doyle Drive approach to the Golden Gate Bridge and the proposed and unbuilt section in between. The unbuilt section from Doyle Drive to Van Ness Avenue was to have been called the **Golden Gate Freeway** and the *Embarcadero Freeway* as originally planned would have extended from Van Ness along the north side of Bay Street and then along the Embarcadero to the San Francisco-Oakland Bay Bridge.

The Embarcadero Freeway, which had only been constructed from Broadway along the Embarcadero to the Bay Bridge, was demolished after the 1989 Loma Prieta earthquake, and Doyle Drive is now part of U.S. Route 101. SR 480 was **Interstate 480**, an auxiliary route of the Interstate Highway System, from 1955 to 1965.[1][2] The entire route was deleted in 1991.[1]

Contents [hide]
1 History
2 Demise
3 Legacy
4 Popular culture

CALIFORNIA 480

State Route 480

Embarcadero Freeway; Golden Gate Freeway (unbuilt Western section)

Route information

Maintained by Caltrans

Existed: 1968 – 1991[1]

Major junctions

APPROCHES FOR PUBLIC ENGAGEMENT

- Public workshops
- Town hall meetings
- Design Charrettes

WHAT ARE DESIGN CHARRETTES?

WHY DESIGN CHARRETTES ARE IMPORTANT?

- Diversity of viewpoints
- Discourse among stakeholders
- Buy-in for final solutions

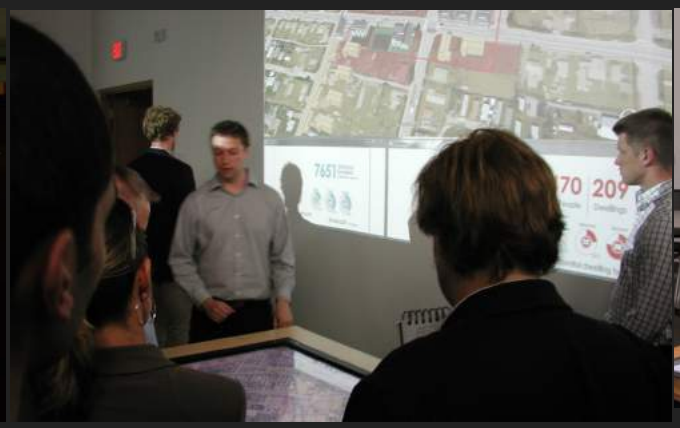
(Lennertz et al. 2006, Brody et al. 2003, Innes & Booher 2004)

UD CO-SPACES (URBAN DESIGN COLLABORATIVE SPACES)

UD CO-SPACES: TABLETOP AND HANDHELD DEVICES

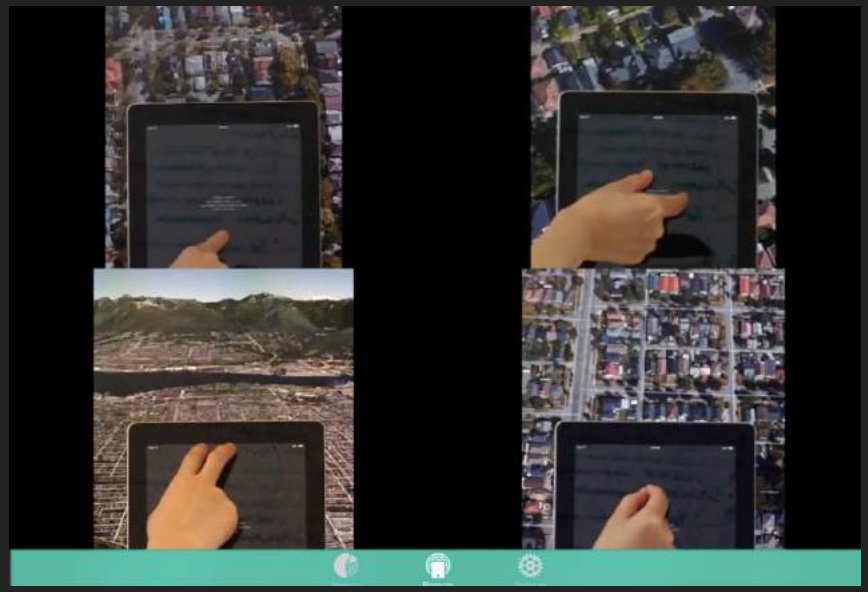
UD CO-SPACES VIDEO

DESIGN, DEVELOPMENT AND DEPLOYMENT PROCESS



2010 2012 2016

CURRENT VERSION: INTEGRATING INDIVIDUAL DISPLAYS



USER STUDY

WHAT DID WE LEARN?

a) engaging diverse stakeholders

b) fostering collaboration and co-creation

c) understanding consequences of their choices

ROLE: CO-CREATION OF SOLUTIONS

"Having this tabletop got every stakeholder involved so they can make changes themselves, see those changes right away, [which] promotes collaboration"

DID THE TECHNOLOGY CATALYZE DISCUSSIONS?

"2D and 3D helped with dialogue"

3D is integral for engagement with the design process

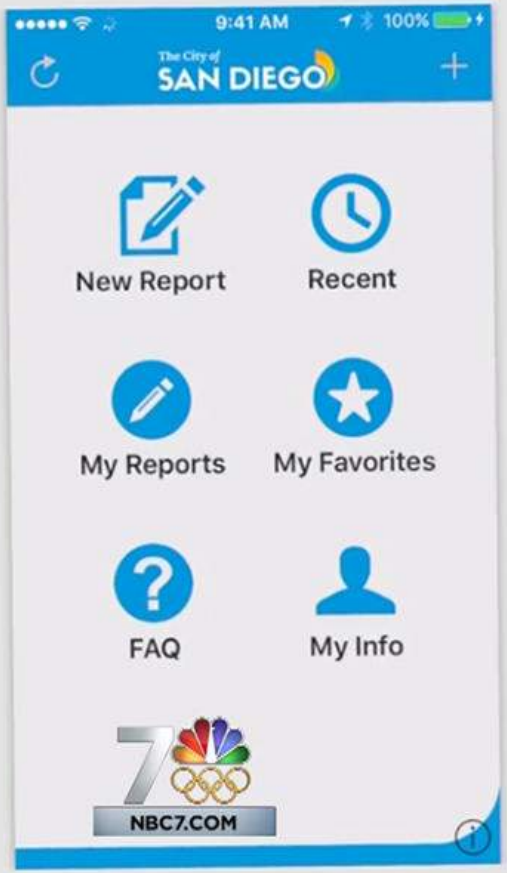
DID THEY UNDERSTAND CONSEQUENCES OF THEIR DESIGNS?

"Having [indicators] and having that in real time definitely altered how we approached the project"

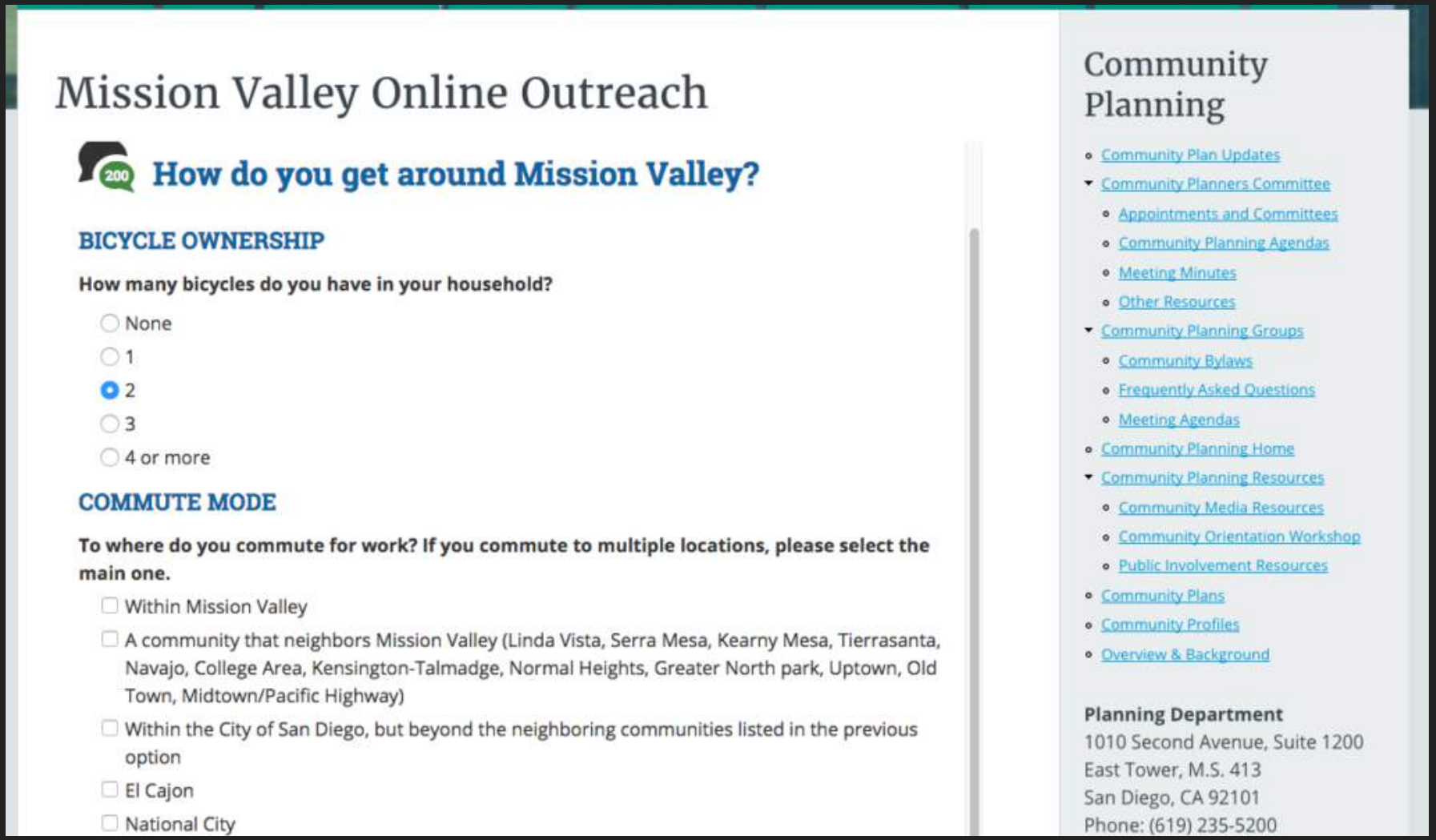
How might we apply such approaches at city scale?

"GET IT DONE" APP

REPORT
NON-EMERGENCY
PROBLEMS



MISSION VALLEY COMMUNITY SURVEY



Mission Valley Online Outreach

How do you get around Mission Valley?

BICYCLE OWNERSHIP

How many bicycles do you have in your household?

- ○ None
- ○ 1
- ◉ 2
- ○ 3
- ○ 4 or more

COMMUTE MODE

To where do you commute for work? If you commute to multiple locations, please select the main one.

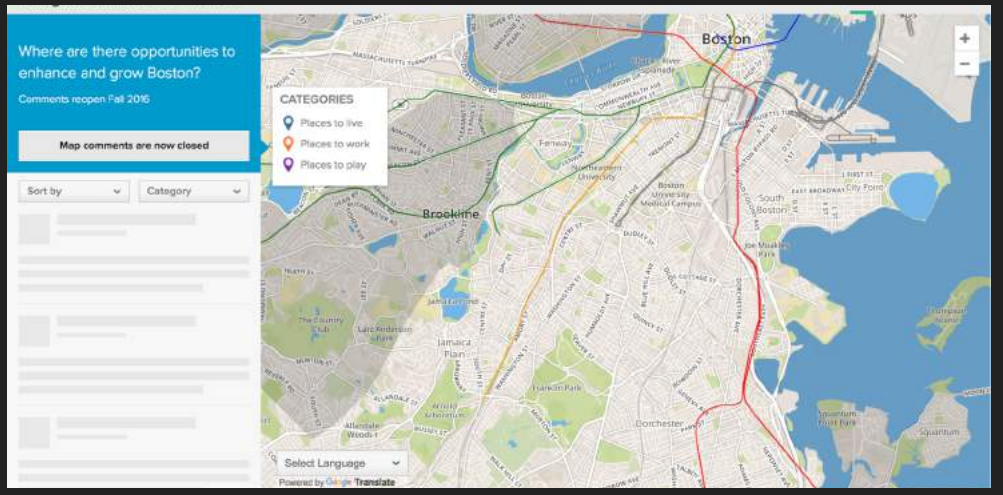
- ☐ Within Mission Valley
- ☐ A community that neighbors Mission Valley (Linda Vista, Serra Mesa, Kearny Mesa, Tierrasanta, Navajo, College Area, Kensington-Talmadge, Normal Heights, Greater North park, Uptown, Old Town, Midtown/Pacific Highway)
- ☐ Within the City of San Diego, but beyond the neighboring communities listed in the previous option
- ☐ El Cajon
- ☐ National City

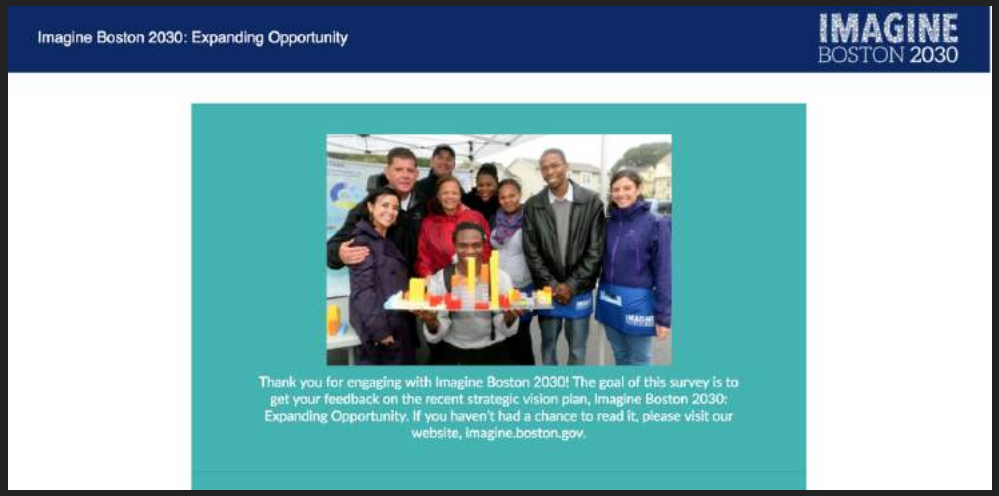
Community Planning

- Community Plan Updates
- Community Planners Committee
  - Appointments and Committees
  - Community Planning Agendas
  - Meeting Minutes
  - Other Resources
- Community Planning Groups
  - Community Bylaws
  - Frequently Asked Questions
  - Meeting Agendas
- Community Planning Home
- Community Planning Resources
  - Community Media Resources
  - Community Orientation Workshop
  - Public Involvement Resources
- Community Plans
- Community Profiles
- Overview & Background

Planning Department
1010 Second Avenue, Suite 1200
East Tower, M.S. 413
San Diego, CA 92101
Phone: (619) 235-5200

OTHER APPROACHES: IMAGINE BOSTON 2030

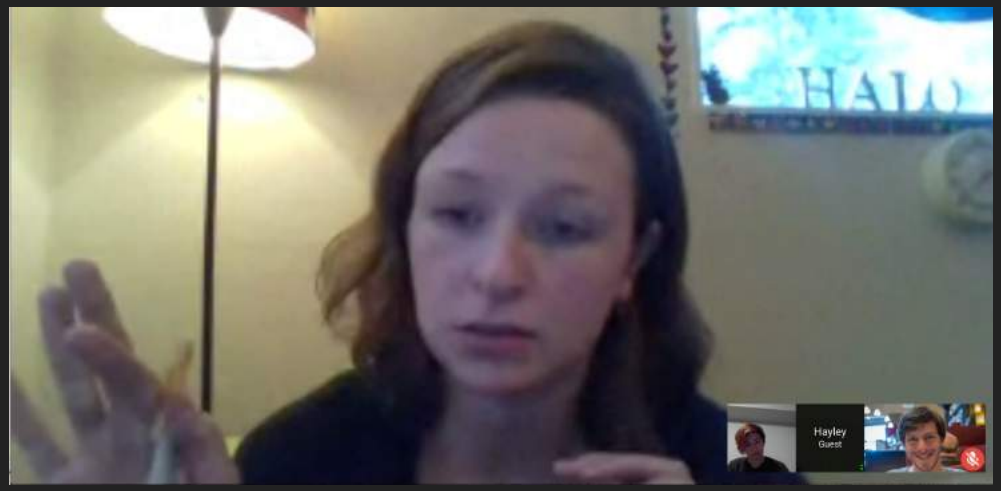




WHAT IS LACKING?

- How to identify and organize opinions and patterns of thoughts?
- How to deal with conflicts?
- How to enable citizens to generate alternative solutions?

NEED FINDING THROUGH INTRA-COMMUNITY INTERVIEWING



Search ...

THE LATEST

SANDAG Nears Deal to Develop Clairemont Trolley Station Site After Threatening to Seize Property

The Case for Fact-Checkers in a 'Post-Truth World'

I'm a Young Techie. Here's What San Diego Needs to Do to Keep Me.

THE GIST

Please don't make me work in Sorrento Valley.

A view of the San Diego skyline

DESIGNSANDIEGO.UCSD.EDU

DIAGNOSE SYNTHESIZE IDEATE PROPOSE IMPLEMENT

Sign Up For Email Updates

First Name Last Name

Email

SUBMIT

The Research Team

Steven Dow
Assistant Professor
Cognitive Science

Narges Mahyar
Postdoctoral Fellow
Cognitive Science

Ariel Weingarten
Ph.D. Student
Computer Science

Tim Banh
B.S. Student
Cognitive Science

Joanne Cho
B.S. Student
Cognitive Science

Lauren Liu
B.S. Student
Computer Science

David Luu
B.S. Student
Computer Engineering

Karen Ma
B.S. Student
Cognitive Science

Sanika Moharana
B.S. Student
Cognitive Science

Alejandro Panduro
B.S. Student
Cognitive Science

Eric Richards
B.S. Student
Cognitive Science

Discussion

- How can we apply methods of collective innovation to business and civic practices?
- What resources does San Diego have to offer?
- What local issues can we tackle with our research?

THANK YOU

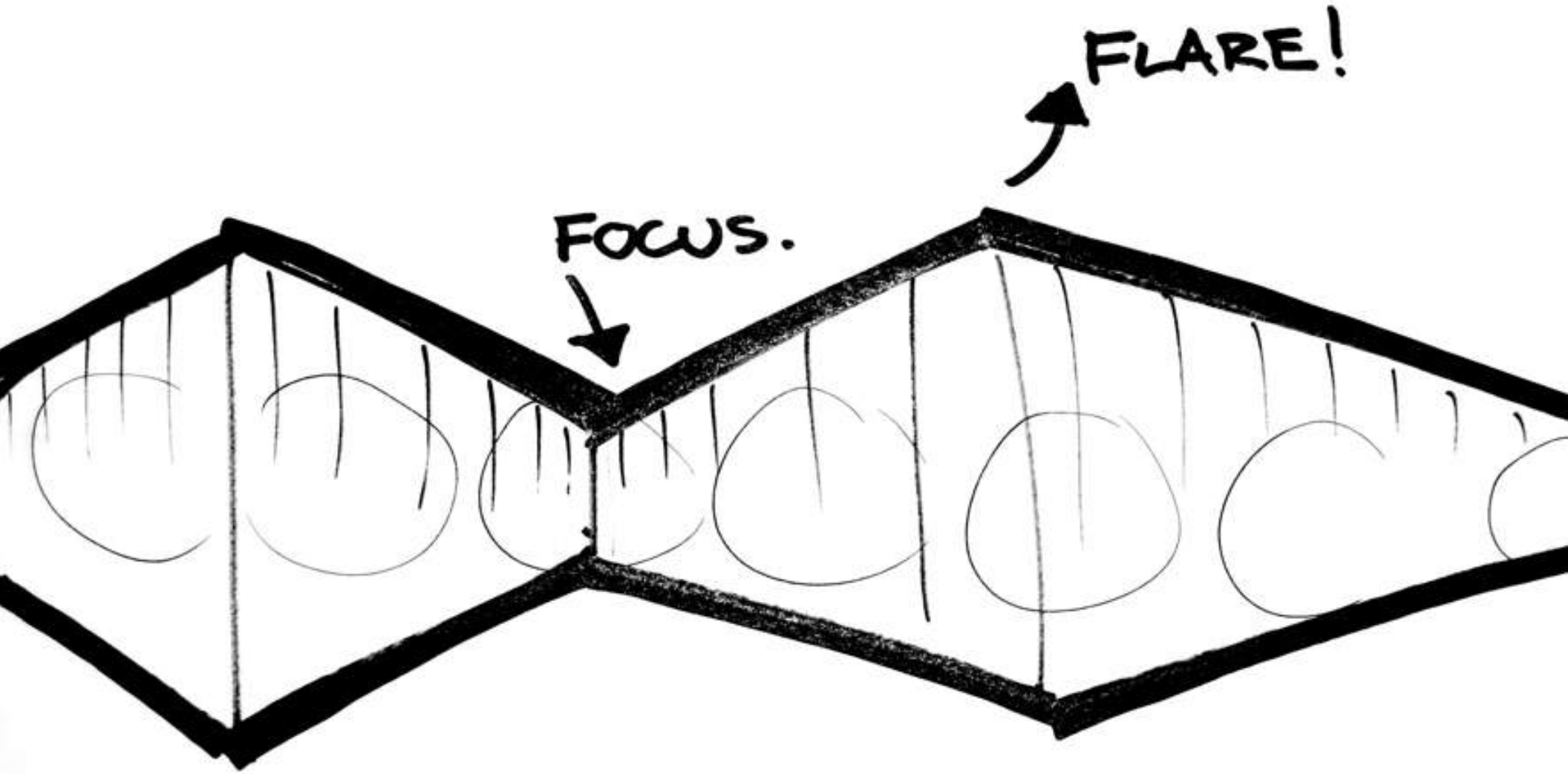
//designlab.ucsd.edu
//protolab.ucsd.edu

@StevenDow
@NargesMahyar

"Enlightened trial and error succeeds over the planning of the lone genius."

Peter Skillman, IDEO

Collective focus and flare



Buxton, 2007
Lasaeu, 1974

A simple model of iterative design

more complex

A simple model of iterative design

create a design

get feedback

BACK UP SLIDES

WHY DESIGN CHARRETTES ARE HARD?

"AN IMPOSSIBLE PROBLEM IN AN ABSURDLY SHORT TIME"

Condon, 2007

CITIZEN INTELLIGENCE

- Cities are a powerhouse of collective intelligence. It is time to unlock the wisdom of the crowd.
- Collective intelligence platforms offer citizens the opportunity to engage in important civic discourse and develop solutions collaboratively.

HOW DESIGN CHARRETTES ARE CARRIED OUT TODAY?

- Paper-based
  - Engaging, collaborative
  - No feedback on indicators
- Geographic info system
  - Expert intensive
  - Non-collaborative

WHAT ARE THE CHALLENGES FOR DESIGNING TOOL SUPPORT?

- Integrating data and visualizations of information
- Employing interactive modes to engage people
- Providing understandable yet credible information
- Employing social and peer learning

(Sheppard, 2012; Moser, 2010; Holden 2008; Davis, 2008)

DEFINITIONS

- Indicators (sustainability metrics):
  - e.g. population density, percentage of walking trips
- Case: has information such as footprint, height, volume
  - e.g. buildings, streets, or parks.
- Task: Designing a neighborhood for maximum walkability

SEVEN PRINCIPLES FOR URBAN DESIGN CHARRETTES

1) Engagement

2) Collaboration

3) Interactive visualization

4) Accessibility

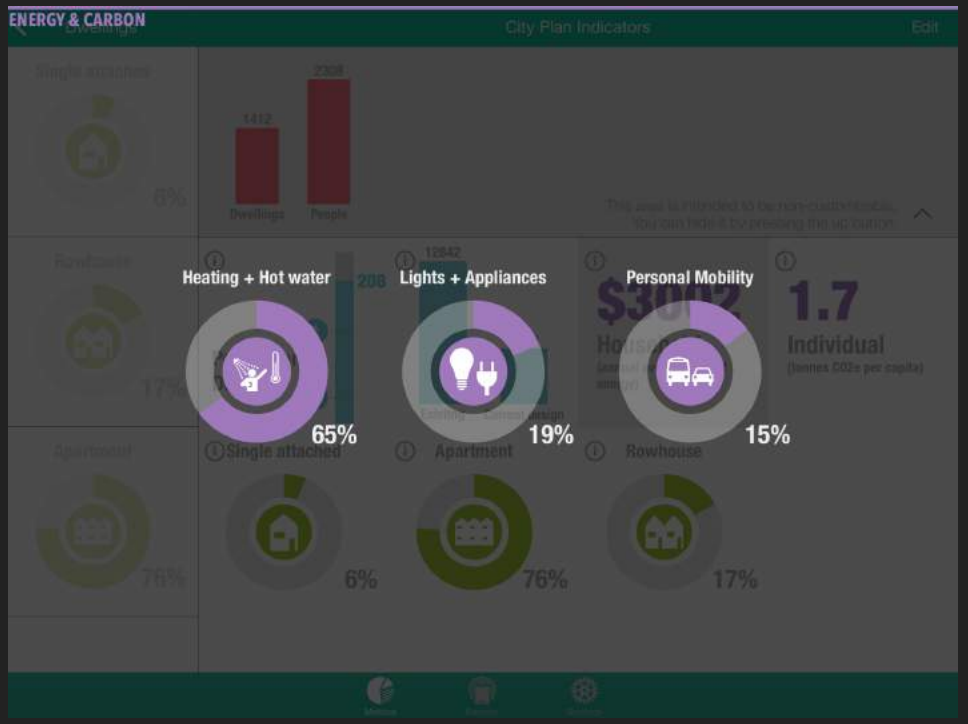
5) Iteration

6) Understanding consequences

7) Transparency

HOW MUCH ENGAGEMENT?

VISUALIZATION DESIGN FOR PUBLIC ENGAGEMENT



- Infographics & donut charts based on domain experts' suggestions

ROLE: SHARE THEIR THOUGHT PROCESS WITH OTHERS

DID THEY GET SOME APPRECIATION FOR WICKED PROBLEMS?

"There are a lot of details to consider when doing urban planning!"

"The process helped understand city planning and its ramifications"

UD CO-SPACES: SPECIFICATIONS

- Projectors in Decision Theater (UBC, CIRS building):
  - Native Resolution:1920x1200
  - Aspect ratio:16:10 (WUXGA)
  - Image Size: 127- 1524 cm
- Touch table: PQ labs touch interface
  - 52” HD TV
  - Resolution 1920 x1080