Social Computing to Enhance Public Engagement in Urban Design at Scale

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Planning problems are wicked

Dilemmas in a General Theory of Planning*

HORST W. J. RITTEL
Professor of the Science of Design, University of California, Berkeley

MELVIN M. WEBBER
Professor of City Planning, University of California, Berkeley

- Unstructured: difficult to sort out causes and effects
- Cross-cutting: have many overlapping stakeholders
- Relentless: can’t be solved, once and for all

Rittel and Webber, 1973

Why Blacksburg, VA, Is a Best Place to Live

Author and Blacksburg local Melody Warnick gets to the heart of what makes this tight-knit town so special.

By Melody Warnick on January 19, 2018 13:13 PM

Virginia Tech president focuses on growth

- Housing for up to 5,000 additional students
- Problems and advantages of student housing
- Preserving neighborhoods and quality life

By Tonia Moxley tonia.moxley@roanoke.com 381-1675 , Jul 5, 2015

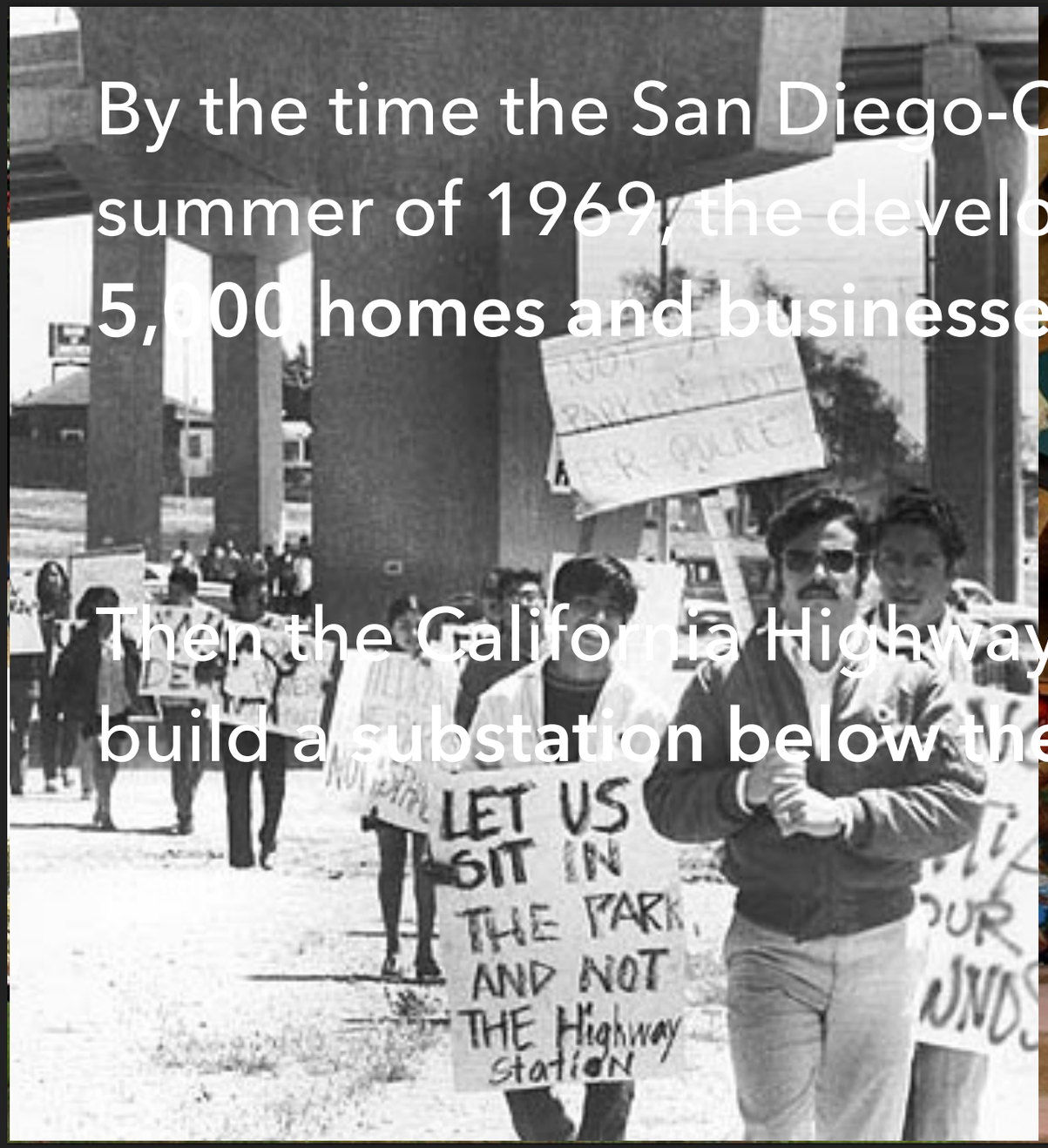
Conventional methods are counterproductive

- Achieving genuine participation in planning
- Satisfying the public that they are being heard
- Improving the final decisions
- Incorporating a broad spectrum of the public

JE Innes & DE Booher, 2004

Coronado Bridge in San Diego

Chicano Park takeover, 35 years of struggle



By the time the San Diego-Coronado Bridge opened in the summer of 1969, the development of Interstate 5 had left **5,000 homes and businesses destroyed in Barrio Logan.**

Then the California Highway Patrol announced plans to **build a substation below the bridge in 1970.**

Why is engaging the public important?

- Local knowledge
- Buy in
- Impact social good

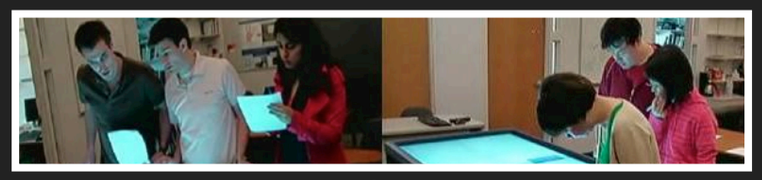
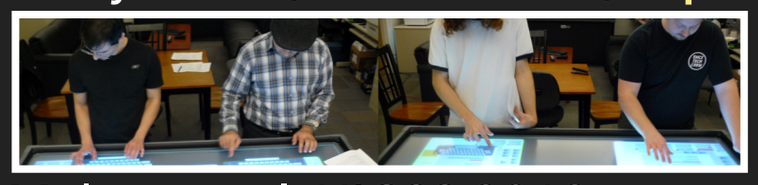
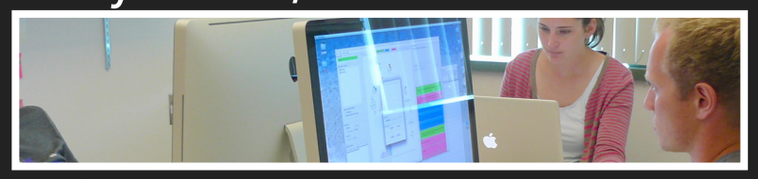
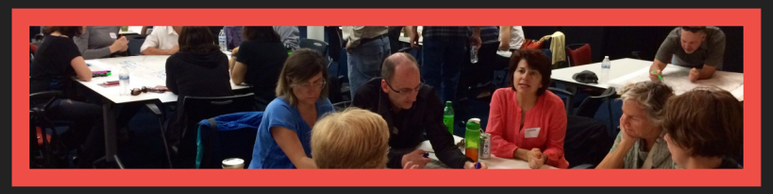
Best practices are workshops and design charrettes

Why design charrettes are hard?

> “An impossible problem in an absurdly short time”

Condon, 2007

I build & study human-centered collaborative tools

	Collocated	Online
Experts	 Mahyar et al, InfoVis 2012, **Top 4 VAST papers**  Mahyar et al, HICSS 2013  Mahyar & Tory, VAST 2014, **Best paper award**	
Novices	Mahyar et al, VIS 2015 Mahyar et al, ISS 2016, **Honorable mention award, Outstanding award**	 Mahyar et al, CHI 2018 Design for San Diego (D4SD)

UD Co-Spaces: A Table-Centred Multi-Display Environment for Public Engagement in Urban Design Charrettes

N. Mahyar, K. J. Burke, J. Xiang, S. Meng, K. S. Booth, C. L. Girling, and R. W. Kellett, Interactive Surfaces and Spaces (ISS), 2016

[Honorable Mention Award], ISS 2016

[Outstanding Paper Award], CELA 2017

Urban design processes

Consultation

Goals setting

Alternative generation

Alternative visualization

Alternative measurement

Alternative evaluation

Preferred alternative development

Implementation

lack of tool support

Girling, C., Kellett, R., and Johnstone, S., 2006

Problem: lack of tool support during design charrettes

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

Sheppard, 2012, Moser, 2010, Holden 2008, Davis, 2008, Al-Kodmany 2000

URP: tangible workbench for urban planning and design

John Underkoffler & Hiroshi Ishii, CHI, 1999

Design of digital technology to avoid marginalizing people

- The importance of providing the right information at the right time in understandable formats.

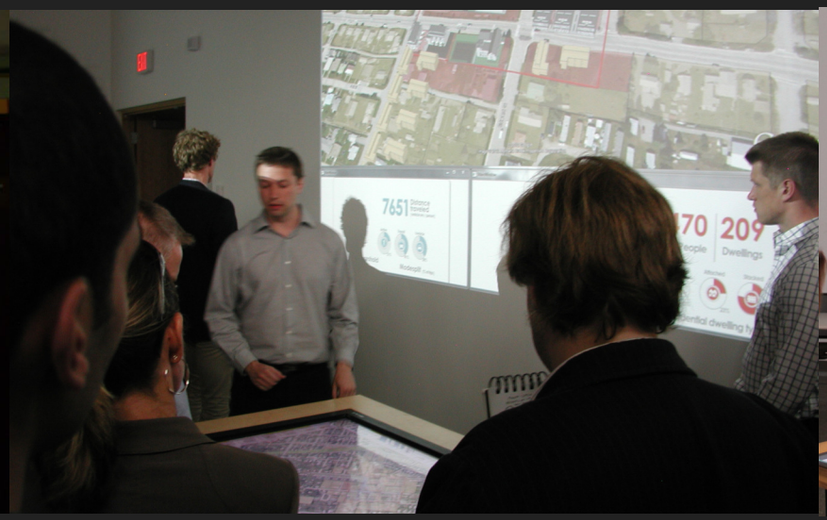
Al-Kodmany 2000, Al-Kodmany 2001

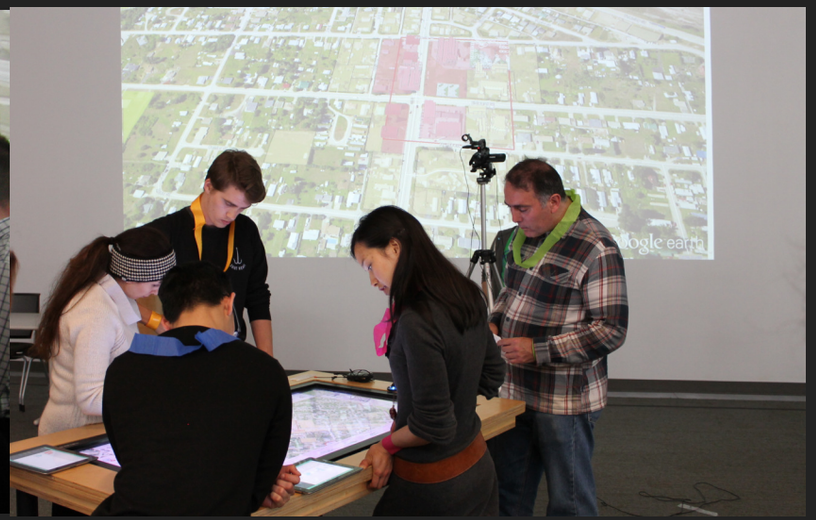
Research questions

- How to use collaboration technology & visualization techniques to
  - engage diverse stakeholders,
  - foster collaboration and co-creation,
  - increase understanding of impacts of choices?

6 years human-centered design and development process

This was a long-term interdisciplinary project that started before I arrived at UBC.





1st version: tabletop tool

2nd version: wall display

3rd version: handheld

2010

2012

2016

UD Co-Spaces (Urban Design Collaborative Spaces)

My role

- Lack of engagement with metrics on the wall
- Lack of interactivity and customization to engage ppl
- Lack of personal spaces
- Difficulty interacting in parallel with the 3D view

Method

- Analysis of version 2 deployment in the wild
- Interview with urban planners & facilitators
- Design & development of version 3
- Heuristic evaluation with 3 urban planners
- Formal evaluation (comparative study)

System design & considerations

- Adding personal spaces
- Increasing interaction with wall display
- Building interactive visualizations
- Providing accessible and understandable information

Comparative study

Design context

- Design a neighborhood center within a hypothetical existing single family neighborhood in the suburbs of Vancouver.
- Main Goal:
  - Increasing the walkability of the neighborhood

Study procedure

- 40 participants (groups of 5-6, 17 male, 23 female)
- Total time: 140 min (~45 min for design activity)
- Pre & post survey
- Focus group
- Video recorded sessions

Findings: Tabletop surface increased equity of participation

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

Muti-display environment catalyzed discussions

"I definitely really liked how everything was synced, specially with regards to 3D, iPad and table itself"

Visualization dashboard increased analytical ability

“Having indicators in real time definitely altered how we approached the project, we could see the larger impact … it was almost like stepping out and saying, okay, what did we actually do and what is the impact.”

Main contributions

- UD Co-Spaces was superior than paper-based
  - Engaging collaborative environment
  - Alternative generation and measurement
- Making information and visualization accessible

Contributions beyond urban deign domain

- Potential of touch-based interactions
  - Increase interactions, engagement & learning
  - Transition novices to experts

How can we scale it up to engage a broader range of stakeholders?

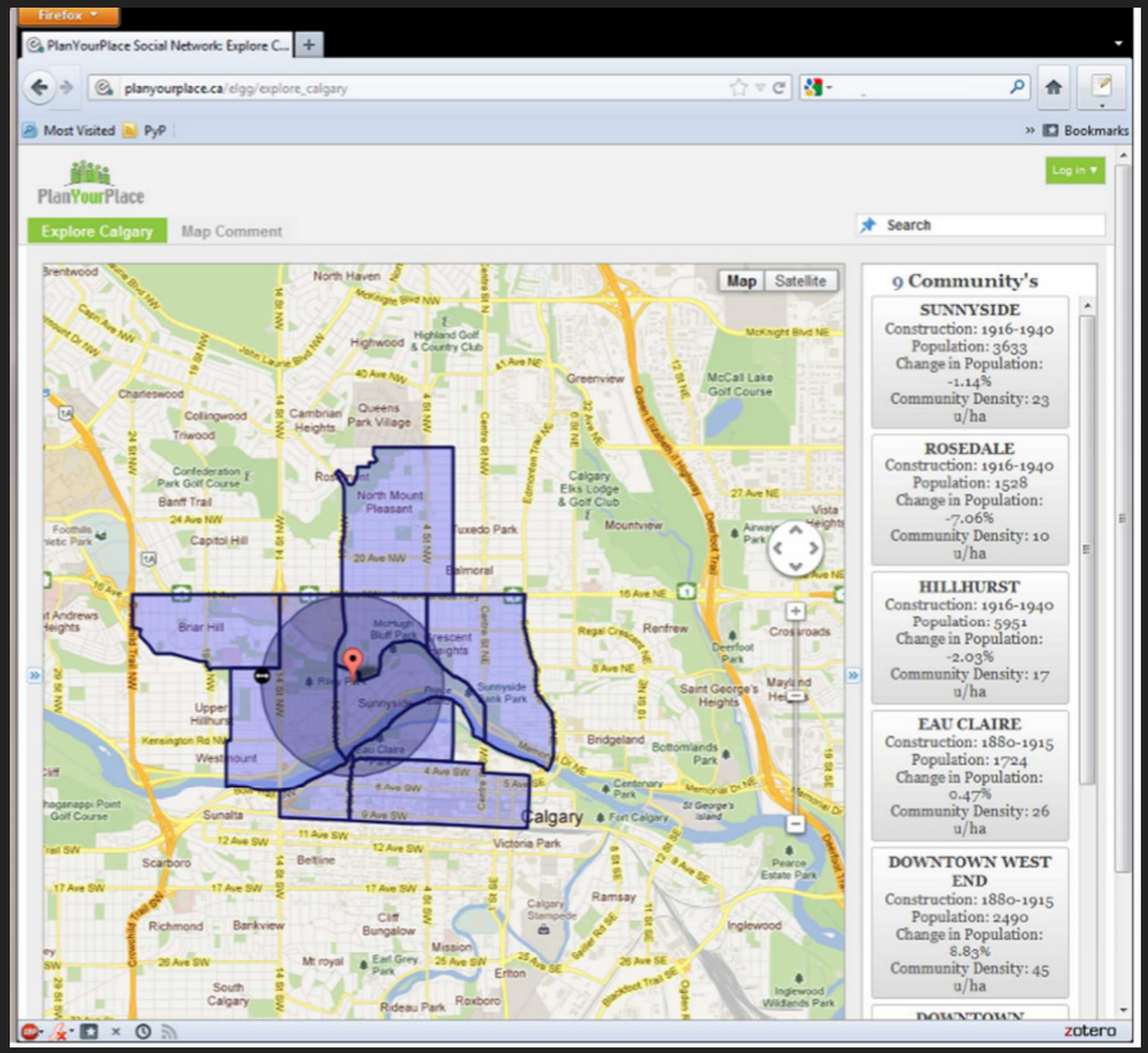
CommunityCrit: Inviting the Public to Improve and Evaluate Urban Design Ideas through Micro-Activities

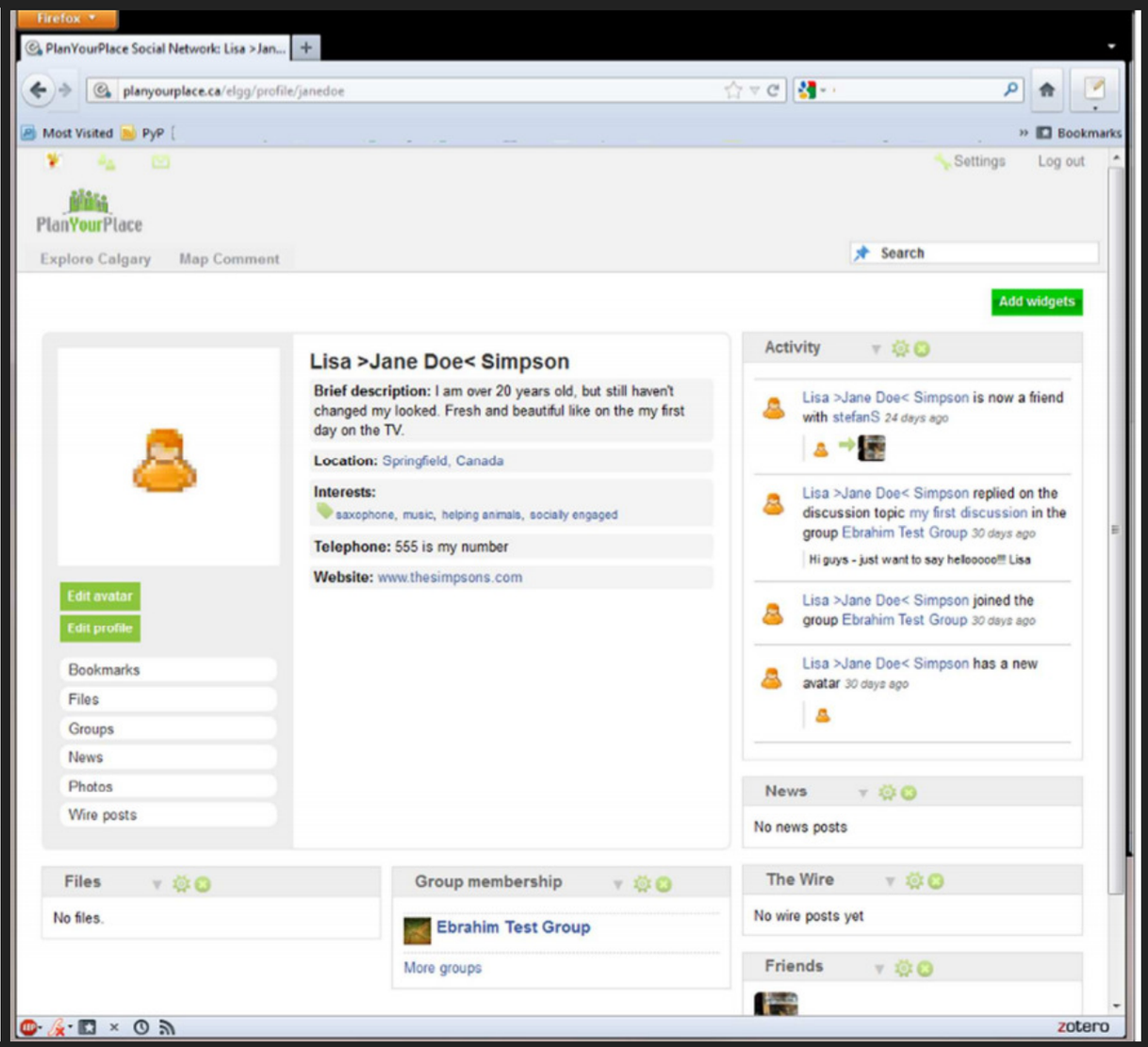
Narges Mahyar, Michael R. James, Michelle M. Ng, Reginald A. Wu, Steven P. Dow, ACM Human Factors in Computing Systems (CHI 2018).

Face to face methods have many limitations

- Engaging representative stakeholders
- Hearing out people's comments
- Recording/disseminating comments

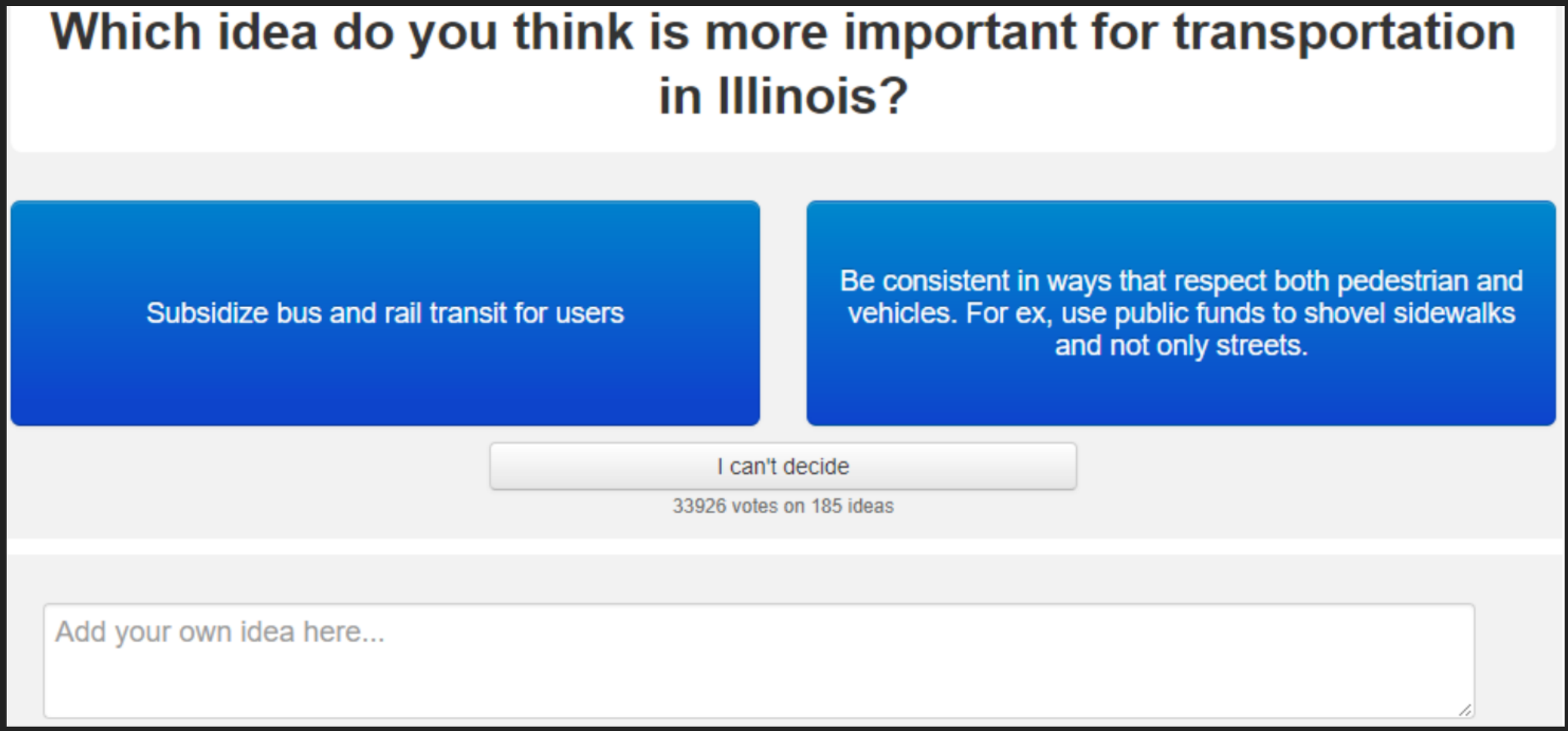
Urban design tools require time investment and expertise





S. Steiniger, M. E. Poorazizi, C. AM Bliss-Taylor, E. Mohammadi, and A.JS Hunter. 2012.

Online civic technologies often limited to opinion polling



WikiSurvey: M. J. Salganik and K. EC Levy. 2015.

Research question

- How can we create a system for activities beyond opinion polling that
  - captures quality feedback
  - in a short amount of time?

System design & considerations

- Providing a quick & flexible workflow
- Designing understandable questions
- Providing social interactions
- Sending people directly into quick activities

http://cc.ucsd.edu

CommunityCrit allows the public to participate in the urban design process.

By offering a quick and easy way to voice opinions, CommunityCrit empowers anyone to help shape the future of their community.

Currently, we are collecting feedback on an effort to expand the 14th Street Promenade in East Village. The intersection of 14th Street, National Avenue, and Commercial Street—referred to as "El Nudillo," or "the knuckle"—is envisioned as a pedestrian destination, a place of social gathering, and a celebration of East Village and its surrounding neighborhoods.

What do you think El Nudillo should be? Please click below to contribute your voice!

GET STARTED

Design case: El Nudillo a key intersection in San Diego

Background Info on El Nudillo

The 14th Street Promenade, which was approved by the city in 2016, will be a pedestrian-friendly "green street" extending from City College in the north to the intersection of 14th Street and National Avenue in the south. It will feature widened sidewalks, outdoor furniture, and art, in order to promote social gathering and a unique neighborhood feel. The overarching goal for the 14th Street Promenade is to help create a more sustainable, walkable downtown.

We are now engaging the public and local experts to develop the intersection of 14th Street, National Avenue, and Commercial Street, which marks the end of the 14th Street Promenade. This intersection —known as **El Nudillo**, or "the knuckle"—is envisioned as a pedestrian destination, a place of social gathering, and a celebration of East Village and its surrounding neighborhoods.

1) Pick an idea

Do An Activity

Please select an option below to begin contributing.

Ideas You Have Worked On

Build a tower ✔

Public Art ✔

Pick an Idea to Work On

Here are three random ideas that were submitted by community members. Select one to complete five activities related to that idea. You are always free to skip activities, and you can switch to a different idea by coming back to this page at any time.

1 2 3 4 5

Gateway

Promenade Real

Have an idea?

Add your own idea for the future of El Nudillo.

SUBMIT A NEW IDEA

All done?

Please take this short survey so we can improve the experience of CommunityCrit for other community members.

GO TO EXIT SURVEY

1

2) Do or skip activities

Idea: Build a tower

*Submitted by a **workshop participant**.*

Build a tower in the center of El Nudillo.
Sketches of tower concepts as shown.

Question 1/5

How could this idea be improved by taking the following submission into consideration?

Submission

14th Street Promenade Workshop

The height limits of East Village/downtown (440 feet) and Barrio Logan (40 feet) converge here. Height should be treated in a sensitive manner.

— *This design guideline was submitted by a **project organizer**.*

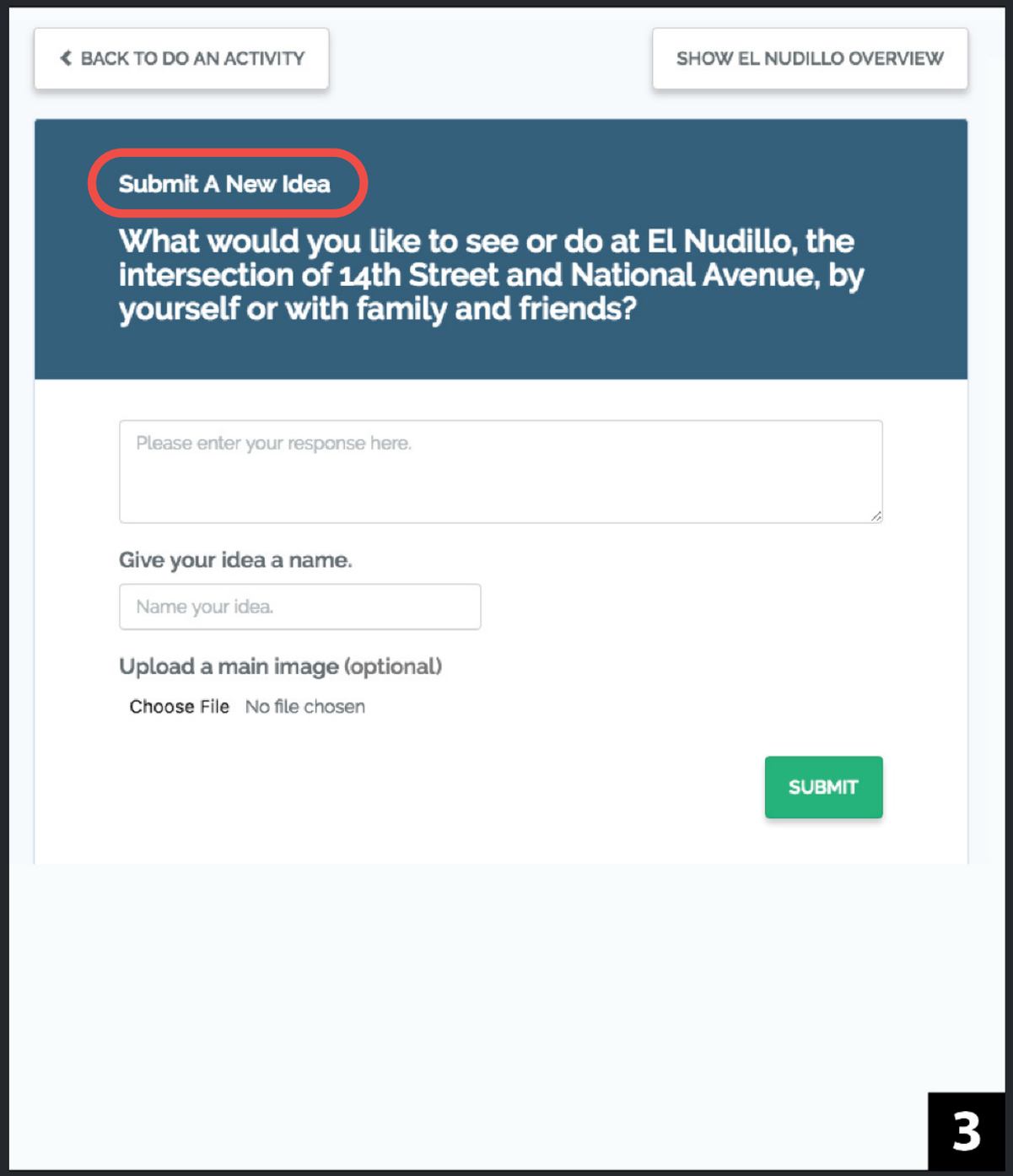
Please enter your response here.

Skip ›

SUBMIT

2

3) Submit a new idea



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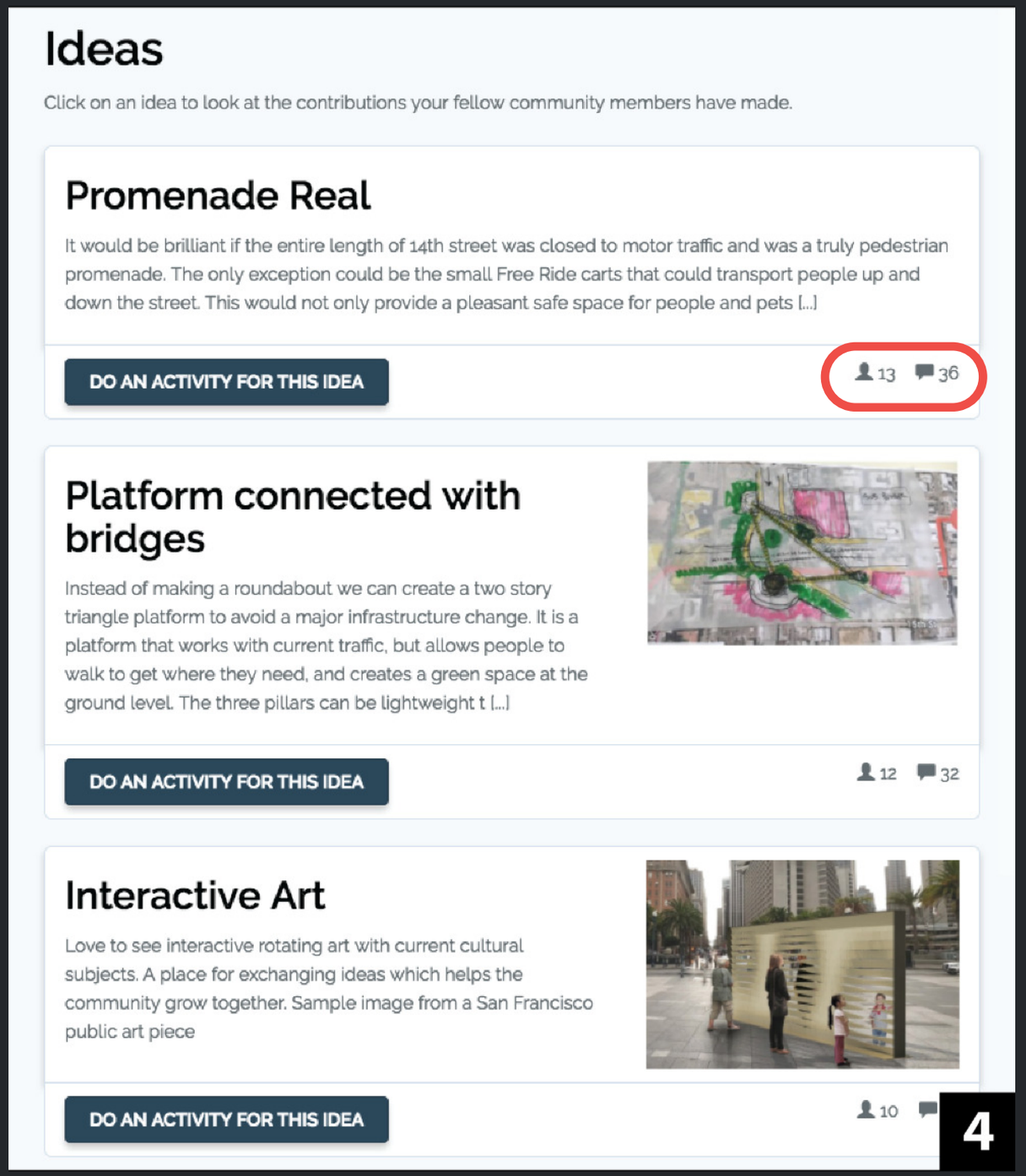
4) View my/all contributions

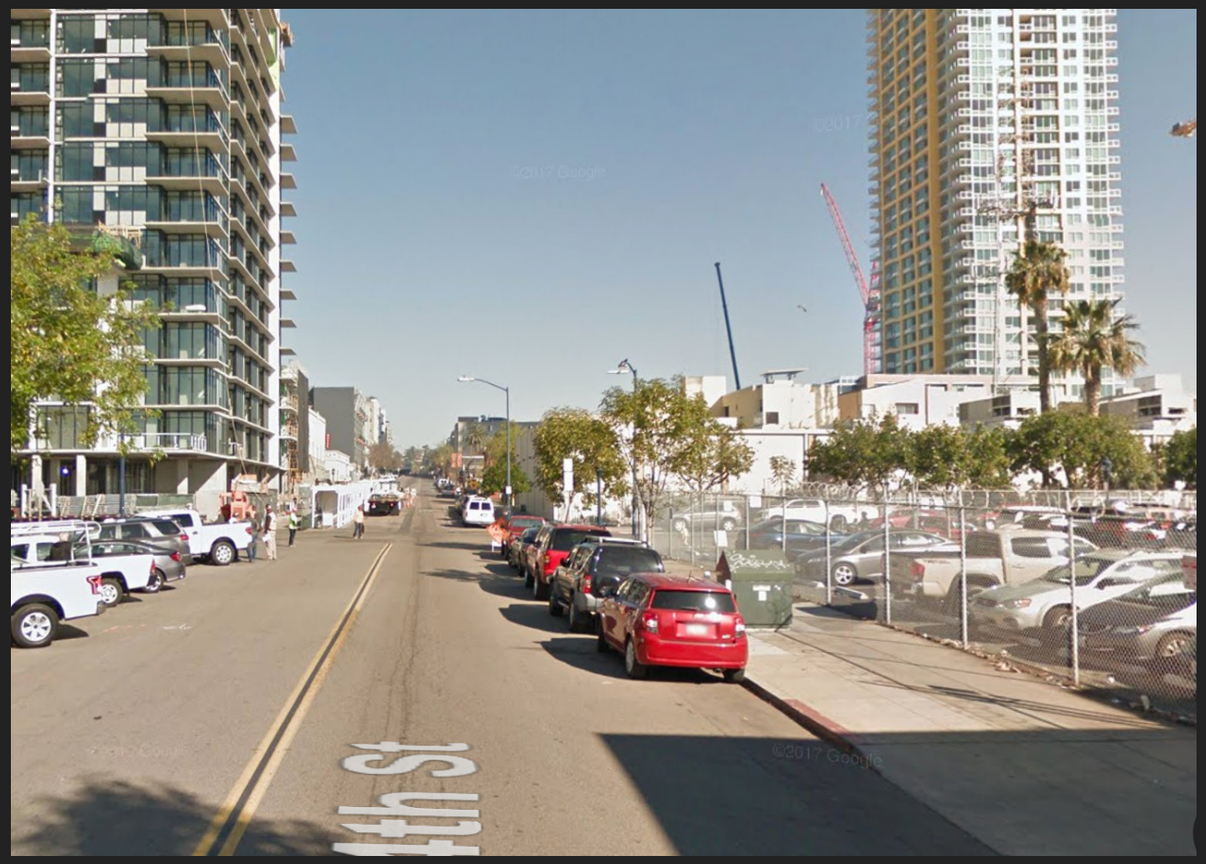


4

Method

- Partnership with a local planning team
- Design and development of the tool
- Deployment in the wild
- Interview with community members
- Think aloud
- Interview with urban planners
- Experts’ feedback on people’s contributions

Case Study: Park-to-Park Project

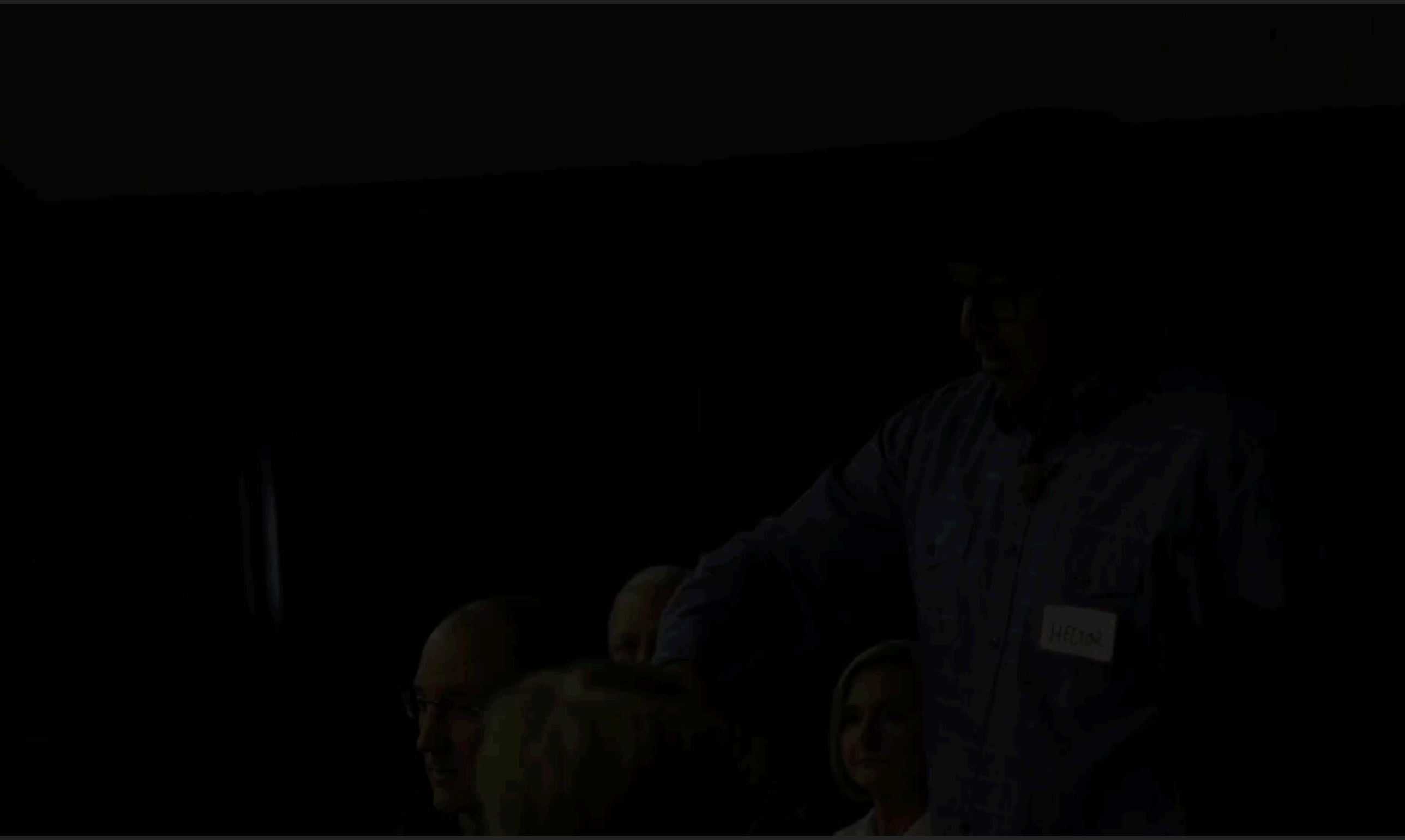


Current

Proposed

14th St
National Ave
Commercial St
Commercial St
National Ave
Commercial St
Commercial St
National Ave
Commercial St
Commercial St
Reliable Pipe

BARRIO LOGAN



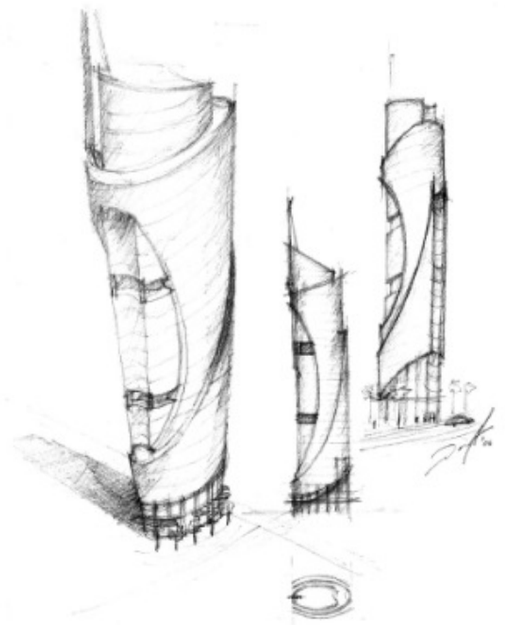
Workshop participants willingness to use an online tool

- Willingness (21/21)
- Technological means (21/21)
- “We have always been overlooked, so my community would be very interested in an online tool”

Workshop ideas

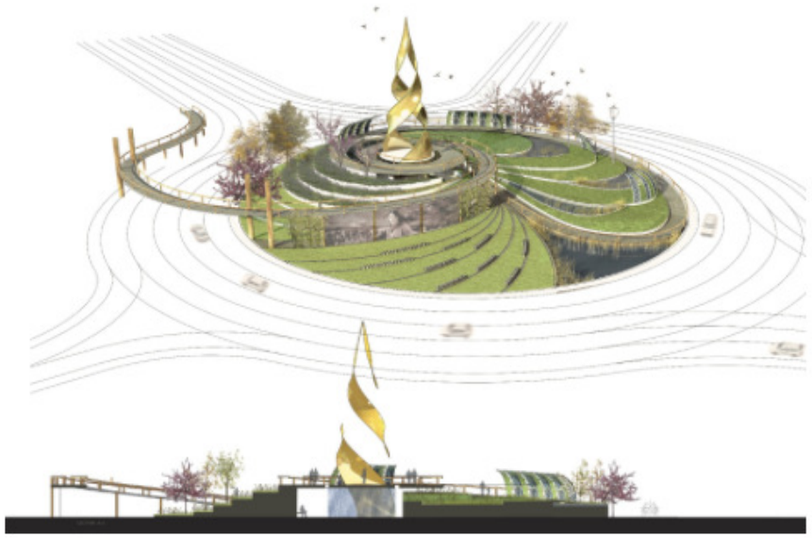
Build a tower

Build a tower in the center of El Nudillo. Sketches of tower concepts as shown.



Roundabout

The intersection right now is basically just an empty lot. We could easily make it a roundabout with three crosswalks so that traffic from National Ave and Commercial St can still get around but so people can also use the open space in the center.



DO AN ACTIVITY FOR THIS IDEA

8 26

CommunityCrit ideas

Promenade Real

It would be brilliant if the entire length of 14th street was closed to motor traffic and was a truly pedestrian promenade. The only exception could be the small Free Ride carts that could transport people up and down the street. This would not only provide a pleasant safe space for people and pets [...]

EL Parquecito

a densely landscaped small urban park. NO Large sculpture or gateway 'ART' archway JUST a BIG canopy tree and pervious ground cover with native grasses to soften

DO AN ACTIVITY FOR THIS IDEA

8 22

Empowered community members to provide input

"I don't have time to go to workshops so it provides opportunity to give feedback". (*P6*)

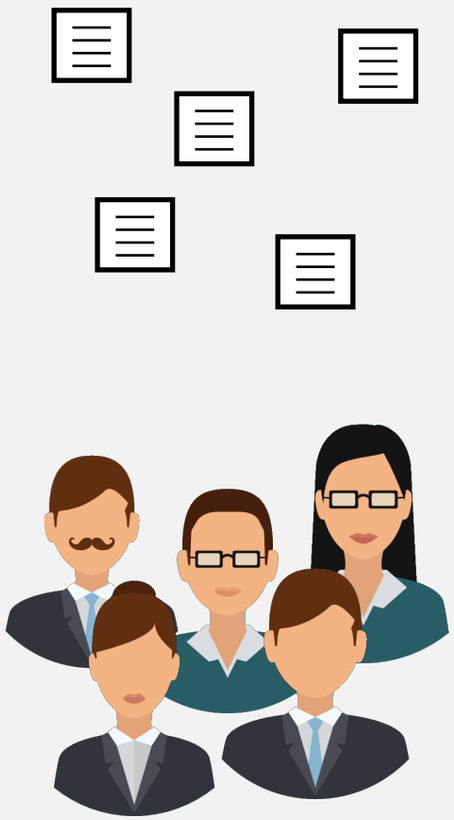
"I liked only having to answer 5 questions. I have conducted lengthy surveys myself and thought them to be excessive to the point of endangering the quality of data collection (respondents get bored, distracted, only want the "reward" etc.)" (*P2*)

Urban planners saw value in public outreach

“Provides more tools for community outreach and for people to participate, and will give us a chance to present ideas that came out of CommunityCrit back to the public during the next workshop and facilitating a discussion around them.” (*E2*)

Contributions: Scaling & diversifying public participation

Public Workshop



CommunityCrit

Remaining problems

- Supporting the broader urban design process
- Authoring interface for supporting multiple projects
- Increasing participation
- Addressing marginalized perspectives
- Making sense of people's input

Problem: difficulty of surfacing the key themes

Promenade Real

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DO AN ACTIVITY FOR THIS IDEA

14 37

Interactive Art

Love to see interactive rotating art with current cultural subjects. A place for exchanging ideas which helps the community grow together. Sample image from a San Francisco public art piece

DO AN ACTIVITY FOR THIS IDEA

10 34

Platform connected with bridges

Instead of making a roundabout we can create a two story triangle platform to avoid a major infrastructure change. It is a platform that works with current traffic, but allows people to walk to get where they need, and creates a green space at the ground level. The three pillars can be lightweight t [...]

DO AN ACTIVITY FOR THIS IDEA

13 33

Build a tower

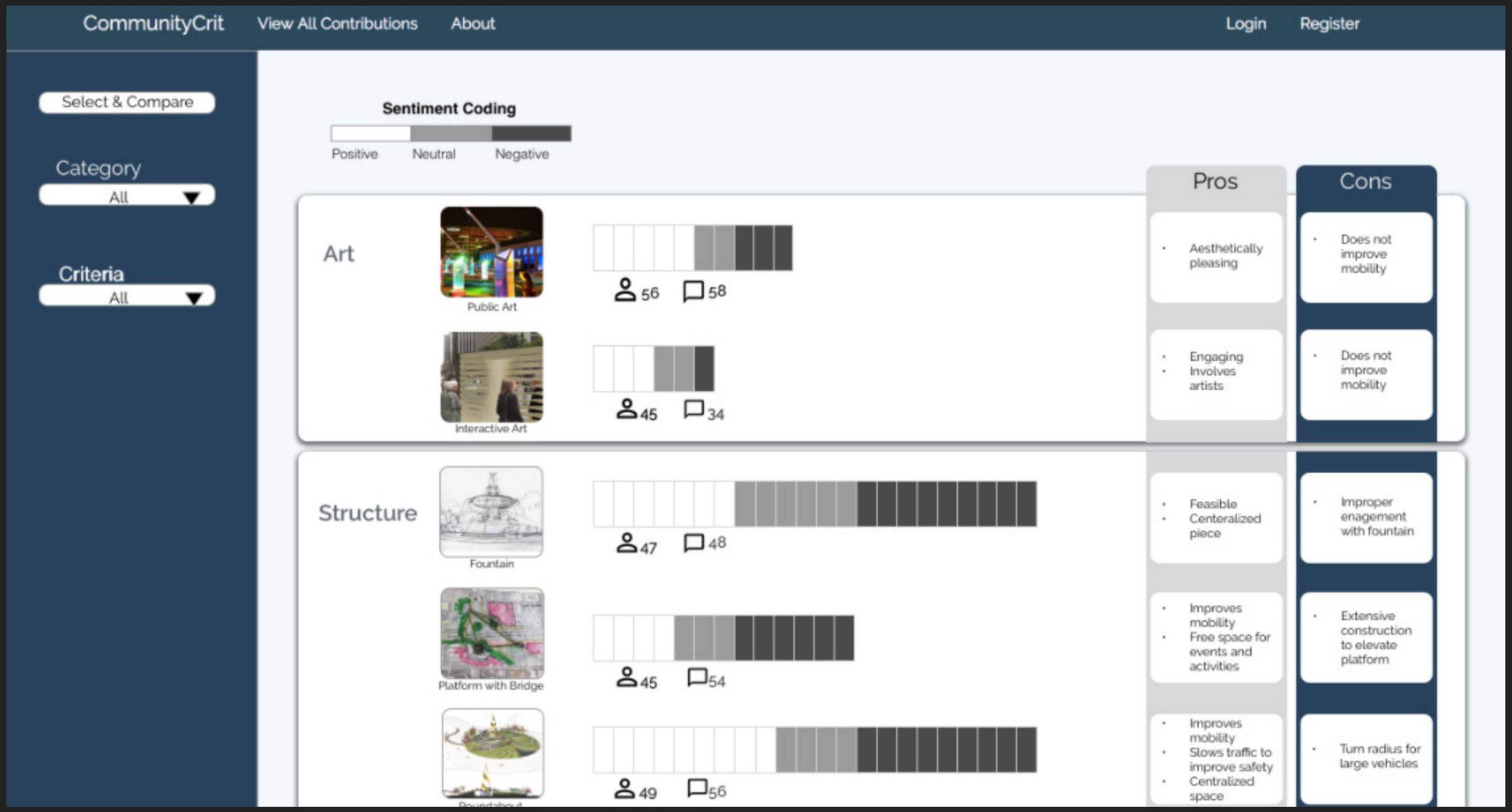
Build a tower in the center of El Nudillo. Sketches of tower concepts as shown.

DO AN ACTIVITY FOR THIS IDEA

7 28

Roundabout

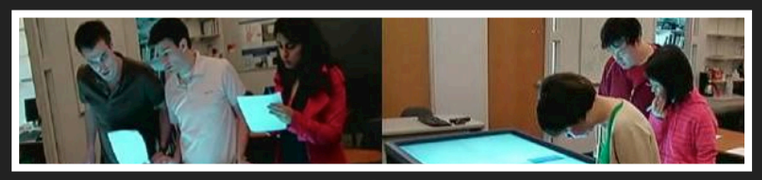
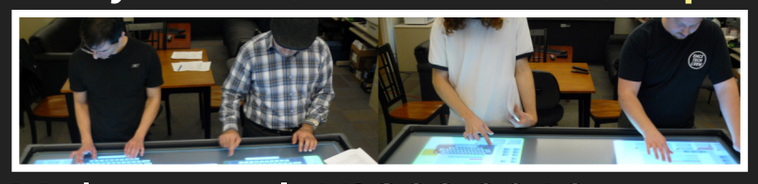
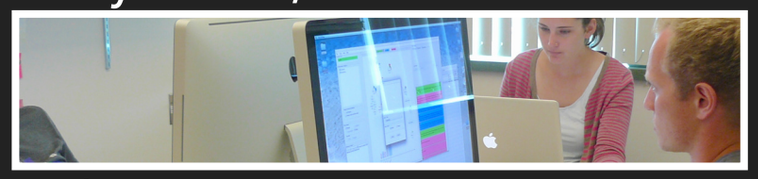
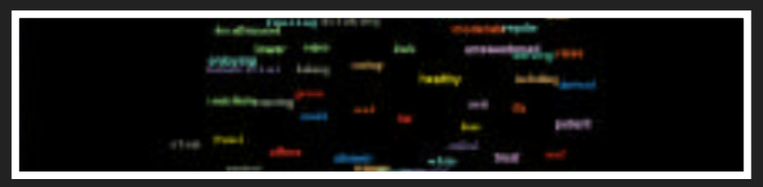
Early design to surface the key themes in comments



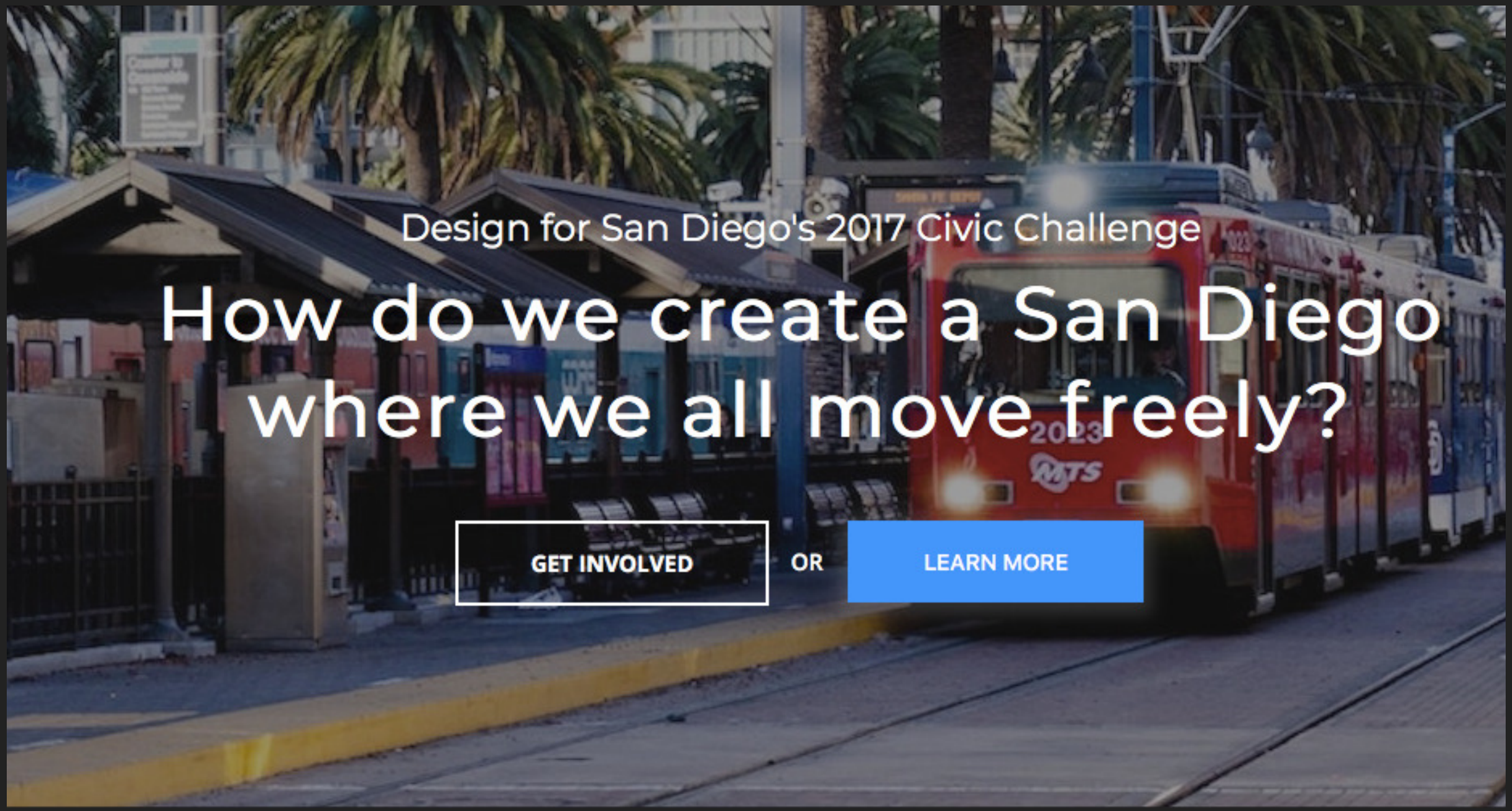
Short-term: building novel tools to advance digital civics

- Sensemaking of complex civic data
- Tools for consensus building and decision making
- Visual storytelling

Extending my work in other sociotechnical problems

	Collocated	Online
Experts	 Mahyar et al, InfoVis 2012, **Top 4 VAST papers**  Mahyar et al, HICSS 2013  Mahyar & Tory, VAST 2014, **Best paper award**	 Mahyar, 2008
Novices	Mahyar et al, VIS 2015 Mahyar et al, ISS 2016, **Honorable mention award, Outstanding award**	Mahyar et al, CHI 2018 Design for San Diego (D4SD)

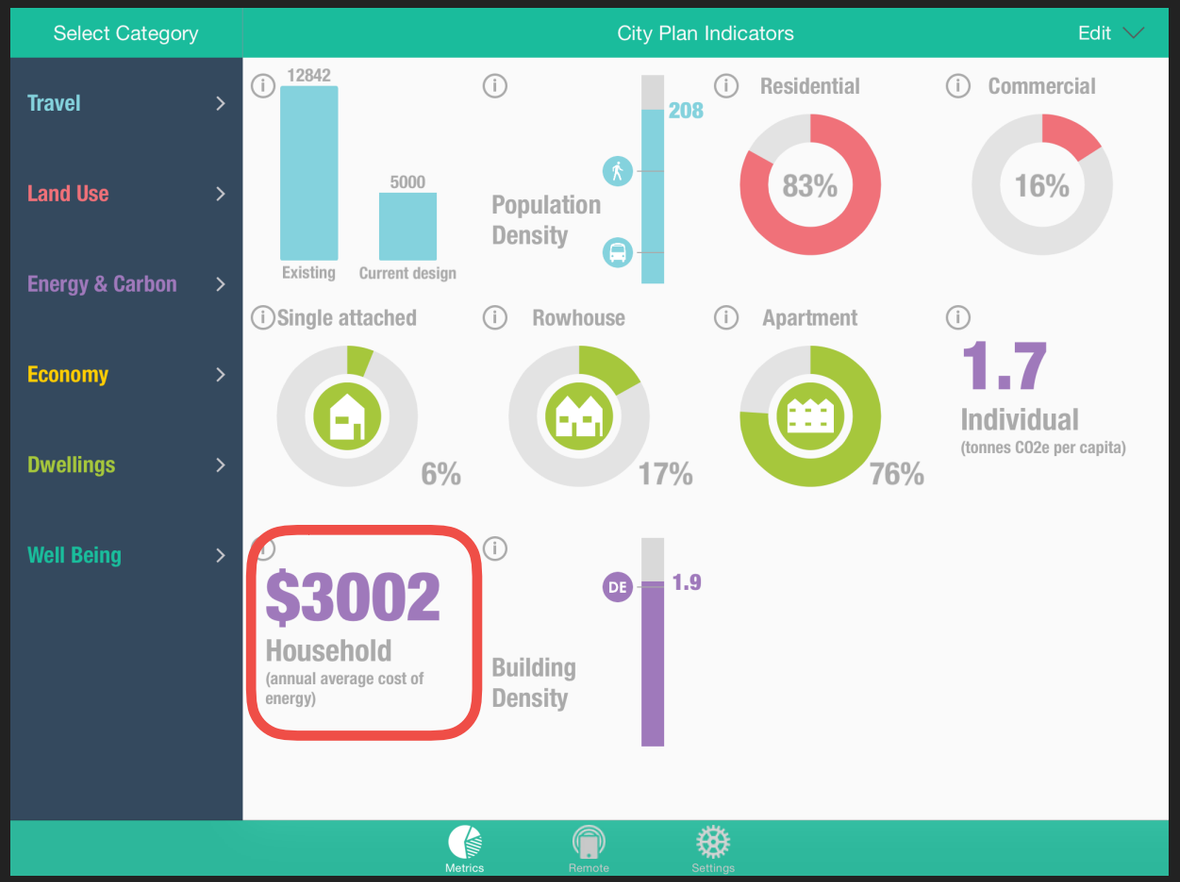
https://d4sd.org

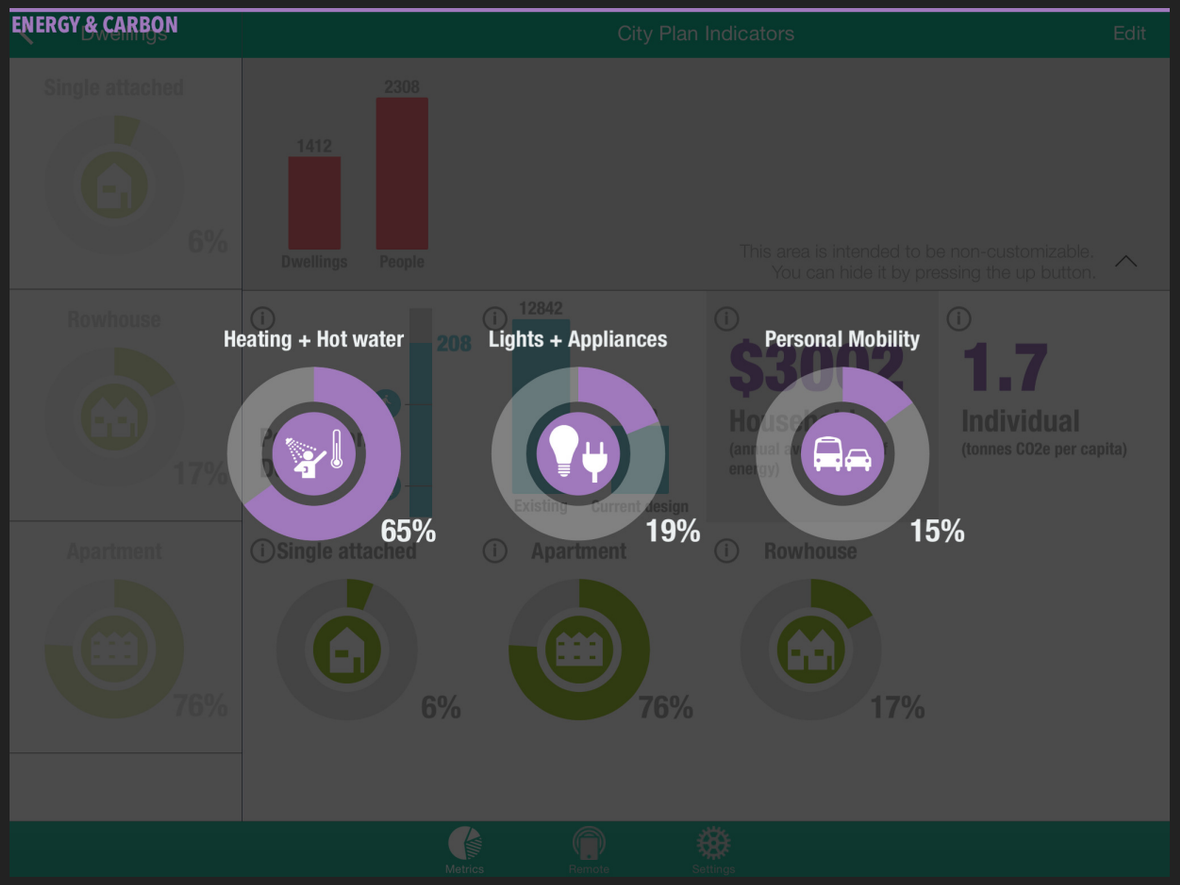


Long-term: learning science, health informatics

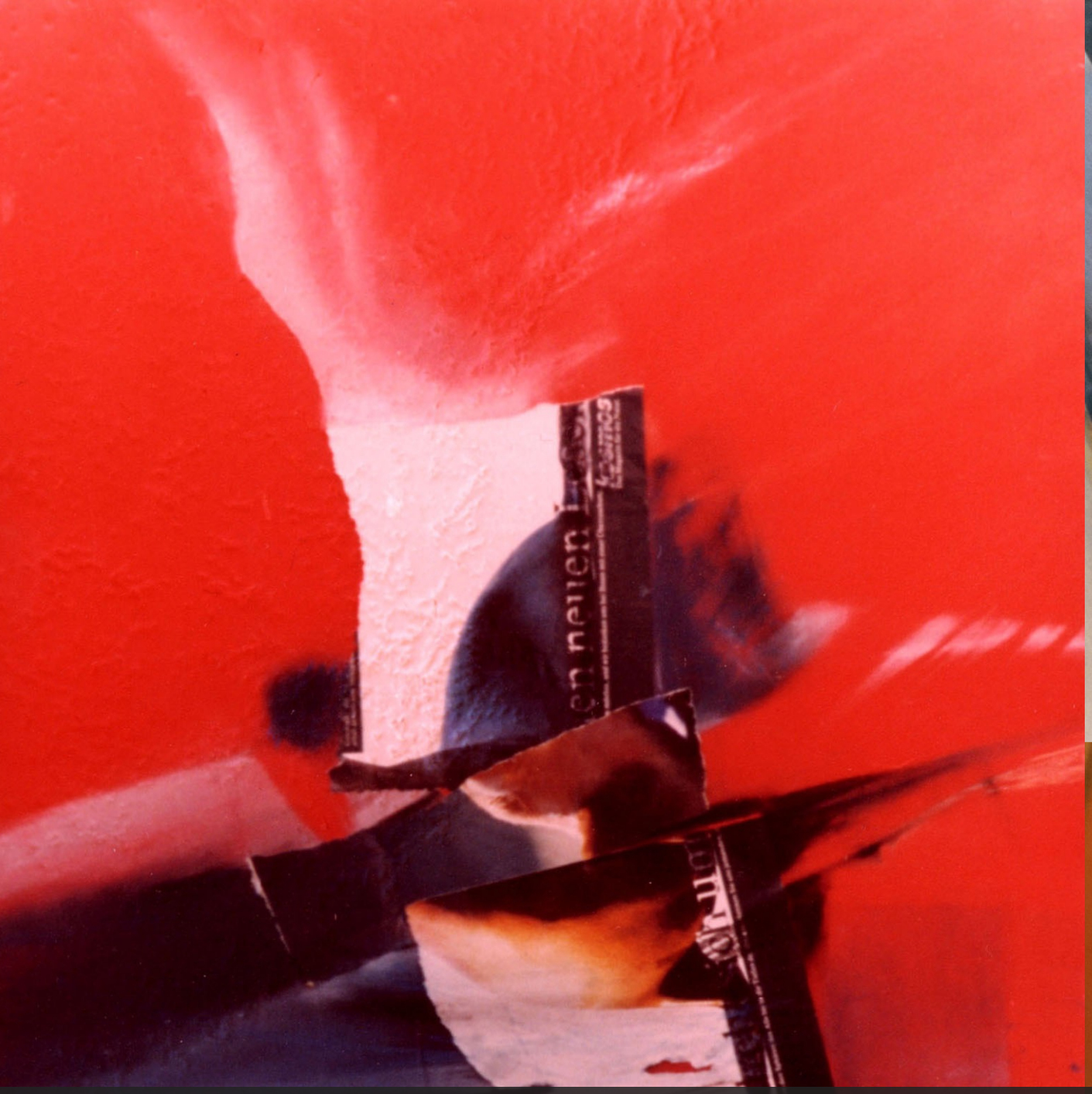
- Design of learning analytics systems
  - Broadening learning analytics for non-specialist users
- Support tools in both online and physical environments
  - Use of multi-touch displays to engage novices

Visualization design for non-specialist users





Infographics to increase everyday people's engagement



How can art make HCI reach beyond specialist audiences?

How can new programs at the interception of Art and Technology address real world problems?

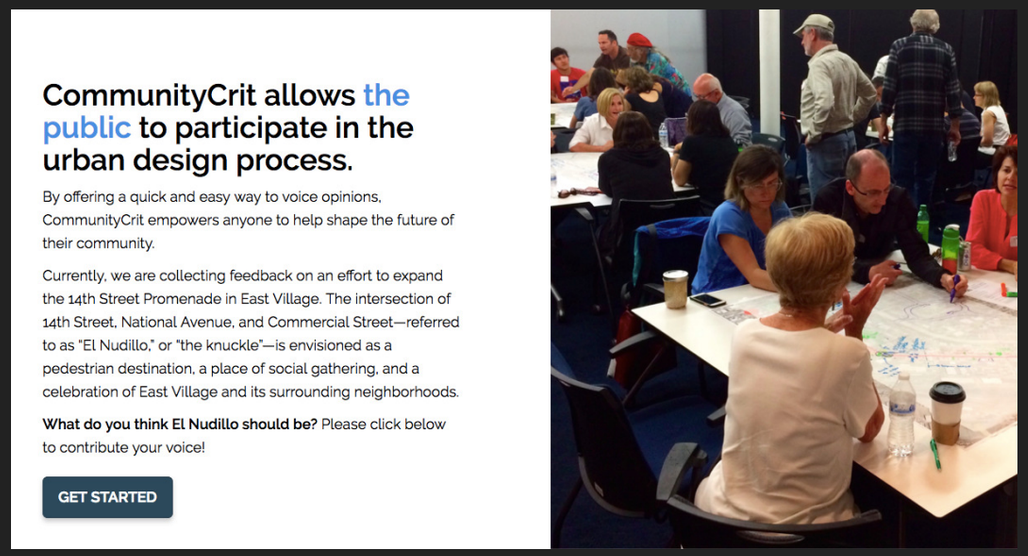
Thank you!

Social Computing to Enrich and Scale Public Engagement

Narges Mahyar (nmahyar@ucsd.edu, http://nmahyar.ucsd.edu)

UD Co_Spaces

Enriched public engagement, increased public's engagement, enabled alternative visualization and measurement in a short amount of time.



CommunityCrit

Scaled & diversified public participation, democratized access and empowered public to contribute meaningfully in a short amount of time.