Advancing Collective Innovation

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PROTOLAB
UC San Diego
The Design Lab
Welcome to Galaxy Zoo’s view of the Universe. If you’re here you should already have seen the Tutorial, but feel free to go and remind yourself. There’s no need to agonise for too long over any one image, just make your best guess in each case.
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.
Supporting Collective Innovation

How can we harness collective intelligence, effort, and creativity to innovate on complex problems?
Engaging communities in planning
Engaging communities in planning
Wicked problems  (Rittel and Webber 1973)

A problem that is difficult or impossible to solve because of incomplete, contradictory, and changing requirements.
Wicked problems (Rittel and Webber 1973)

• The solution depends on how the problem is framed and vice versa (i.e., the problem definition depends on the solution).

• Stakeholders have radically different world views and different frames for understanding the problem.

• The constraints that the problem is subject to and the resources needed to solve it change over time.

• The problem is never solved definitively.
CONFERENCES

PROGRAM COMMITTEE
~200 PEOPLE

AUTHORS
~1000 PEOPLE

ATTENDEES
~3500 PEOPLE
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)
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)
Tag papers you want to see and get social recommendations of other papers you may like. The recommendations update automatically as you tag new papers. Just click "Show More" to see more!

Papers you want to see (4)

**Critique Style Guide: Improving Crowdsourced Design Feedback with a Natural Language Model** - Paper
Markus Krause  Thomas Garncarz  Steven P Dow  Brian P Bailey  Elizabeth Gerber
Designers are increasingly leveraging online crowds; yet, online contributors may lack the expertise, context, and sensitivity to provide effective critique. Rubrics help feedback providers but require domain experts to write them and may not generalize across design domains. This paper introduces and tests a novel semi-automated method to support...

peer feedback, feedback, review, natural language model, machine learning, artificial intelligence, online education

**Online Feedback Exchange: A Framework for Understanding the Socio-Psychological Factors** - Paper
Eureka Foong  Steven P Dow  Brian P Bailey  Elizabeth M Gerber
To meet the demand for authentic, timely, and affordable feedback, researchers have explored technologies to connect designers with feedback providers online. While researchers have implemented mechanisms to improve the content of feedback, most systems for online feedback exchange do not support an end-to-end cycle, from help-seeking to sense-making...

Online feedback exchange, feedback, design methods, online communities, social networks, crowdsourcing

ATTENDEES
~3500 PEOPLE
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Advancing Collective Innovation

pre 2014

2014 -

projectCOBI.com

UC San Diego
Discovering constraints at scale

Deployments:

- Conference on Computer-Human Interaction (CHI) 2013-2016
- Conference on Computer-Supported Cooperative Work (CSCW) 2014-2015

Research papers:


- **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:
Supporting Collective Innovation

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Advancing Collective Innovation
Independent teams only gain insight on a portion of the “design space”
Harvesting design inspiration from examples

CupClub - Join the Reusable Revolution

By: CupClub
Location: UK

CupClub is the world’s first returnable cup ecosystem which replaces the 100 billion single-use cups and lids used globally every year. CupClub provides a service for drinks, allowing consumers to take away hot and cold beverages from any participating cafe, returning them when finished to the nearest CupClub drop point. Think bike sharing, but for cups.
How can we inspire people to explore the design space more productively?
What should we name our company?

Let's make it playful/fun!

Enter ideas related to this inspiration here

3 Ideas for this Inspiration!

DataLegos
DataPlayground
dataplay

Names that evoke movement (think of fluids, energy, etc.)

Dynamic Data

What should we name our company?

Names that evoke movement (think of fluids, energy, etc.)

Dynamic Data
What should we name our company?

Names that evoke movement (think of fluids, energy, etc.)

Enter ideas related to this inspiration here

Submit Idea

- DataNitro!
- Influx
- Dynamic Data

Names that evoke movement (think of fluids, energy, etc.)

Enter ideas related to this inspiration here

Submit Idea

- DataNitro!
- Influx
- Dynamic Data
Real-time facilitation improves crowd ideation


Experts derive semantic models that inspire

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Description</th>
<th>Sample Inspiration with Strategy</th>
<th>Yield</th>
<th>Max creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examples</td>
<td>Directly provide an idea</td>
<td>“Ask them to put their contact info in your phone”</td>
<td>+0.2</td>
<td>+1.8</td>
</tr>
<tr>
<td>Simulations</td>
<td>Invite ideators to generate ideas from a different perspective (e.g., from a different “persona” or specific situation/setting).</td>
<td>“Imagine if you had a different persona (e.g., a politician collecting signatures). What strategies might be available to you?”</td>
<td>+0.3</td>
<td>+8.2 **</td>
</tr>
<tr>
<td>Inquiries</td>
<td>Provoke open-ended reflection</td>
<td>“Where might their name be written?”</td>
<td>+0.2</td>
<td>-2.3</td>
</tr>
</tbody>
</table>

\[ m p < .10 \quad * p < .05 \quad ** p < .01,\]


(How) can we gain better coverage of very large spaces of ideas?
Effort required to explore an opportunity space

Building an affinity model of concepts

1. Individual whiteboards


Steven Dow
Advancing Collective Innovation
Building an affinity model of concepts

1. Individual whiteboards

2. Sparse Similarity matrix capturing similarity among some pairs of ideas

3. t-SNE

The “idea map” capturing approximate similarity among all ideas

\[ P(\bigcirc, \bigcirc) = \frac{\# \text{ times } \bigcirc, \bigcirc \text{ in the same cluster}}{\# \text{ times } \bigcirc, \bigcirc \text{ seen together}} \]
Strategies for sampling concepts from the underlying affinity model
People who saw auto-selected diverse examples generated more diverse ideas

![Graph showing diversity of generated ideas (z-score) across different example conditions.

F(2,56) = 2.26, p = 0.028


People who saw auto-selected diverse examples fixated less


Brainstorming with crowds

Research papers:


Collaborators:
Obtain feedback from multiple stakeholders
Peer feedback during class: scale but poor diversity
Obtaining feedback from diverse stakeholders


Scaffolding feedback exchange

CrowdCrit

CrowdCrit: Principled Rubrics

Allegheny County Music Festival (P1): This is a poster for an upcoming music festival in Allegheny County, Pennsylvania. The goal of the poster is to get people interested in going to the festival.

LABOR DAY WEEKEND EVENT
RUSTED ROOT
CORNED BEEF AND CURRY BAND
ROYAL TEETH → CARLA BIANCO
SUNDAY, SEPTEMBER 1

CrowdCrit: Principled Rubrics

The design should enable a progressive discovery of meaning. There should be layers of importance, where less important information receives less visual prominence.

CrowdCrit: Annotations

Allegeny County Music Festival (P1): This is a poster for an upcoming music festival in Allegeny County, Pennsylvania. The goal of the poster is to get people interested in going to the festival.

Add a Critique

Critique Details
Annotate the parts of the slide related to the critique you selected:

- Marker
- Box
- Polygon
- Whole

Describe the issue using the textbox below:

Good emphasis on the band name

CRITIQUES

Your Comments
You have not made any comments yet. Your critiques will show up here after you add them.

CrowdCrit: Visual overview

Feedback On Your Design

Feedback Distribution (75)

Top Feedback

- 8% Simple and clean (Simplicity)
- 6% Well organized (Layout)
- 6% Consistent design language (Consistency)
CrowdCrit: Detailed feedback

Feedback On Your Design

**Title**
Allegheny County Music Festival (P1)

**Context**
This is a poster for an upcoming music festival in Allegheny County, Pennsylvania. The goal of the poster is to get people interested in going to the festival.

**Layout (20)**

- Well organized (6)
  - Overall it's a good poster. It has the right style and design for the event it's promoting.
  - (no details)
  - (no details)
  - In general, the message is clear.
  - Good use of space.
  - (no details)
  - Well organized: not a lot of distractions. Straight to the point! Easy to read. Design is great.

- Good alignment (5)
  - Text has good margins
  - I really like the use of space here. There is not too much blank space.
  - No issues with alignment. Very nice.
  - Everything is aligned and in great order. It's easy on the eyes and attractive.
  - Very readable - great spacing, contrast, font and size.

- Poor placement (3)
  - I think this should be at the top with the event title, so the audience immediately knows the date of the event.
More feedback providers, more issues identified

Without rubrics, novices do worse than experts

CommunityCrit supplements public workshops
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
How do surrounding community members think about improving this intersection?

**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.
Participants perform micro-tasks around urban design concepts

Participants perform micro-tasks around urban design concepts

Participants perform micro-tasks around urban design concepts

Participants liked that CommunityCrit allowed for small bursts of 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 see 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)
Urban planners see 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)

However...

“it gives a voice to people who are too lazy to get off the couch and come to the workshop” (E4)

Enabling feedback from diverse stakeholders

Research papers:


How can we engage many stakeholders in design thinking?
Supporting Collective Innovation

How can we harness collective intelligence, effort, and creativity to innovate on complex problems?
Supporting Collective Innovation

1. Discovering constraints and preferences at scale
2. Obtaining feedback from many diverse stakeholders
3. Exploring many solution paths in parallel
4. Gathering and synthesizing complex information
5. Making rational decisions as a community
6…
Design for San Diego's 2017 Civic Challenge

How do we create a San Diego where we all move freely?

GET INVOLVED
OR
LEARN MORE

KEY DATES

Human-Centered Design Course at UCSD
Oct 3-19 • UCSD main campus

D4SD Poster Session, Design Forward mixer
Oct 25 • Broadway Pier

D4SD Award Ceremony, Design Forward Summit
Oct 26 • Liberty Station

LATEST TWEET

@Design4SD
We thank everyone for joining us and making the D4SD challenge a success.
CHALLENGE: Accessibility

Beach Access For All

Daniel Lenzen, Andrea Flagiello, Matt Abbondanzio, Tomas Robinson
**What is Navier?**

A software and protocol for autonomous vehicles that pools cars together in lanes based on distance to their respective exits to make traffic flow without disruption.

Lucien Eloundou, Roshan Fernando, and Ian Carrasco
CHALLENGE: Bike Safety

Cycle Detection

Allowing bikes and smart cars to travel together safely.

D.J. Nelson, Savera Soin, James Maron, Stephen Cerruti
The chart illustrates the message volume per day for different events and deadlines. The x-axis represents the days from 9/1 to 11/1, divided into periods A to F. The y-axis shows the message volume ranging from 0 to 150. Key events and deadlines marked include:

- **Course begins**: High message volume spike on 10/1.
- **Event kickoffs**: Occurrence in periods C and E.
- **Hackathon ends**: Appears in period C.
- **Team registration due**: Occurs in period E.
- **Project submission due**: Occurs in period E.
- **Design Summit ends**: Occurs in period F.

The chart uses a legend indicating different message types:
- **General**: Orange bars.
- **Process**: Green bars.
- **Team**: Blue bars.

The data reflects a pattern of increased communication leading up to and during key events and deadlines.
Goals for D4SD

- Creating collective knowledge through competition
- Building social computing systems to facilitate
- Delivering a hybrid educational model
- Providing value for diverse stakeholders
- Combining ideas from design thinking, crowdsourcing, and organization science
Get Ready for D4SD's 2020 Design Challenge

Design for San Diego (D4SD) is a city-wide human-centered design competition focused on exploring solutions to important civic challenges facing our region.

Innovators, volunteers, teachers, and sponsors... find out how we can improve the city together.

Learn More  Get Involved

How to Get Involved Now  Register Now for the 2020 Design Challenge  Offer Experiential Learning to Your Students  Volunteer as a Mentor, Organizer, Judge, Writer...  Sponsor D4SD to Promote Your Brand
Thank you!

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