

Designing human-AI ecosystems for flourishing in education, work, and communities

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Kraw Lecture | 3.13.2024



Three eras requiring different ways
in how we live, work, and learn

John Seely Brown







Industrial Age



Digital Age



Networked + AI Age



This talk is about exploring, asking, and speculating:

designing ecosystems for flourishing in a whitewater world

1 reinventing education for continuous learning

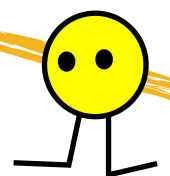
2 societal collaboration to support communities

Two Themes

Education, work, communities

Human-AI interactions

The Journey



1

How might we imagine...

a more tightly integrated approach to
education, work, and community engagement?

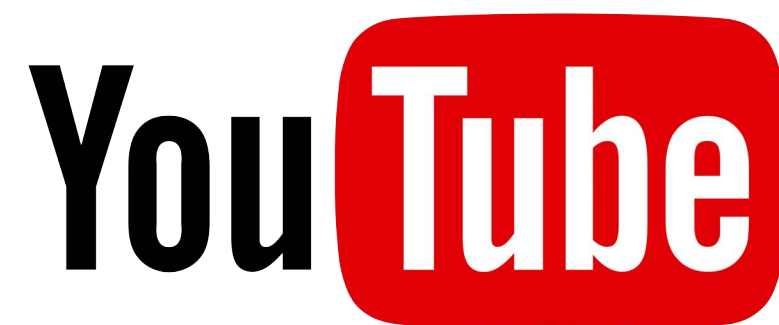
Edtech has focused on scaling access to content, but scaling **real-world experiences** remains challenging



coursera



KHANACADEMY



APPRENTICESHIPS

Key Findings

Cengage Group
2023 Graduate Employability Report

Higher Education needs to make a greater connection to employment.

Employers

74% *skills training credentials or real-world experiences* as most important for entry-level jobs,

Graduates

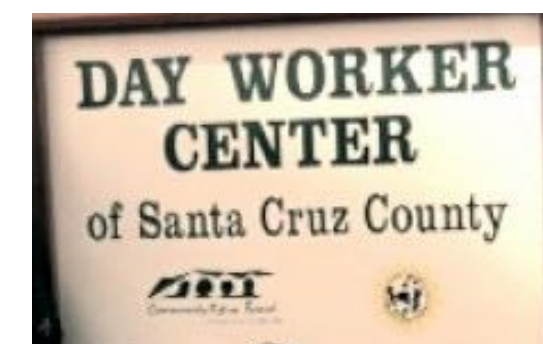
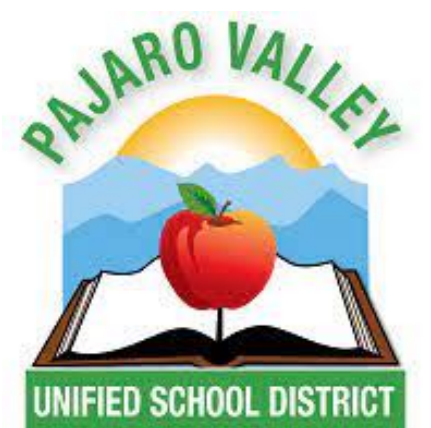
59% degree program did **NOT** teach them skills needed for first job

53% did **NOT** obtain internships, externships, apprenticeships

Communities have
growing needs to meet
amidst rapid change.



How can we support
under-resourced non-profits
and social innovators?

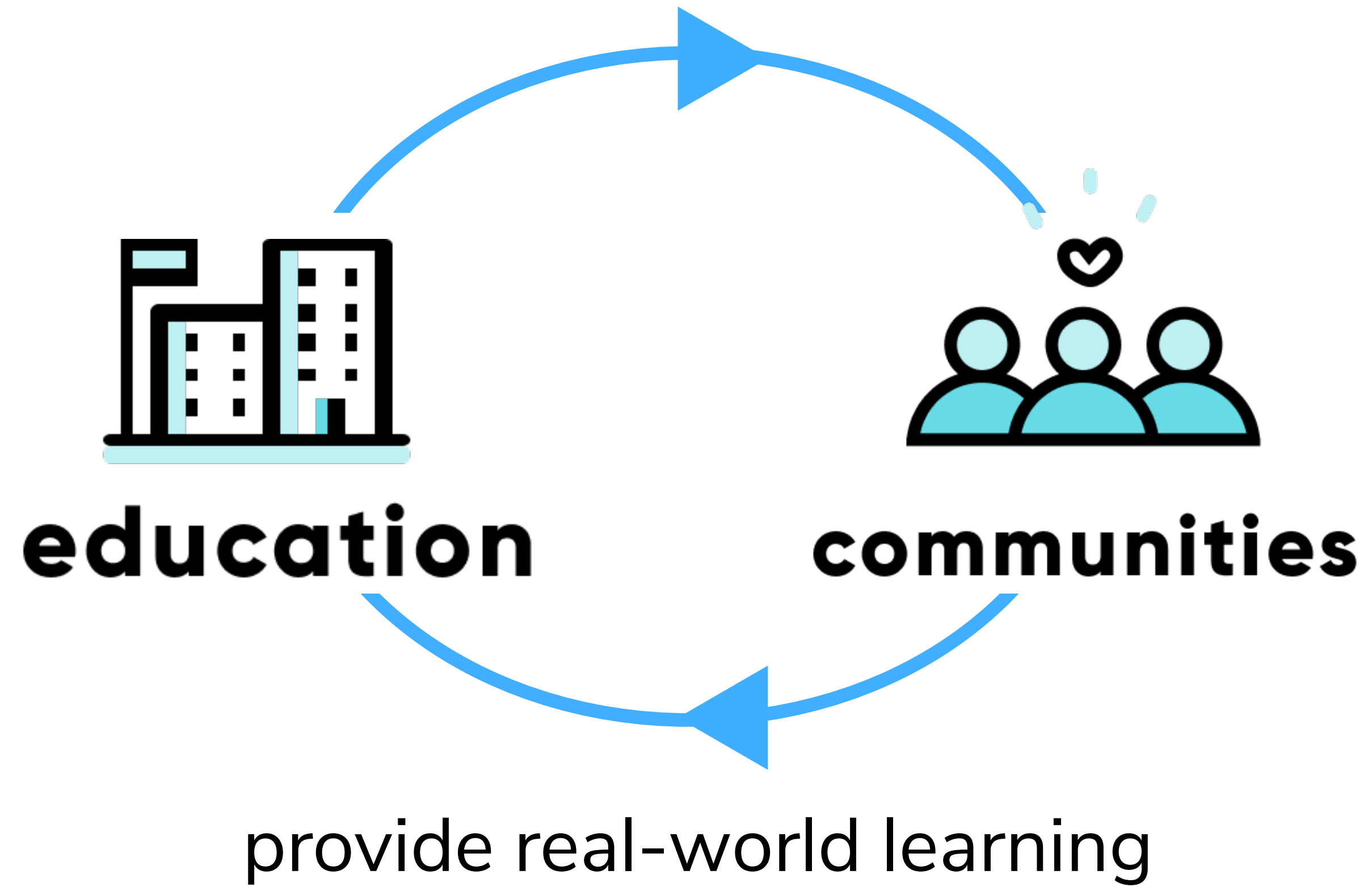


YOUR FUTURE
IS OUR BUSINESS



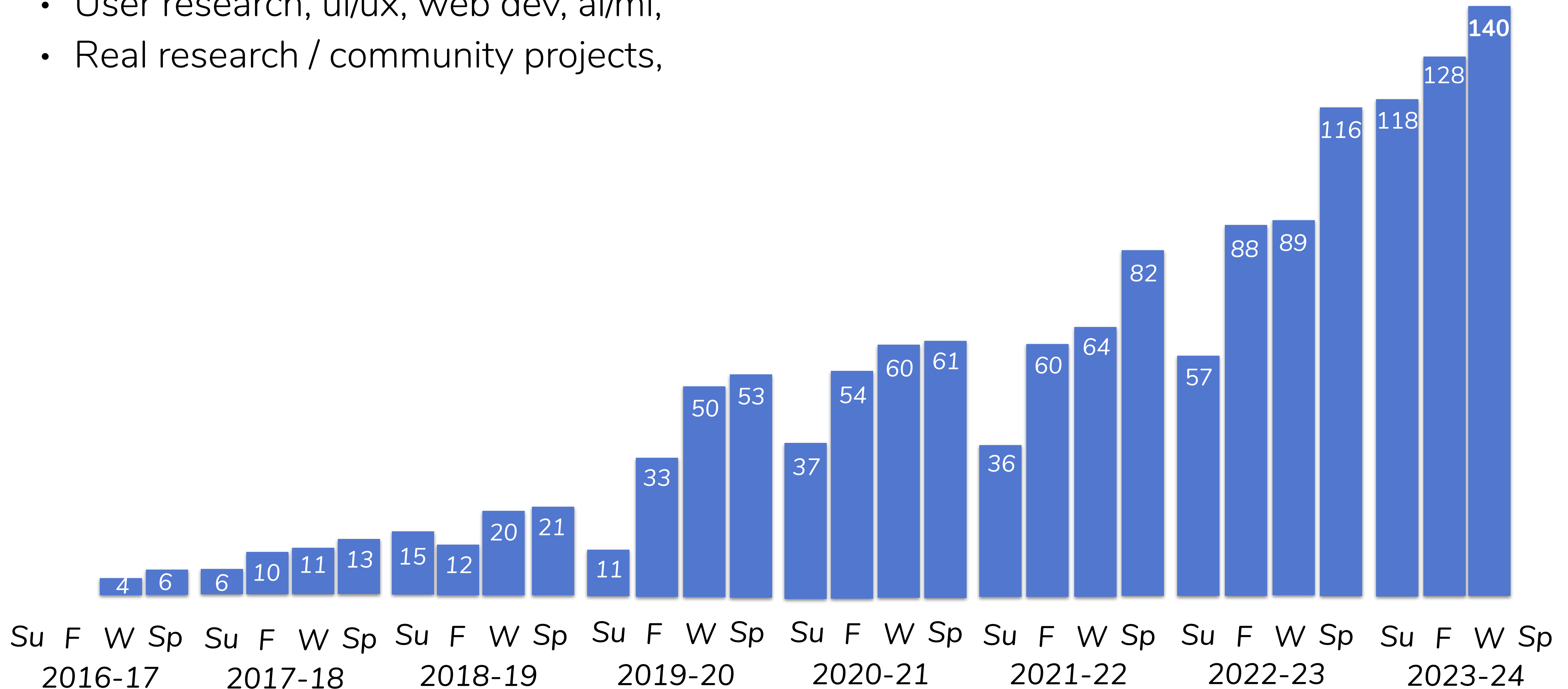
SANTA CRUZ
COUNTY OFFICE OF
EDUCATION
DR. FARIS SABBABH • SUPERINTENDENT OF SCHOOLS

support community needs



Tech4Good Collaboratory

- For students at any experience level,
- User research, ui/ux, web dev, ai/ml,
- Real research / community projects,



Community Consultancy

Strategic assessment and design exploration

1

Phase One
Landscape Analysis

2

Phase Two
Stakeholder Experience

3

Phase Three
Future State Design

4

Phase Four
Design Exploration



One partner that all 100+ students in the course are organized around supporting

A diverse portfolio of deliverables balancing research, no-code implementation, and digital prototyping

A foundation to build on in other courses, student orgs, or labs

Idea #1

find ways to make large
classes a strength rather
than a weakness

How do we scale personalized feedback to a 100+ student class?

Annota: Peer-Based AI Hints Towards Learning Qualitative Coding at Scale

Dustin Palea, Giridhar Vadhul, David T. Lee

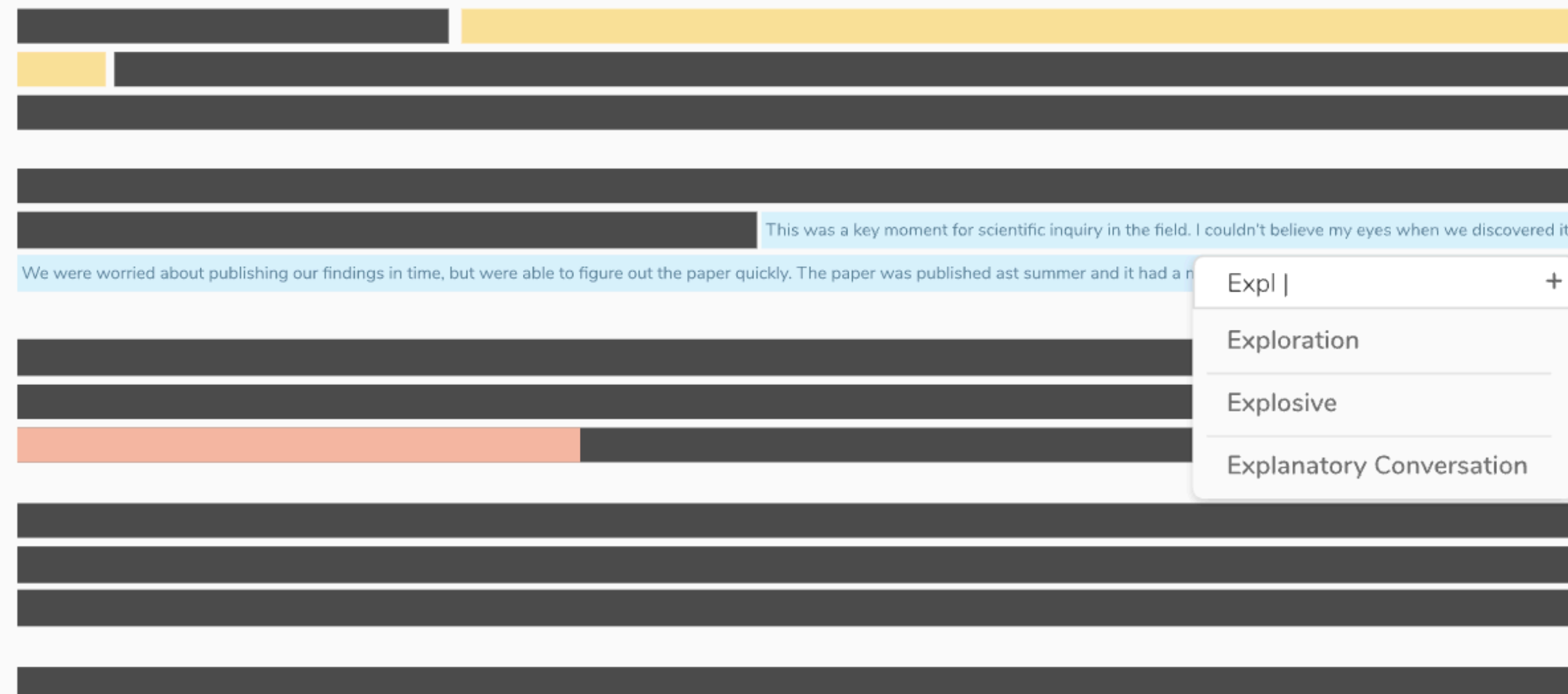
ACM Conference on Intelligent User Interfaces ([IUI](#)) 2024

Best Poster Award at HCOMP

Learn thematic analysis collaboratively.

Learn to analyze qualitative data, draw patterns, and develop theory in collaboration with others.

 Sign in with Google



Annotate with ease

Easily annotate transcripts and organize your codes and themes towards discovering patterns and insights.

What forms of articulation work do faculty need to engage in to provide undergraduate research opportunities that are successful for both the students and their own goals, e.g. in recruiting, filtering, task definition, and mentoring students?

talk about FROB specifically, could you start by briefly telling us a little bit about your role as superintendent?

And how does that intersect with CTE?

DISCUSSION OF EMMA'S BACKGROUND

Sierra Snow 2:22

How does it intersect with CTE? I'm responsible for overseeing all the operations of the district. And that would include educational services, and Career Technical Education falls under that. In addition to educational services,

I'm responsible for the business and facility services and transportation and food services and IT and all of those. I'm ultimately responsible for all of those parts. And I have been a high school teacher and been a high school principal, and Assistant Principal at an elementary school principal. And in my early life, I as a teacher, I was also a career counselor at a high school that I worked at

David Lee 3:28

Okay that's a lot. That's really cool. And maybe let's start with talking about, based on your experience throughout the years. And what you see as the biggest challenges to achieving fulfilling a successful careers. And in your survey, you mentioned knowing what you want to do. Can you me a little bit more about that.

CHALLENGES AND BARRIERS

David Lee 4:50

Okay that's a lot. That's really cool. And maybe let's start with talking about, based on y

Current codes (shift + alt + s)

SD - commissions for pet portraits

SH - NOT much online marketing

SH - follow a bunch of artists on social media

SH - participating in art classes

SD - commissions for pet portraits

SH - NOT much online marketing

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SD - commissions for pet portraits

SH - participating in art classes

SD - commissions for pet portraits

SH - NOT much online marketing

SH - follow a bunch of artists on social media

SH - participating in art classes

SD - commissions for pet portraits

Code

e.g. S - DEDICATED VOLUNTEERS

Memo (optional)

e.g. Volunteers also motivated by food

Write any thoughts you want to remember

RQ1

RQ2

RQ3

RQ4

RQ5

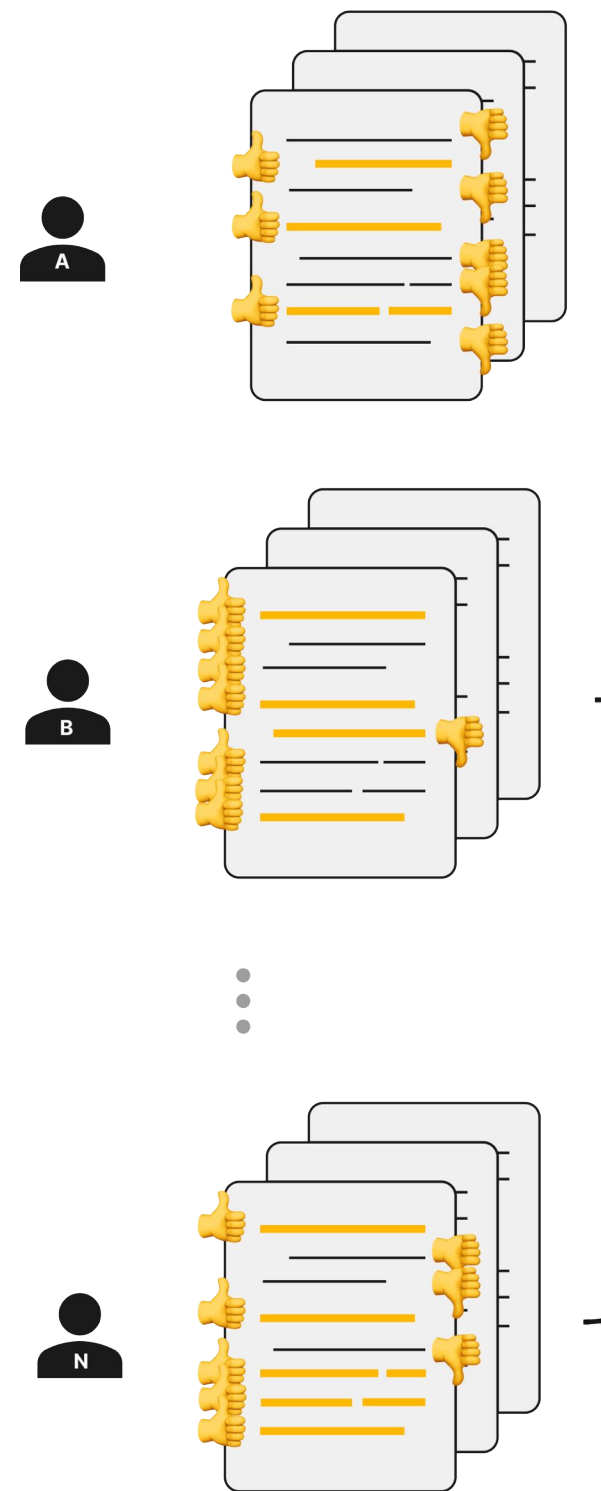
Cancel

Submit

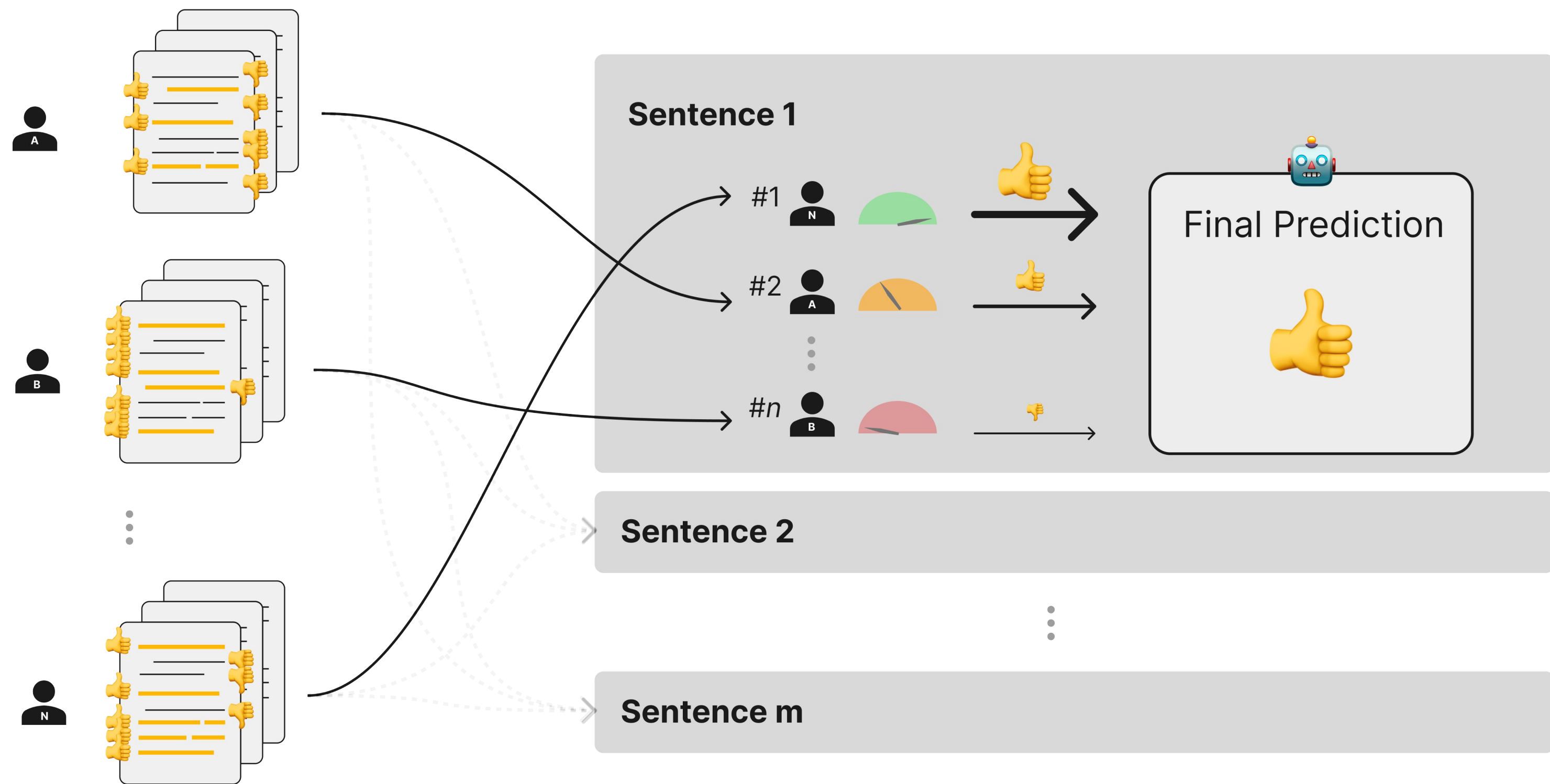
Memo

e.g. Volunteers also motivated by food

Write any thoughts you want to remember



Annotations
as ‘votes’ on
relevance

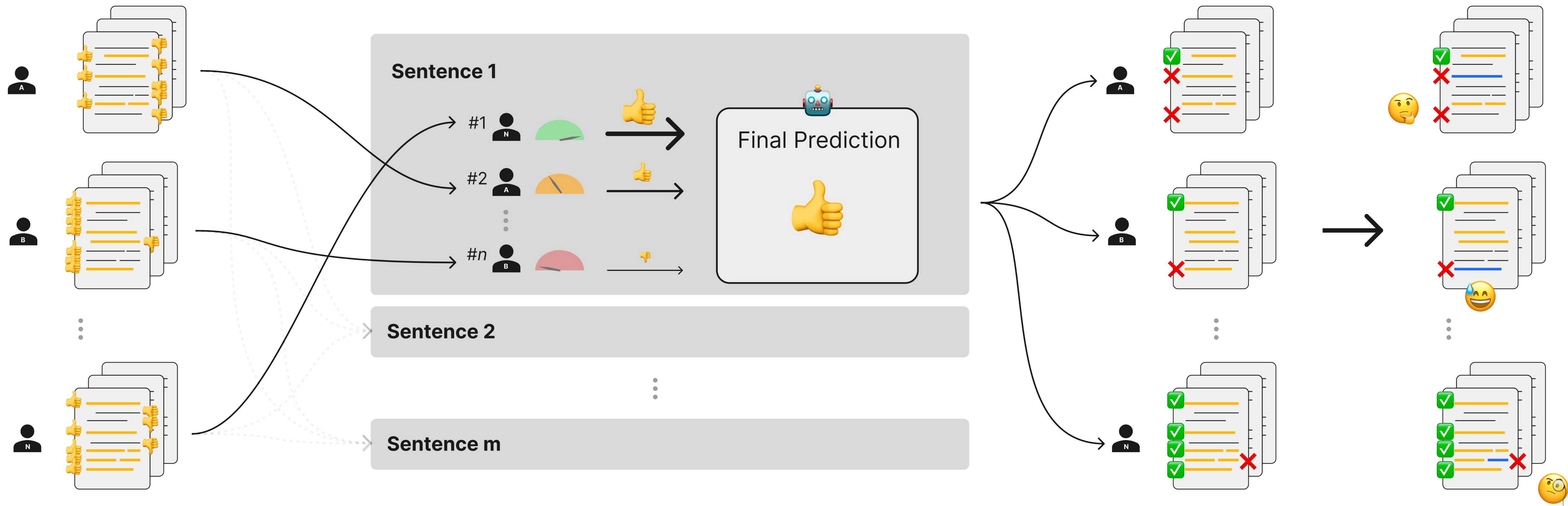


Annotations
as 'votes' on
relevance

1

EM-inspired
algorithm predicts
sentence relevance

2



Annotations
as 'votes' on
relevance

1

EM-inspired
algorithm predicts
sentence relevance

2

Provide personalized
hints for reflection
and iteration

3

RQ2Challenges and Barriers

What challenges or barriers do youth experience in their education or career exploration? What challenges or barriers do parents, teachers, administrators, volunteers, peers, or others experience in supporting youth in their education and career exploration?

Viewing peer-based hints

You're done, but feel free to take a look at the generated peer-based hints to make additional improvements if you'd like.

Current codes (shift + alt + s)

Current Annotations

RQ2: Challenges and Barriers

- Education Barrier - Parent/Child: Students need push
- Education Barrier - Youth: Barrier of validation
- Education Barrier - Youth: Lots of administrators and others tend to put punishment solely upon people that fail
- Education Barrier - Youth/Adult: difficult subject
- Education Barrier - Youth/Adult: done with school
- Education Barrier - Youth/Teachers: work for money
- Education Barrier-Youth: Students not speaking up
- Social Barrier - Adults: even adulthood has worry
- Social Barrier - Parent/Child: Parents dont want to be hard
- Social Barrier - Parent/Child: Parents work a lot
- Social Barrier - Parent/Child: Sometimes parents are blind
- Social Barrier - Youth: students lack confidence
- Social Barrier - Youth: teacher is unsure about whats on minds of youth
- Social Barrier - Youth: Would talk but

class what you do? And I was like, Yeah, sure, no problem. So I came and took this whole thing of drugs in there. And it just turned out that I knew that teacher, I knew her from back in the day.

So I started going, like, for a couple years, I went and I would, you know, take all this drugs, I talk about my experiences and what I've done. And then one day, she was like, 'Hey, how would you like to teach with me? ' And I was, like, Teach with you? Me? I was like, I don't I don't like my kids. I don't like, kids, I ain't trying to teach some kids. And she's like, Hey, you got a great personality. Will you meet my director? And I was lik down at a coffee shop, talk for 30 minut And I think 30 minutes, he's like, Hey, I'n it was that kind of party. So he says, you I don't like kids. I'm like, my kids, I don't v You got the personality, he's all We're w like, Think about it, you get to go back to

I think when he said that, that's the poin great. So I got into this teaching thing, th me a credential and walk away. But I act by the end of it, when I actually started t me a book. And they said, Go teach. I'm type of guy. So when I asked my co teach she's like, open the book. And I was like started thinking about subjects that that thinking about touchy subjects, subjects mental health is a good one. I developed anxiety, social anxiety, or depression, jus went to domestic violence.

Just, just everything you could think of I lesson plans. So every lesson plan that I And of course, my own experiences goin specifically that part of mental health, b badass in life. And it's happened to me,

Atira Nair 18:24

And in terms of like helping students, yo

Code

Social Barrier - Youth/Adults: Ramon had previously not even wanted to deal with children

Memo

no mentors

Many adults shut out kids like Ramon initially did. There is a barrier of I don't think I have anything to teach for many adults.

Delete

Edit

Prediction: Not Relevant

Select here...

Agree

✓ Disagree

Other

what misconception did the hint help you realize? Anything else?

I think this is definitely important because it shows that a lot of adults push away the idea of teaching youth and that is a barrier involving the lack of a variety of adults as a resource for

Cancel

Submit

And we sat st about life. / I didn't know I was like, Nah, ke, you know, redential. He's community.

And I was like, s, they'd give ecting that. So ey sort of gave I'm not a book son plans,

me. So I l then I started said, Hey, wn to from own, then I

ne up with no anybody else. lerstand, I think I'm a

do you think

See Peer-based Hints Summary

You have 9 hints to review

< Now viewing 1 of 9 >

Prediction: Not Relevant

0 peers agree with the prediction

3 peers disagree with the prediction

I think that the feeling of not being smart enough for college is a feeling many students have and discourages them from seeking out those opportunities. Likely because community college isn't as praised as a 4 year.

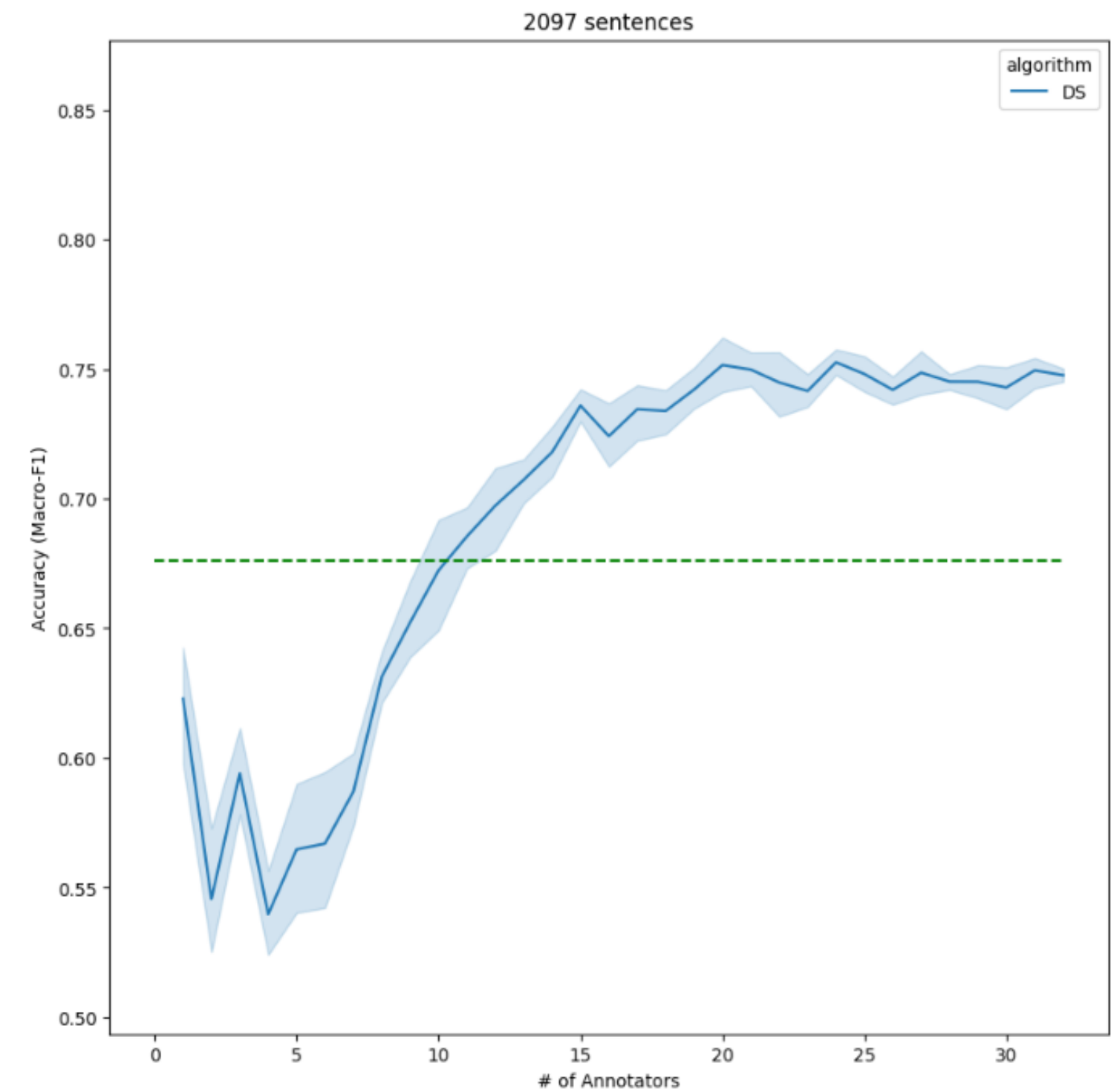
I felt he stated his thoughts clearly that he felt he wasn't smart enough for college so he took the military route. He tried to figure out where he was in life.

Its mentioning the students' feedback about their futures and the potential concerns about not knowing what to do and not being good enough.

25%

of students identify a particular relevant sentence, on average

Annota: Peer-Based AI Hints Towards Learning Qualitative Coding at Scale
Dustin Palea, Giridhar Vadhul, David T. Lee
ACM Conference on Intelligent User Interfaces (IUI) 2024
Best Poster Award at HCOMP



With ~15 Students, the algorithm attains an accuracy (Macro-F1) of

75%

Students found that the hints helped with...

Understanding the research question

"Yes I agree with this [hint]... COVID is not a weakness for the [organization], but like, COVID caused the other financial [issues] that caused the weakness."

Reflective examination of annotations

"[The AI hints] showed other team members' annotations too which helped me better understand the sentences."

Mental models of coding technique

"I didn't expect the AI to generate helpful hints. But [it] actually generates some pretty useful hints... quotes that I didn't even see... It got me to redo the rest of the next interviews in more depth and detail."

Annota: Peer-Based AI Hints Towards Learning Qualitative Coding at Scale

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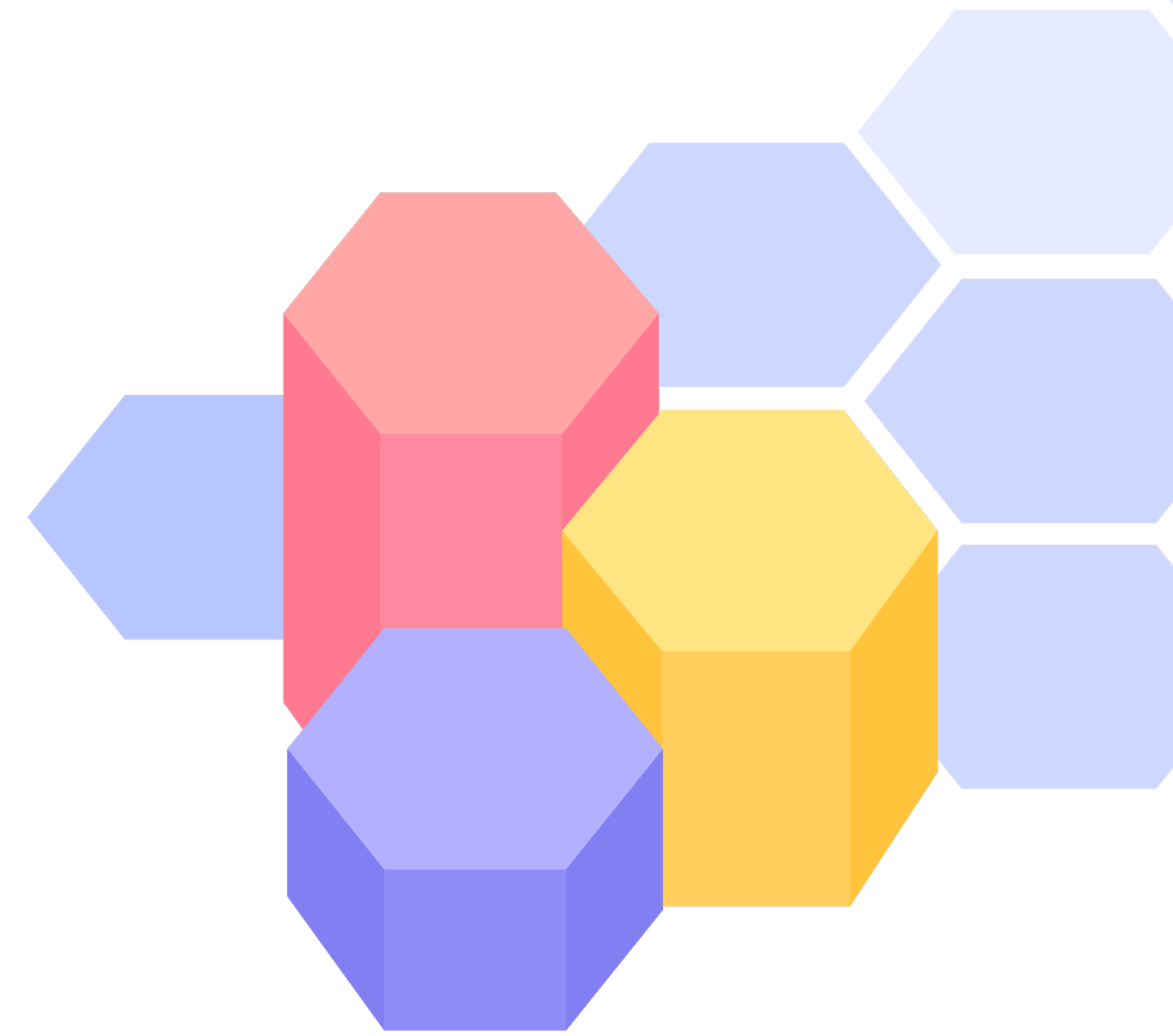
Best Poster Award at HCOMP

Idea #2

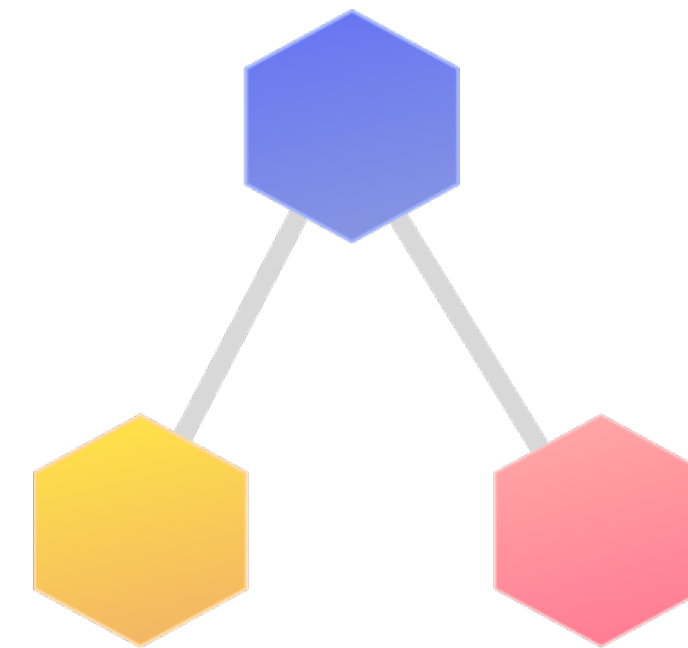
*use and adapt work
structures to support
experiential learning*

Causeway

Learn real-world skills while
supporting community causes



Micro-Roles



Projects



Causes



Introduction to Causeway

Web Development:

Elements Developer

Responsible for identifying, implementing, and styling elements within a given low-level component using HTML and CSS styling attributes.

CURRENT LEVEL

Basic

Advanced

Continue project →

Web Development:

Layout Developer

Responsible for laying out elements within a given low-level component using CSS layout attributes.

CURRENT LEVEL

Basic

Advanced

Give me a project! →

The Layout Developer Role

Your responsibility is to position the elements constructed by the elements developer to achieve the desired layout. You will do this by repeatedly laying out groups of elements vertically and horizontally.

Your Role

Your Project

Intro to Flexbox Based Positioning

You will be using flexbox-based positioning to create your layout. Read a quick overview before getting started.

Read Guide

Create a Container for the Component

Start by creating a container div for the entire component. If the component has a border or background color, style the new div accordingly.

Read Guide

Let's Do It!

Partition Elements into Vertical or Horizontal Groups

Partition the elements into a set



Causeway

< Back

Partition Elements into Vertical or Horizontal Groups

Now that we have created and styled the container, the next step is to partition all the individual elements into a set of groups that can be arranged vertically or horizontally. We will enclose each of these groups in an opening and closing set of `<div>` tags, add a `class` attribute to each tag, and then apply CSS properties that set the layout direction of the groups and their wrapping behavior.

Partition the elements into a set of groups and enclose them in div tags. Partition the elements into a set of groups. Groups may be chosen because they share a border or background color, or because they are a logical unit. Additionally, *the set of groups must either all be laid out vertically or horizontally* (with wrapping allowed). In your HTML file, nest each group of elements inside an



Causeway

Step 2 of 7

Partition Elements Into Vertical or Horizontal Groups

It's time for you to take what you just learned to partition the elements within your component into groups that can be arranged vertically or horizontally.

- 1 Partition the elements into a set of groups and enclose them in div tags
- 2 Nest the CSS child selectors to match

< Back to Guide

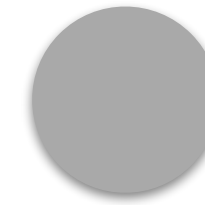
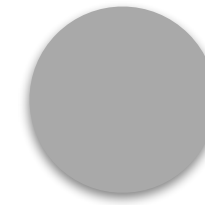
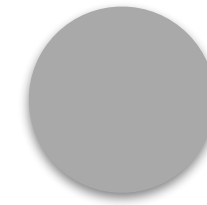
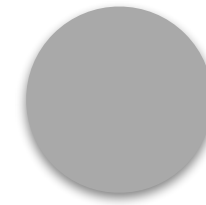
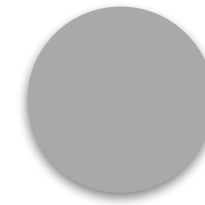
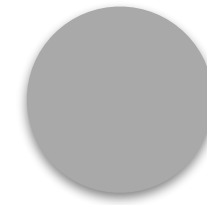
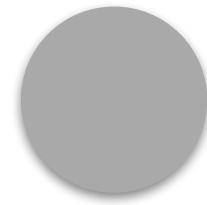
Complete >

HTML Code

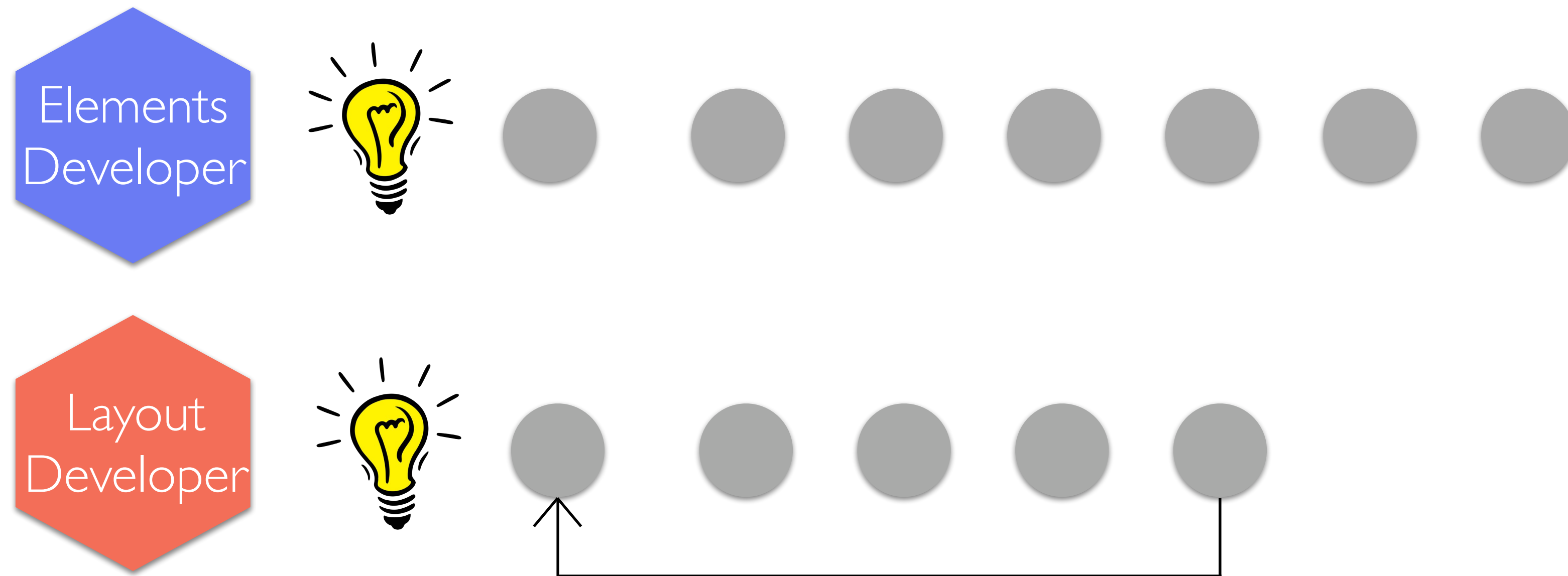
SCSS Code

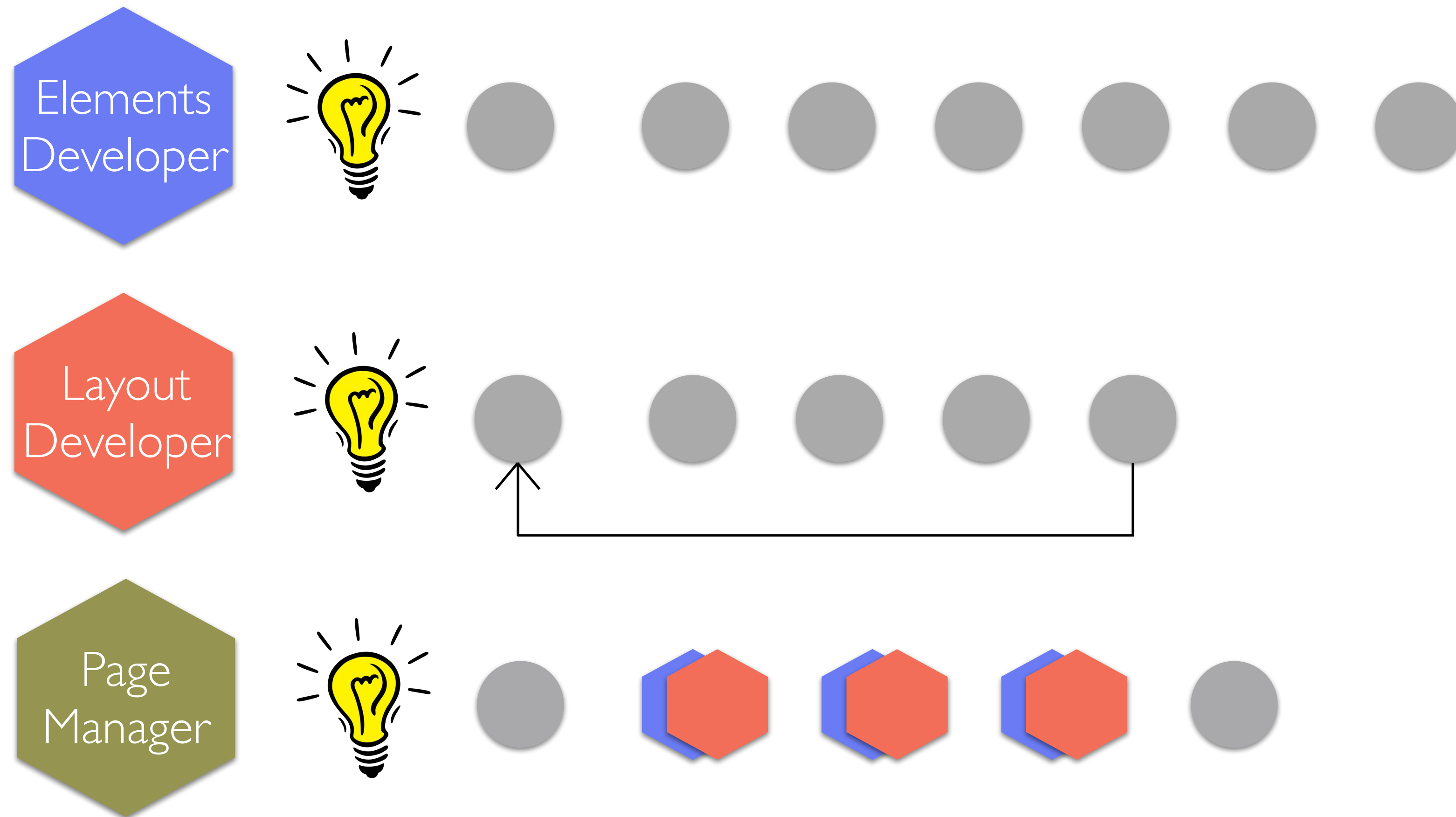
Code Preview

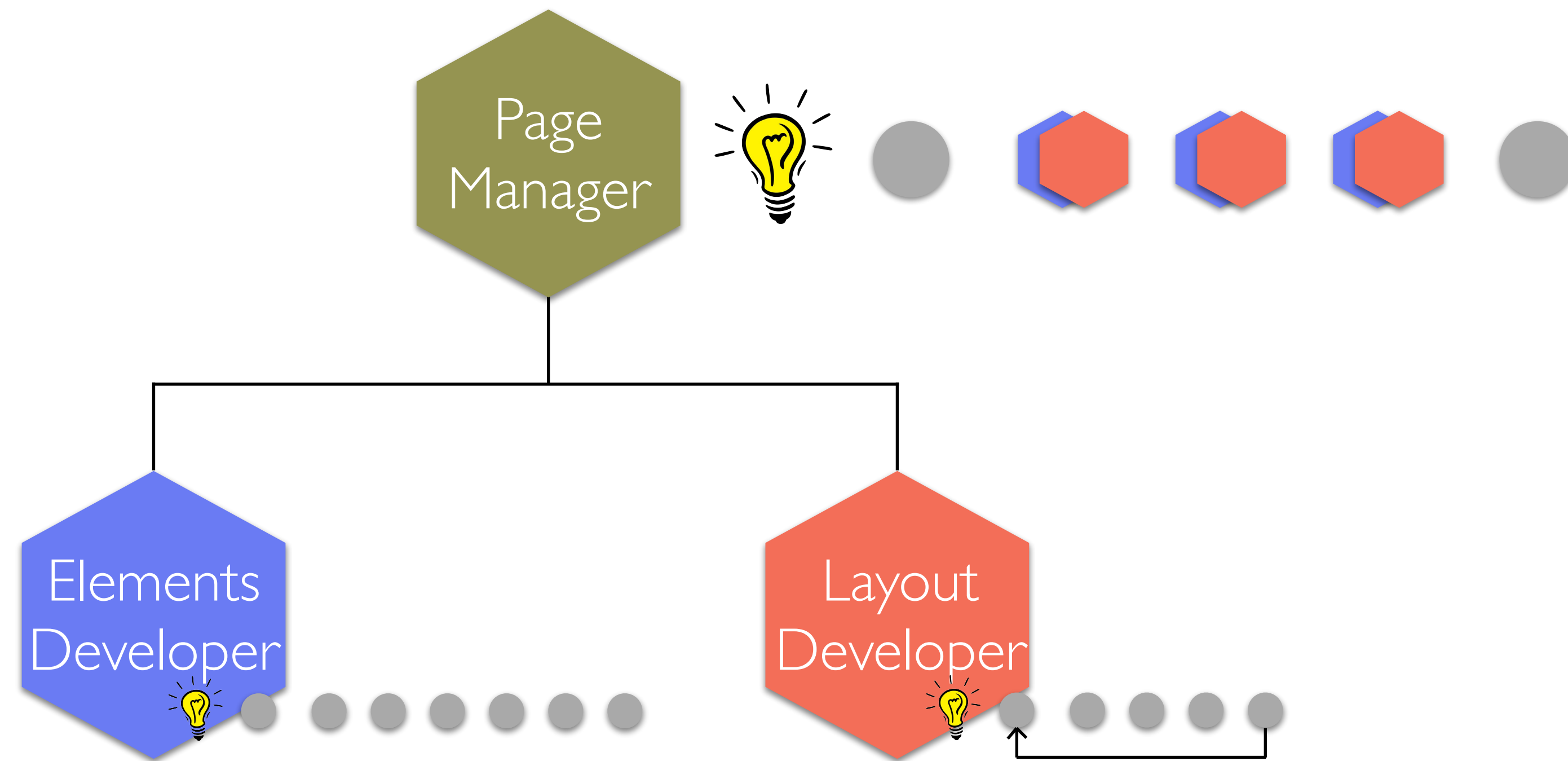
```
1 .paper-card {
2   display: flex;
3   flex-direction: column;
4   box-shadow: 0 2px 12px 0 rgba(0,0,0,.15);
5
6   .paper-info {
7
8     .paper-title {
9       font-weight: bold;
10      font-size: 18px;
11    }
12    .reader-name {
13      font-size: 13px;
14      color: #4F4F4F;
15    }
16    .pdf {
```



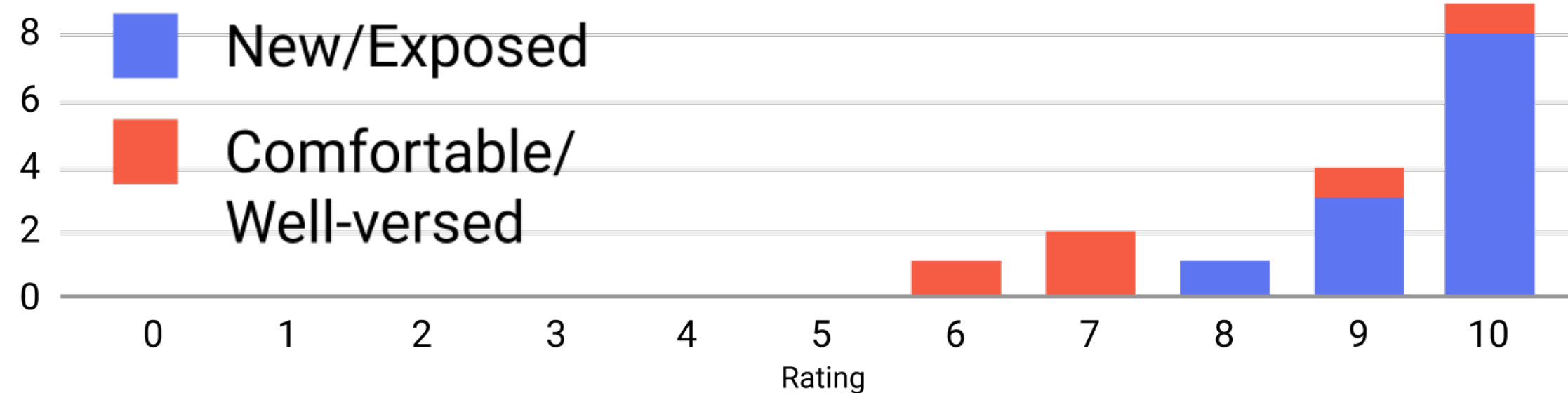
Causeway: Scaling Situated Learning via Micro-Role Hierarchies
David T. Lee, Emily S. Hamedian, Greg Wolff, Amy Liu
ACM Conference on Human Factors in Computing Systems ([CHI](#)) 2019
Honorable Mention Award







Likelihood of recommending



“The ability to learn the concepts in such a way that they are applied quickly, and then practiced on pages for real-world use is rewarding, and makes the material stick better.”

Containers: Observable Events (Quarter Goals)

Now that we have retrieved and bound data from the backend to the view, you can learn to handle events in the *Containers: Observable Events* role.

What you will be doing and learning

You will continue to build on what you learned in the *Containers: Observable Data* role about [functional reactive programming](#) and [RxJS](#) for event binding.

Step-by-step process

We will first introduce you to Event Streams and Subjects, then teach you how to define, bind, and handle event streams in your container:

- Intro to Event Streams and Subjects
- Implement event streams with Subjects: openEditModal\$
- Implement event streams with Subjects: saveGoals\$

[Next: Intro to Event Streams and Subjects](#)

page

+state

modal

page.animations.ts

[page.component.html](#)

page.component.scss

page.component.ts

widget

```
1 <div class="page-container">
2   <app-widget [quarterData]="quarterData$ | async"></app-widget>
3 </div>
4
```

Winter '24 Goals

1/1 - 3/31

- 1
- Finish cover letters
- 2
- Apply to internships
- 3
- Technical interview prep!



Tech4Good Collaboratory Structure

Skill-Building Teams

User Research
Visual Design

Web Dev: Components
Web Dev: Containers
APIs and Scripts

Machine Learning
AI Economist

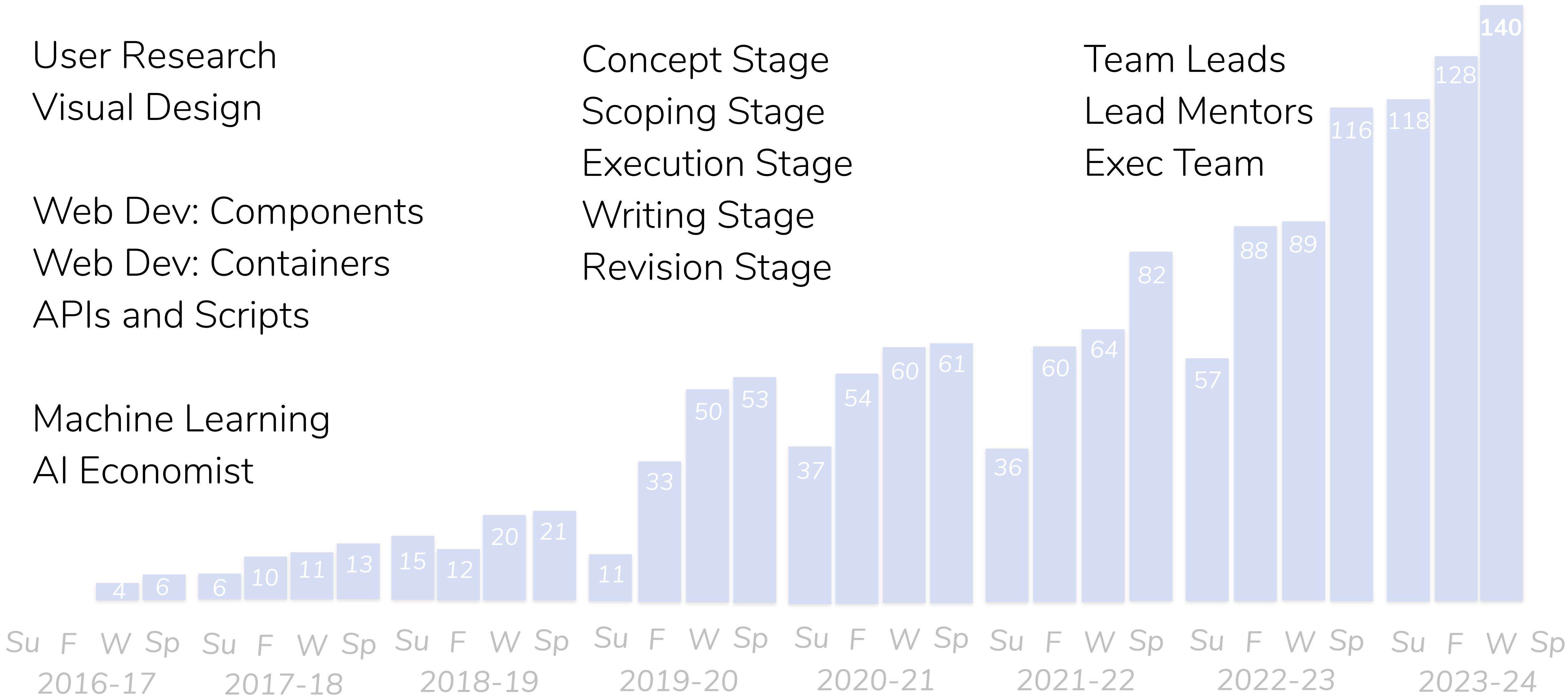
Research Teams

Concept Stage
Scoping Stage
Execution Stage

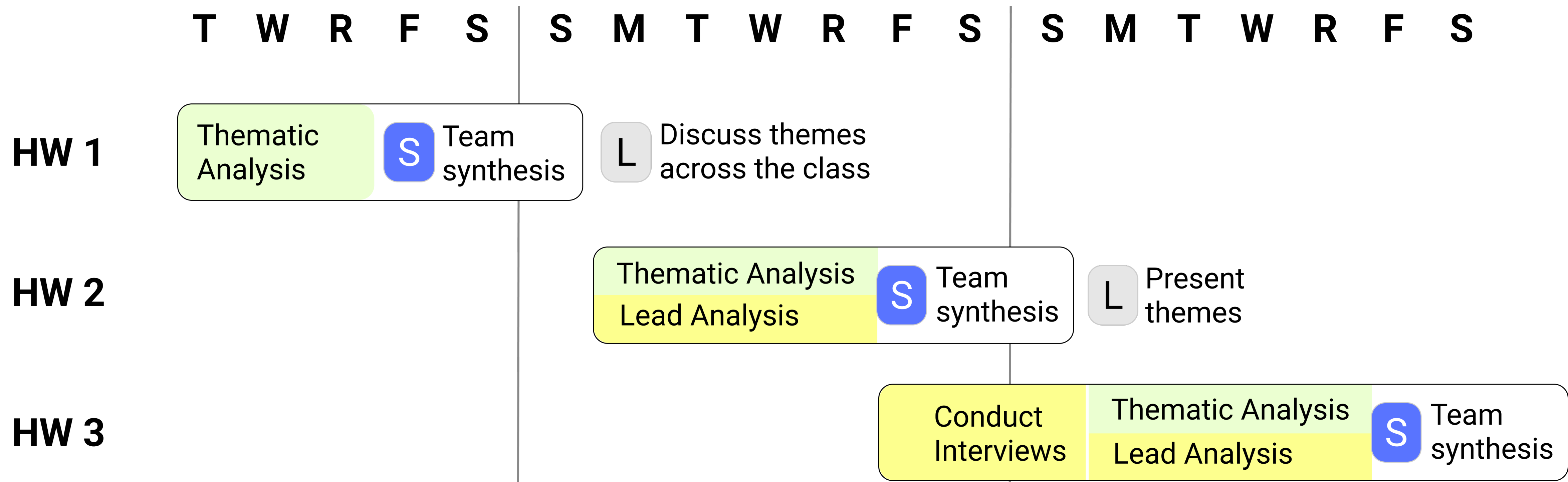
Writing Stage
Revision Stage

Leadership Roles

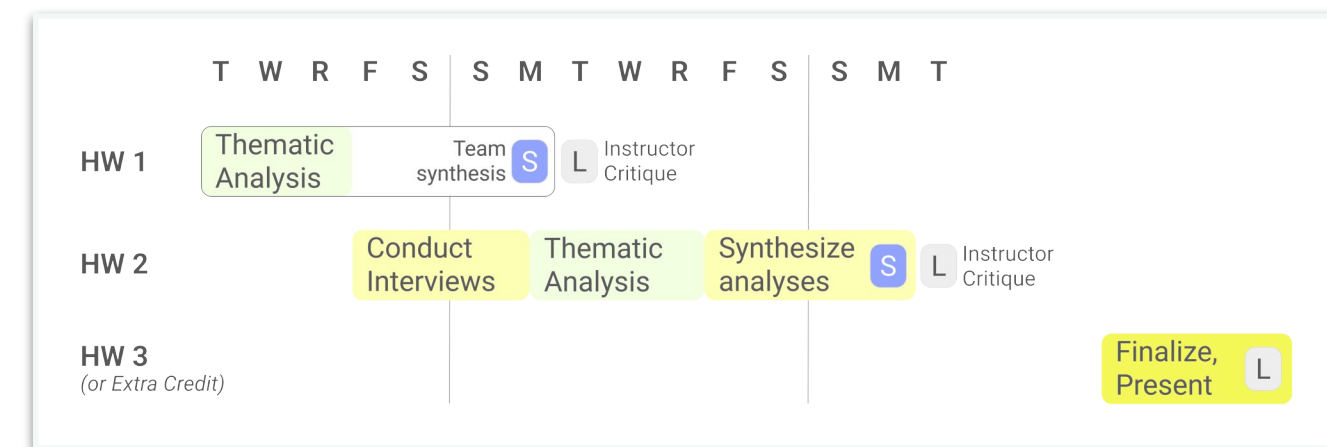
Team Leads
Lead Mentors
Exec Team



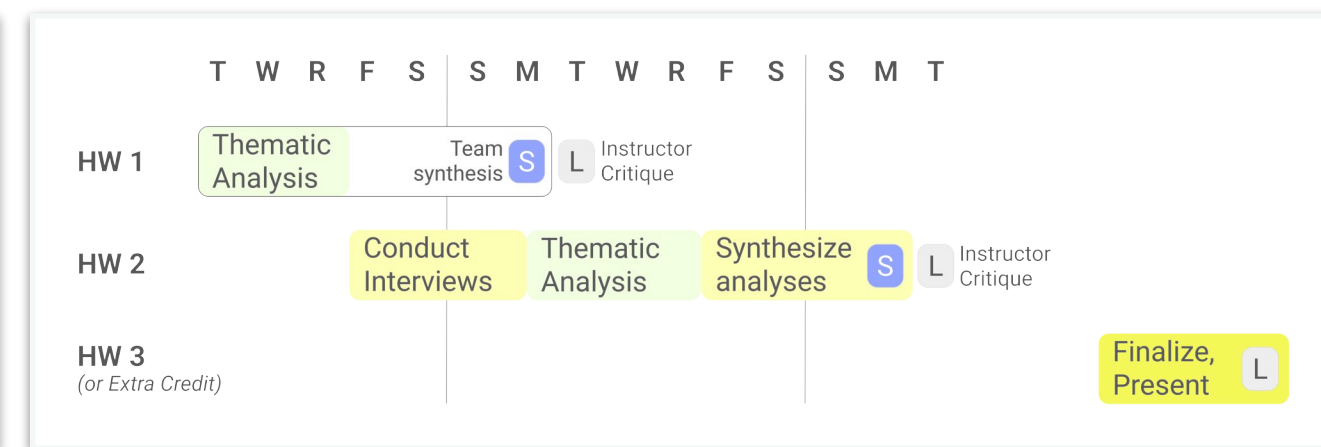
Micro-Role Structure for Thematic Analysis in Project Class



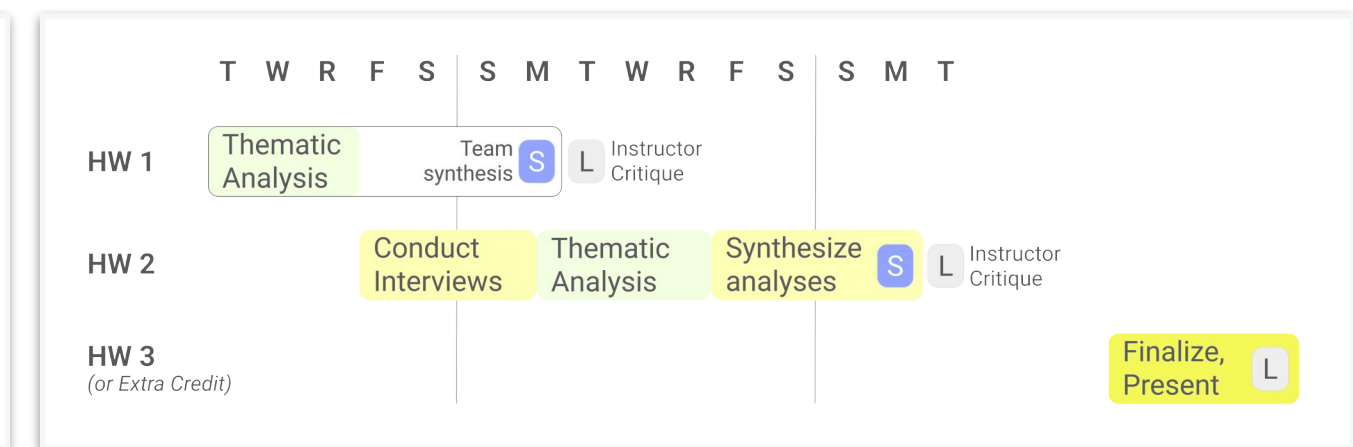
Business Strategy and Information Systems



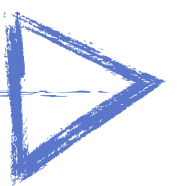
Human-Centered Design Research



Web and Mobile Applications

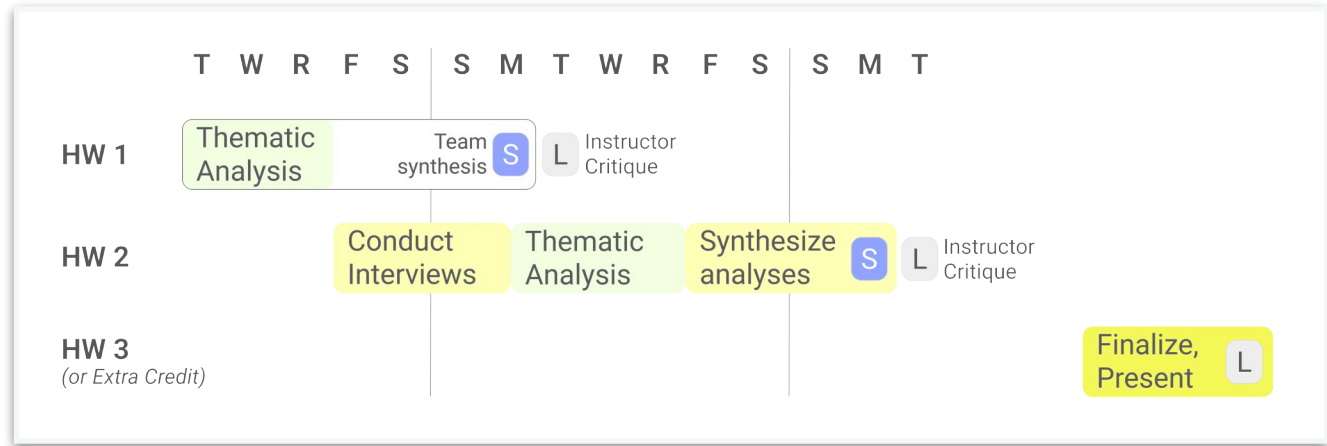
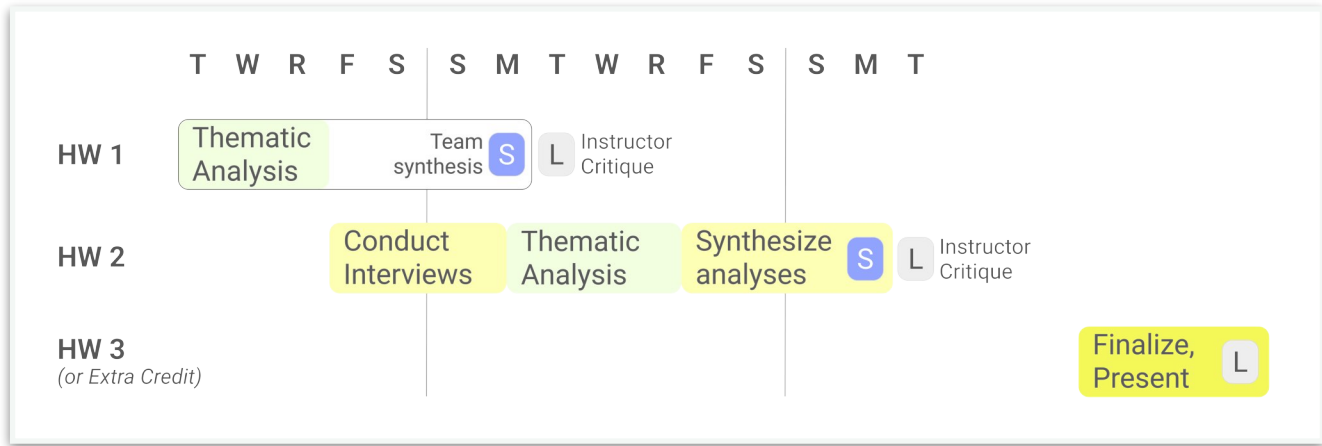
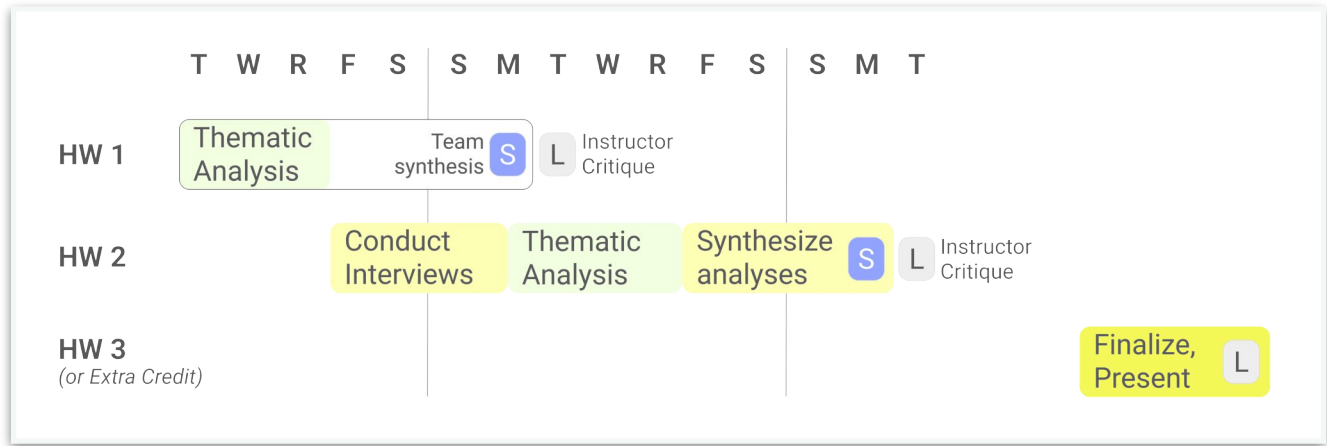


Extend across quarters

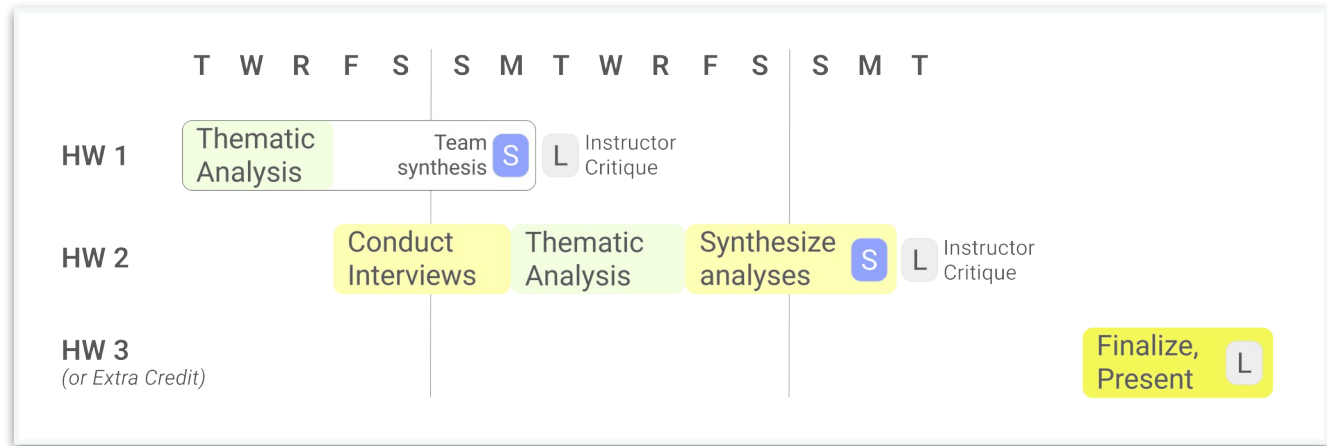
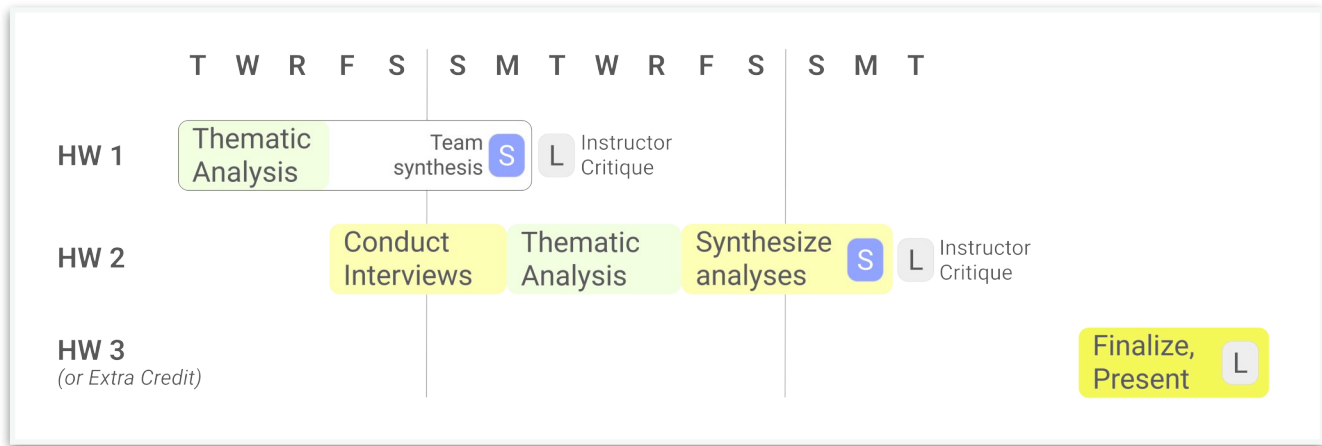
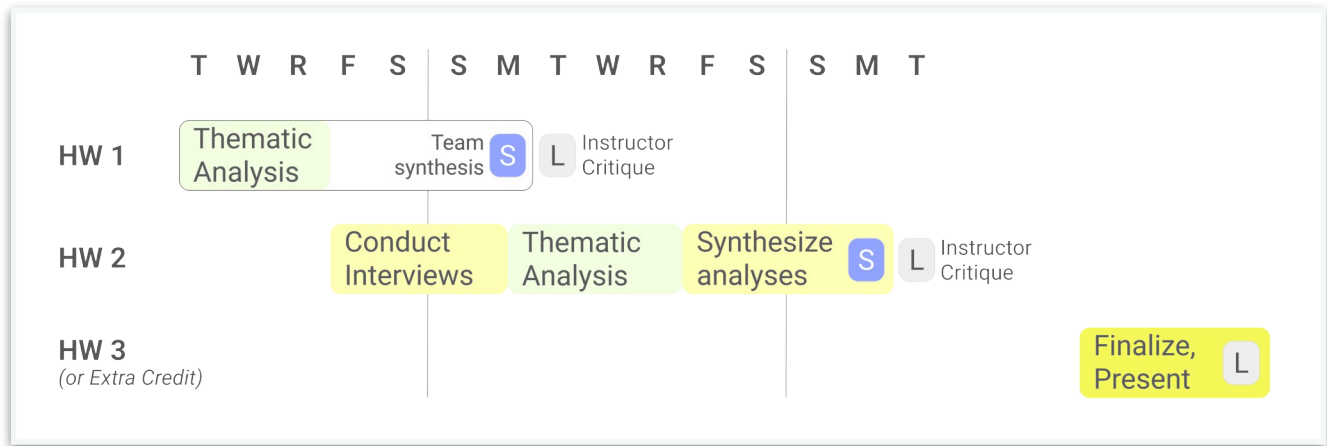


Stack within quarters

Leadership and Management



Business Strategy and Information Systems



Human-Centered Design Research

Web and Mobile Applications

Extend across quarters

In the past, we learned in
order to work. Now we must
work to continuously learn.

Heather McGowan

Co-author of The Adaptation Advantage

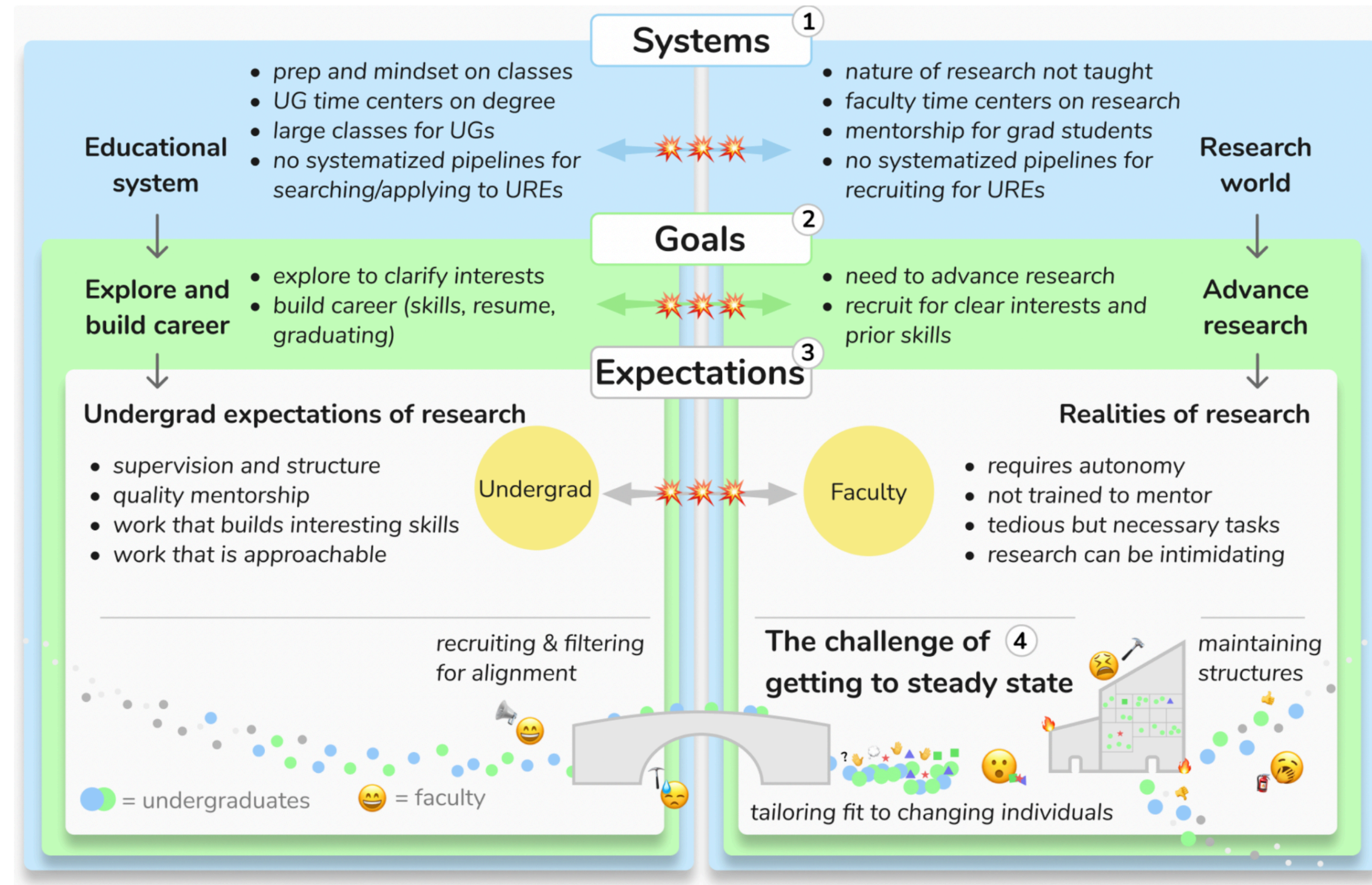


Idea #3

develop easy-to-
engage experiences
that build relationships

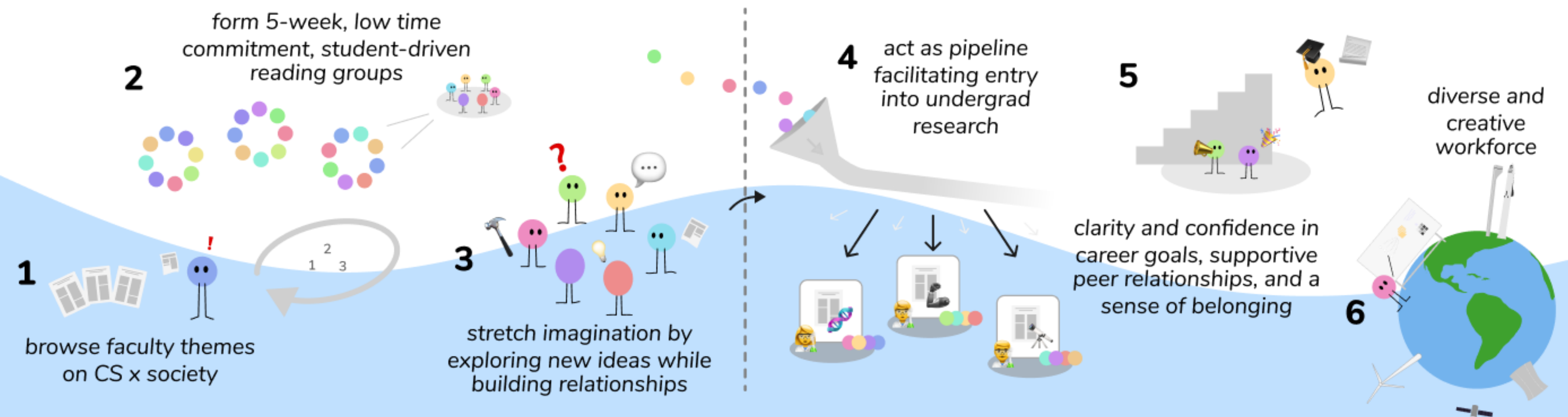
Barriers to undergrad research experiences

- *misaligned systems, goals, and expectations,*
- *significant time required to continuously create and maintain alignment.*



Exploratory Reading Groups

Fostering creative, relational, and student-driven exploration and establishing pipelines into undergraduate research experiences



Exploratory Reading Groups: A Scalable Approach to Creative, Relational, and Student Driven Exploration in CS Education

Dustin Palea, David T. Lee

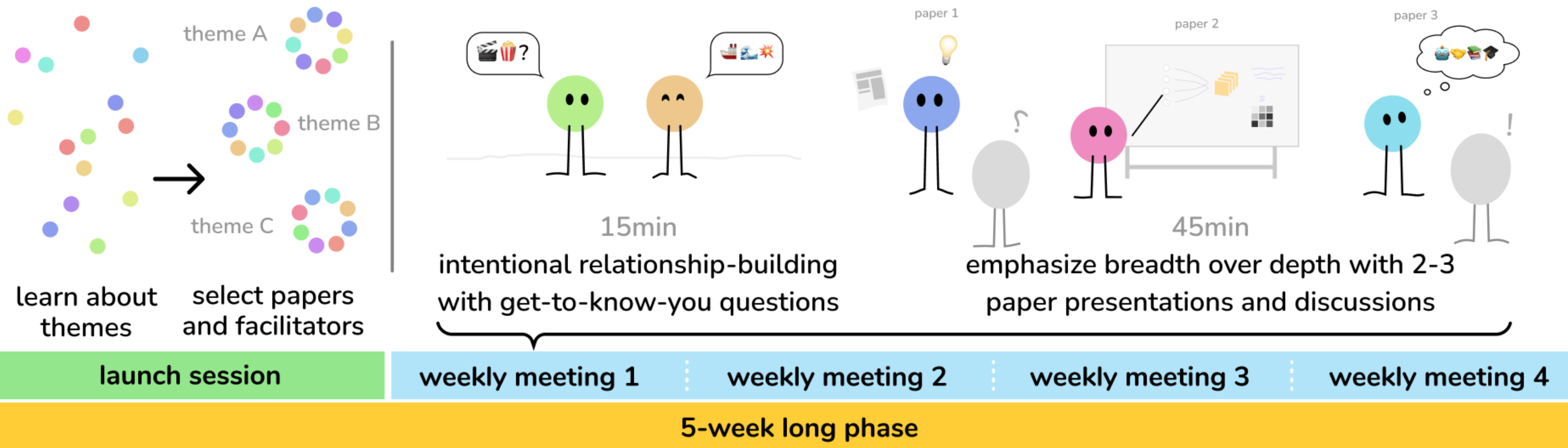
ACM Technology Symposium on Computer Science Education, Research Track ([SIGCSE](#)) 2021

Very **lightweight** (just one-hour/week and present one paper)

Completely **student-run** once groups are formed and launched

Time carved out for intentional **relationship building**

Designed for **broad exploration** rather than in-depth reading



volume

2

DESIGN
UNBOUND
NOTES

ECOLOGIES
OF CHANGE

DESIGN UNBOUND
DESIGNING FOR EMERGENCE IN
A WHITE WATER WORLD

ANN PENDLETON-JULLIAN AND
JOHN SEELY BROWN

Systems of Action

“A coherent collection of interrelated action-intended components that... work systemically to **affect the context of the problem...** They scale, enabling small actions to affect a **larger social ecosystems** through work they do inside the system.”

Pilot matchmaking program

BSOE COMMUNITY PARTNERSHIPS

Existing & potential ways to collaborate

The [Baskin School of Engineering](#) and the [Tech4Good Lab](#) at UC Santa Cruz are seeking to strengthen community-engaged projects as part of the [Creative EDG2](#) initiative (Creative Engineering Design for Global Good). The vision is to provide real-world experiential learning for students, develop community-minded technologists, and connect courses and initiatives across BSOE to supporting local businesses, non-profits, and government projects (see Professor David Lee's [TEDxSantaCruz](#) talk, [Redesigning Our Economy to Maximize People's Fullest Contribution](#)).

Let us know if you have project ideas, feedback, or want to collaborate: bit.ly/bsoe-community.

COMMUNITY-ENGAGED PROGRAMS AND PROJECTS

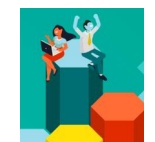
Explore existing community-engaged programs and examples of past projects.

CAPSTONE & CORPORATE-SPONSORED PROJECTS



Senior or MS students work on company-defined projects to gain real-world experience and solve problems for partners.

TECH4GOOD COLLABORATORY



A Tech4Good Lab program where students work on projects for the public interest, with a focus on education, work, and communities.

Besides filling out our survey, bit.ly/bsoe-community, you can also email Professor David Lee at dlee105@ucsc.edu with any questions on this initiative.



University of California, Santa Cruz
TECH4GOOD LAB

MARINE PLASTICS POLLUTION



A capstone project in collaboration with Clean Oceans International to create a website and app for monitoring plastic marine pollution.

FIRE REPORTING



A capstone project mentored by a member of the California Fire Department to create an app to pinpoint where fires start.

EXPANDING CAREER MENTORSHIP



An ongoing project in Tech4Good to expand opportunities for students to obtain career mentorship and coaching.

KAHZUM: LOCAL BIZ SUPPORT



A student startup centered on supporting local businesses that was developed out of UCSC's entrepreneurship courses.

CAPSTONE COURSES

Many of our engineering programs have capstone courses where students apply the skills they've learned towards significant projects, some of which are already community-engaged.



Undergraduate Seniors

Software Design Project (CSE 115bcd)
Engineering Design Project (CSE 123ab)
Electrical and Computer Eng. Capstone (ECE 129abc)



Professional Masters Programs

Serious Games Studio I/II/III (GAME 255)
Games and Playable Media Studio I/II/III (GAME 270)
Human Computer Interaction Capstone (HCI 271)
Natural Language Processing Capstone (NLP 271abc)

PROJECT-BASED COURSES

There are also many courses with hands-on assignments with potential for supporting community projects in specific skillsets. The list below is just a small sample.



Business & Entrepreneurship

Starting a New Technology Company (CSE 80C)
Decision Analysis in Management (CSE 174)
Business Strategy and Info. Systems (CSE 175)



Human-Centered Design

Interactive Design Studio (CMPM 132)
Strategies for Designing Interactive Media (CMPM 177)
Human-Centered Design Research (CMPM 178)



Analytics, Machine Learning, and Visualization

Machine Learning and Data Mining (CSE 142)
Applied Machine Learning (CSE 144)
Visualizing Complex Systems (CMPM 290a)



Systems Development

Mobile Applications (CSE 118)
Software for Society (CSE 119)
Web Applications (CSE 183)

STUDENT ORGANIZATIONS

Several student-run organizations teach K-12 students or provide services to the community.

UCSC Rocket Team



Teach elementary school children physics and rocketry.

Slugbotics



Mentor middle and high schoolers with designing robots.

Creative Tech Design



Website designs and marketing strategies for local businesses.

PROGRAMS BEYOND BSOE

We believe interdisciplinarity is critical, and can facilitate partnerships with community-engaged programs outside of Baskin Engineering or connect you directly to them.

Everett (Sociology)

Community-engaged projects on digital tools for social innovation.

GetVirtual (Crown)

Help local businesses affected by COVID adjust to the digital landscape.

IDEASS (Carson)

Innovation and design projects for sustainability related challenges.

Annual luncheon

tech4good community luncheon

April 29, 2023 | Merrill Cultural Center, UC Santa Cruz

11:00am | Check-in begins

Check where you're sitting, get a boxed lunch, and mingle

11:30am | Introduction

- Introductory remarks and tech4good overview, [David Lee](#)
- Lifelong learning, technology, and community, [Doug Erickson](#)

11:40am | Tech4Good projects

A small sampler of programs, projects, and ideas from student leads

- Supporting large group mentorship in a chat-based UI, [Kehua Lei](#)
- Peer-based AI hints for learning qualitative analysis in a project-based course, [Giridhar Vadhul](#)
- Better integrating #dayinalife videos towards career identity formation, [Elizabeth Fonseca](#)

Table discussion and brief speaker Q&A

- In your tables, share a question or reflection you had while listening, or share your own dreams for using technology to support education, work, or communities
- 1-2 questions for speakers drawn from the table discussions

12:05pm | Stretch and shuffle

Toss your lunch box, get a drink, and move to a new table to meet new people :)

12:20pm | Tech4Good journeys

Alumni experiences and journeys during Tech4Good and beyond

- Structuring impactful teams by centering empathy, [Nathaniel Thompson](#)
- Learning to appreciate the process of growth over fixating on achievements, [Aproop Kamat](#)
- Staying hopeful while finding a job during a tech downturn, [Eliza Gonzales](#)

Table discussion and brief speaker Q&A

- In your tables, share a question or reflection you had while listening, or share your own life or career lessons learned throughout your journey
- 1-2 questions for speakers drawn from the table discussions

12:45pm | Looking forward

- Reflections from Your Future Is Our Business, [Yvette Brooks](#)
- Towards computational thinking at scale in Santa Cruz County, [Jason Borgen](#)
- Concluding remarks and tech4good directions, [David Lee](#)

1:00 pm | See you next year!



Blossom

CMPM 15 Bingo

Charlie D.  1	FName L.  2	FName L.  3	FName L.  4	FName L.  5
how were you able to obtain an internship... 6	recommend a club... 7	who is interested in the use of sensing technologies... 8	who has already taken CSE121 9	who has already taken CSE101 10
who wants to take CSE140 11	who once found a tiny plastic duck in a tree... 12	FREE 13	who once picked up a goat at UCSC 14	who can explain why "bubble!" is the worst... 15
who knows how to throw a good S'mores night 16	discuss an idea you liked for improving @explore... 17	who is a developer in UCSC Blueprint 18	share your internship application process... 19	how can you get experience w/out experience 20
draw/make and IG post for @explore.computing 21	who wants to work in the software industry... 22	people who enjoy gaming in their free time 23	whose worst dining hall meal was the jackfruit 24	your dream field of work 25

Complete rows of bingo prompts and meet new people to score points!

More Info

1



Find Someone

Look for a person who would consider delving into the future research of their research topic, either for work or fun

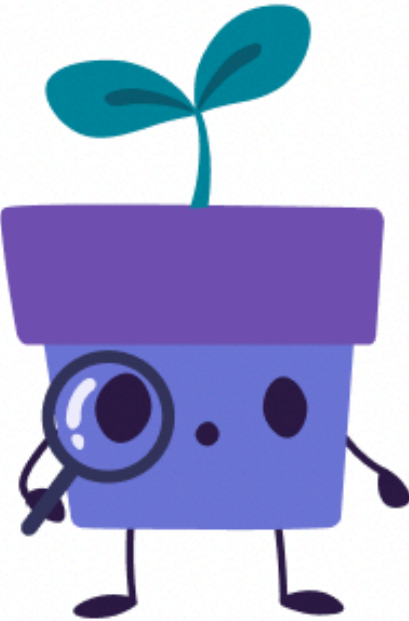


Who did you find?

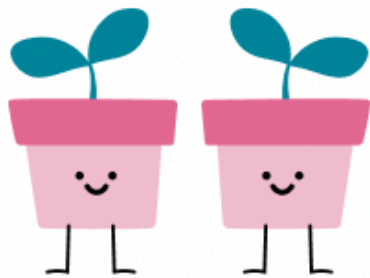
Search for names



SUBMIT



4



Connect Someone

Pair with two people who share one of the following athletic hobbies: going to the gym, soccer, rock climbing, or biking



Which two people were you able to connect?

Search for first person



and

Search for second person



SUBMIT

In designing ecosystems, think about **relationships**
and how to support **the work of alignment**

“governments [are] composed [of] relations with constituents.
It is precisely these ***relations***—not the deliberative transactions
—that matter most in day-to-day civic life”

— Miriam Asad, Christopher LeDantec, Becky Nielsen, Kate Diedrick, **Creating a
Sociotechnical API: Designing City-Scale Community Engagement**

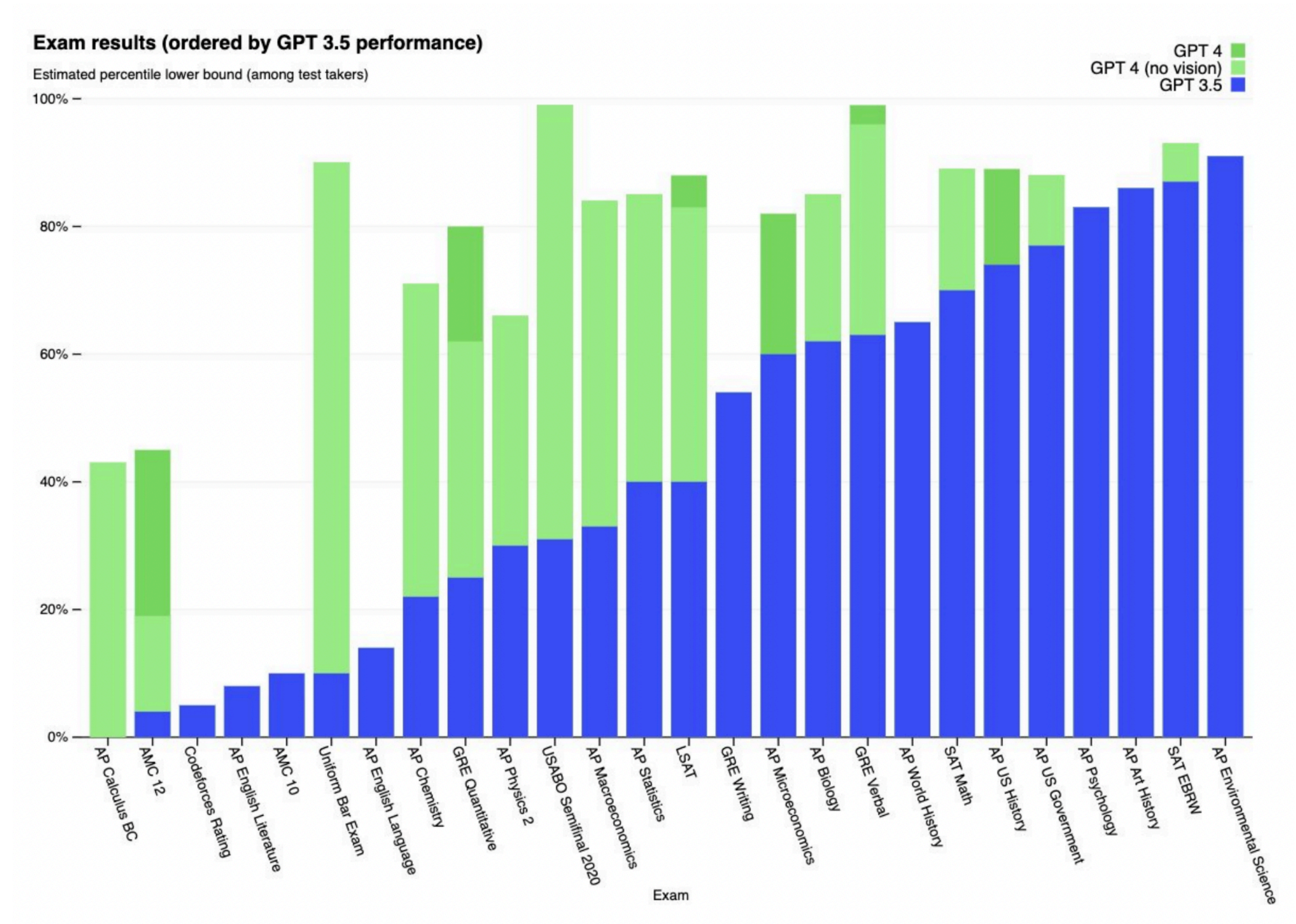
2

How might we imagine...

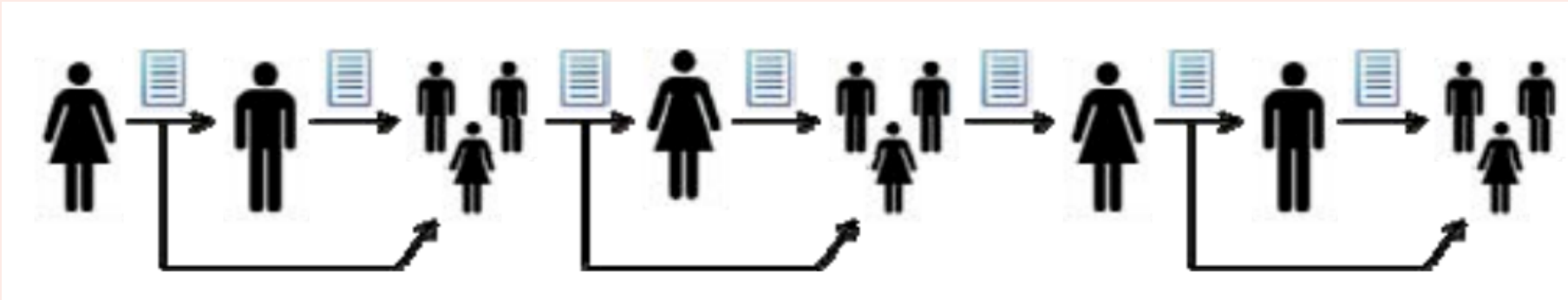
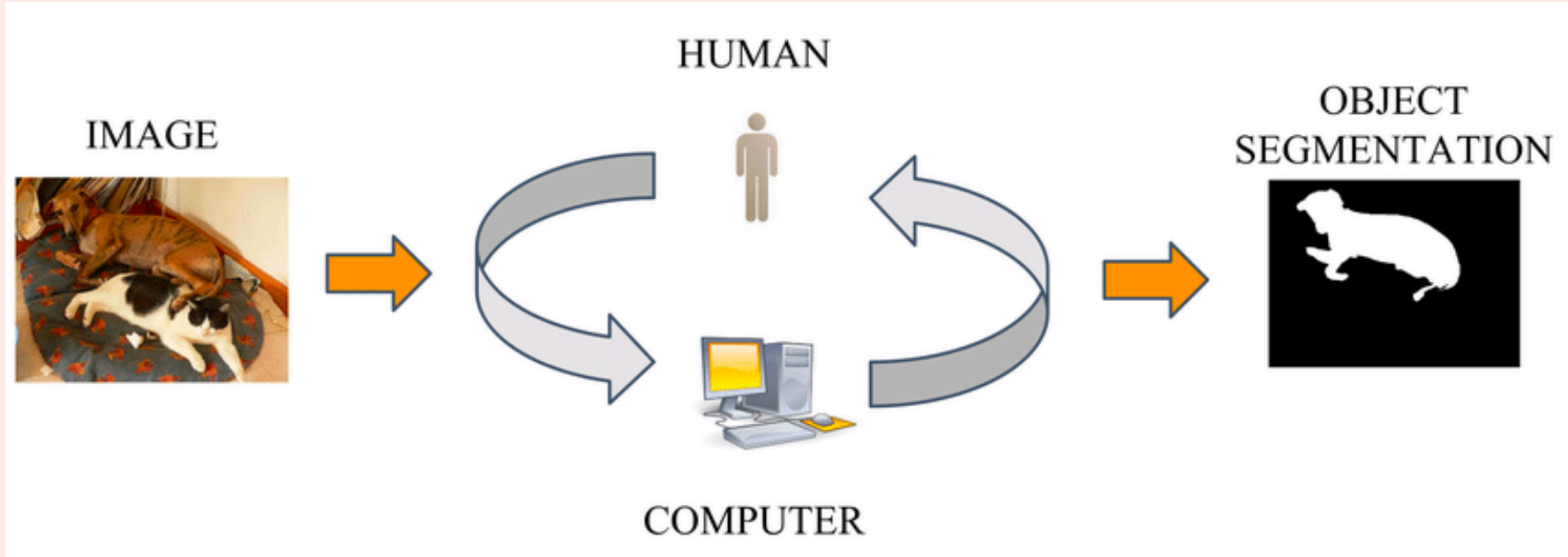
approaches to designing human-AI
interactions that are more human-centered?

GPT-4 scored around 90th percentile in the following in 3/2023:

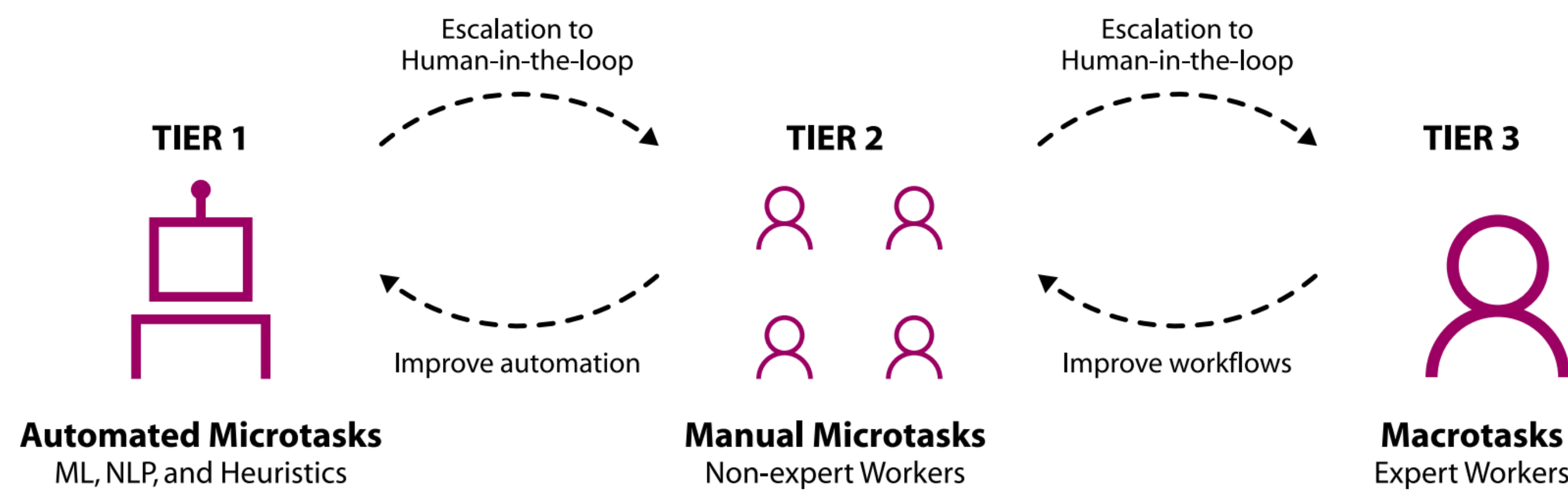
- SAT Math
- GRE Verbal
- Uniform Bar Exam
- AP World History
- USABO Semifinal
- ...

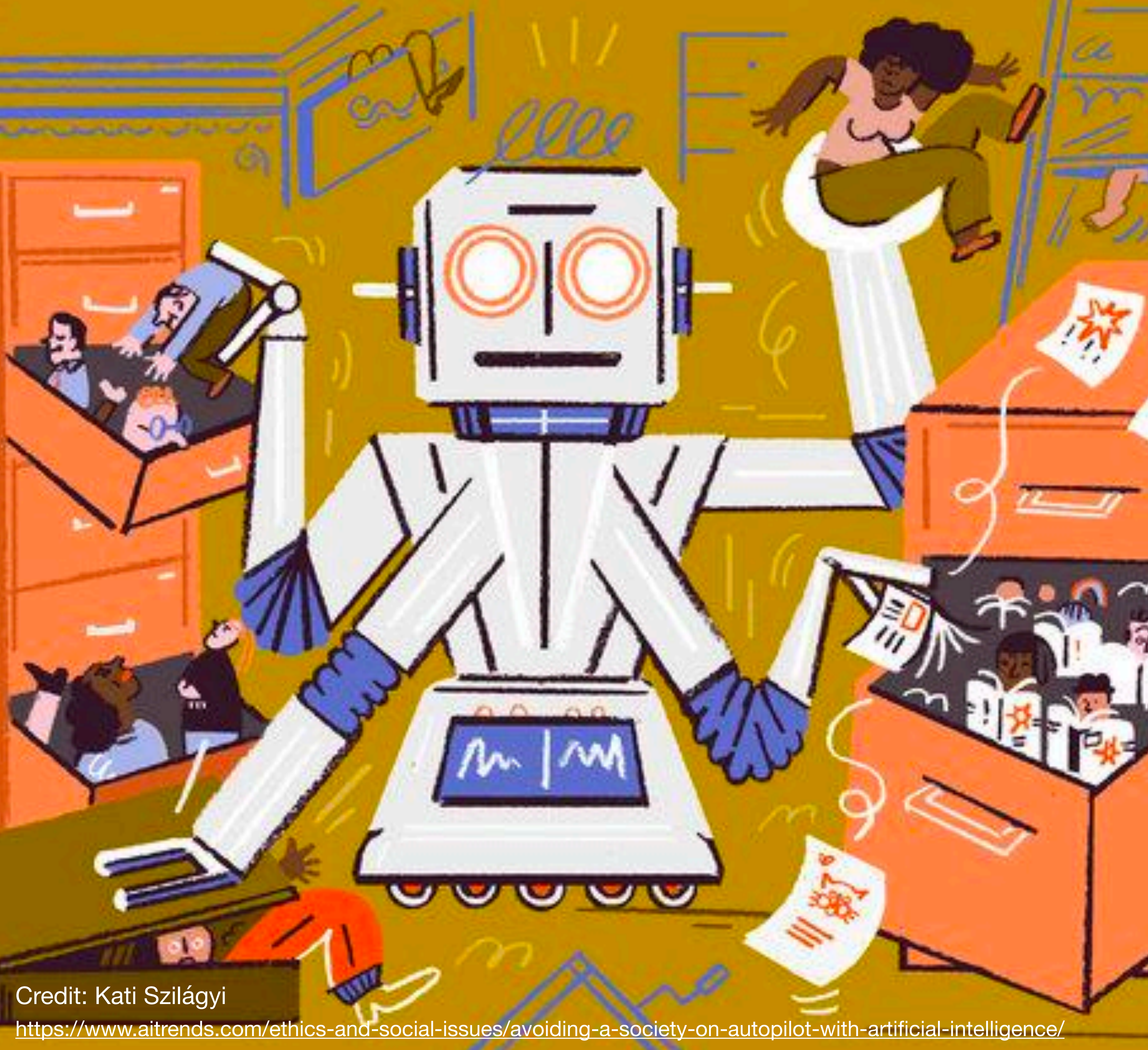


Human-in-the-loop systems and micro-tasks

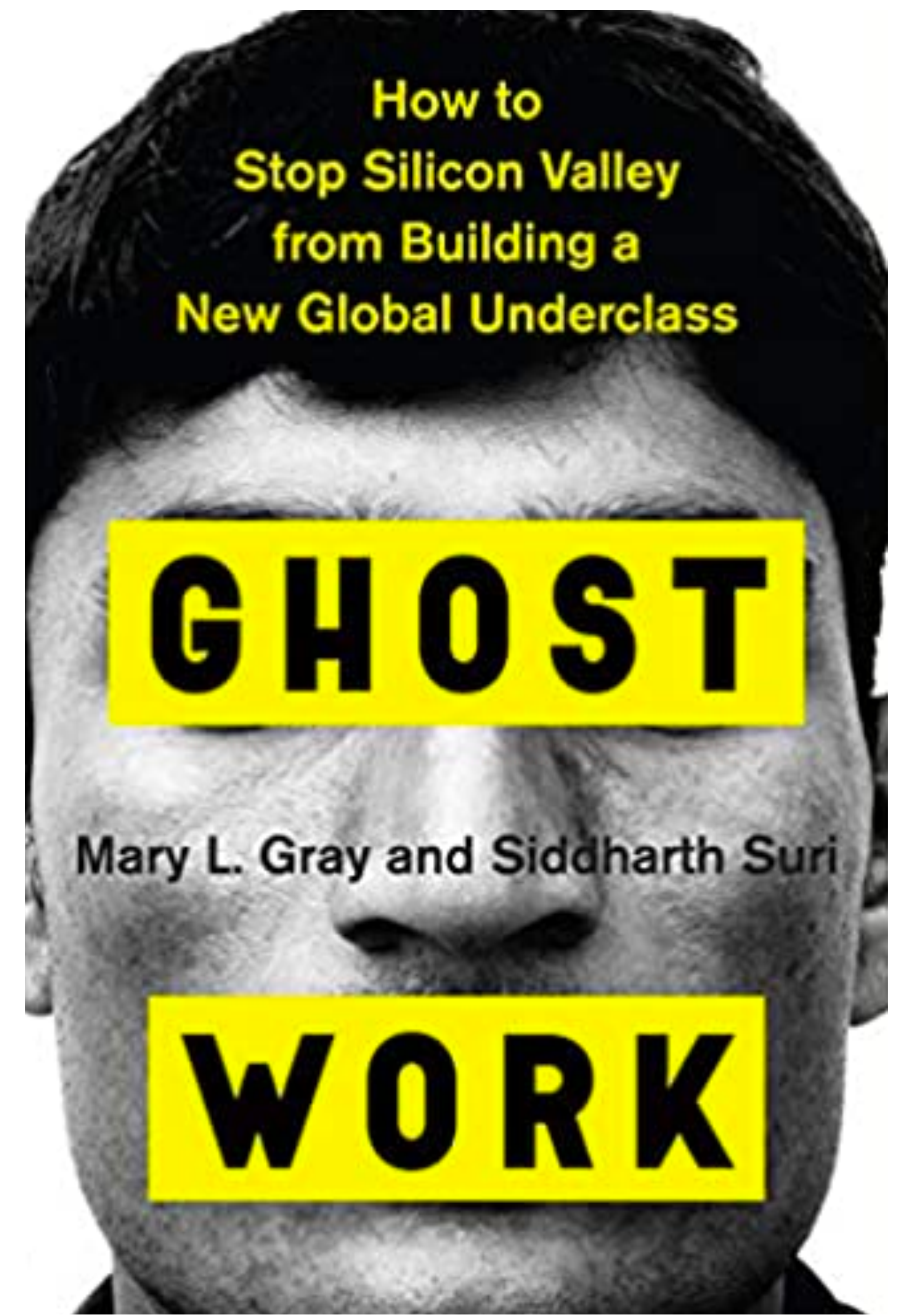


Expert work is atomized
Atomized work is automated





Credit: Kati Szilágyi
<https://www.aitrends.com/ethics-and-social-issues/avoiding-a-society-on-autopilot-with-artificial-intelligence/>



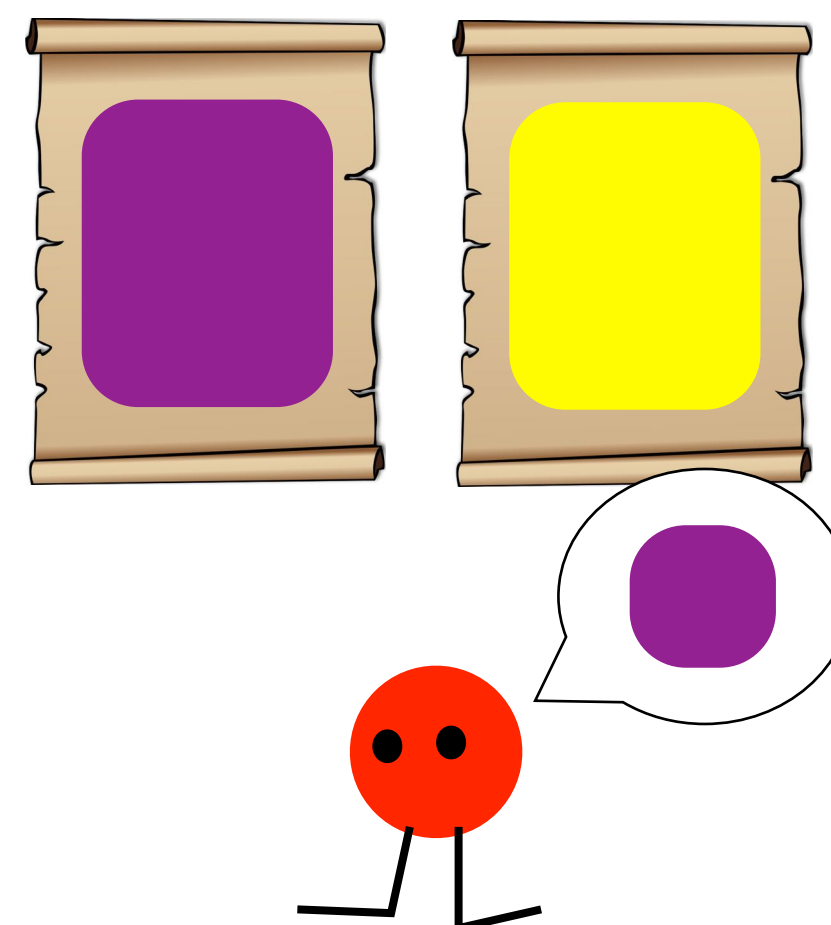
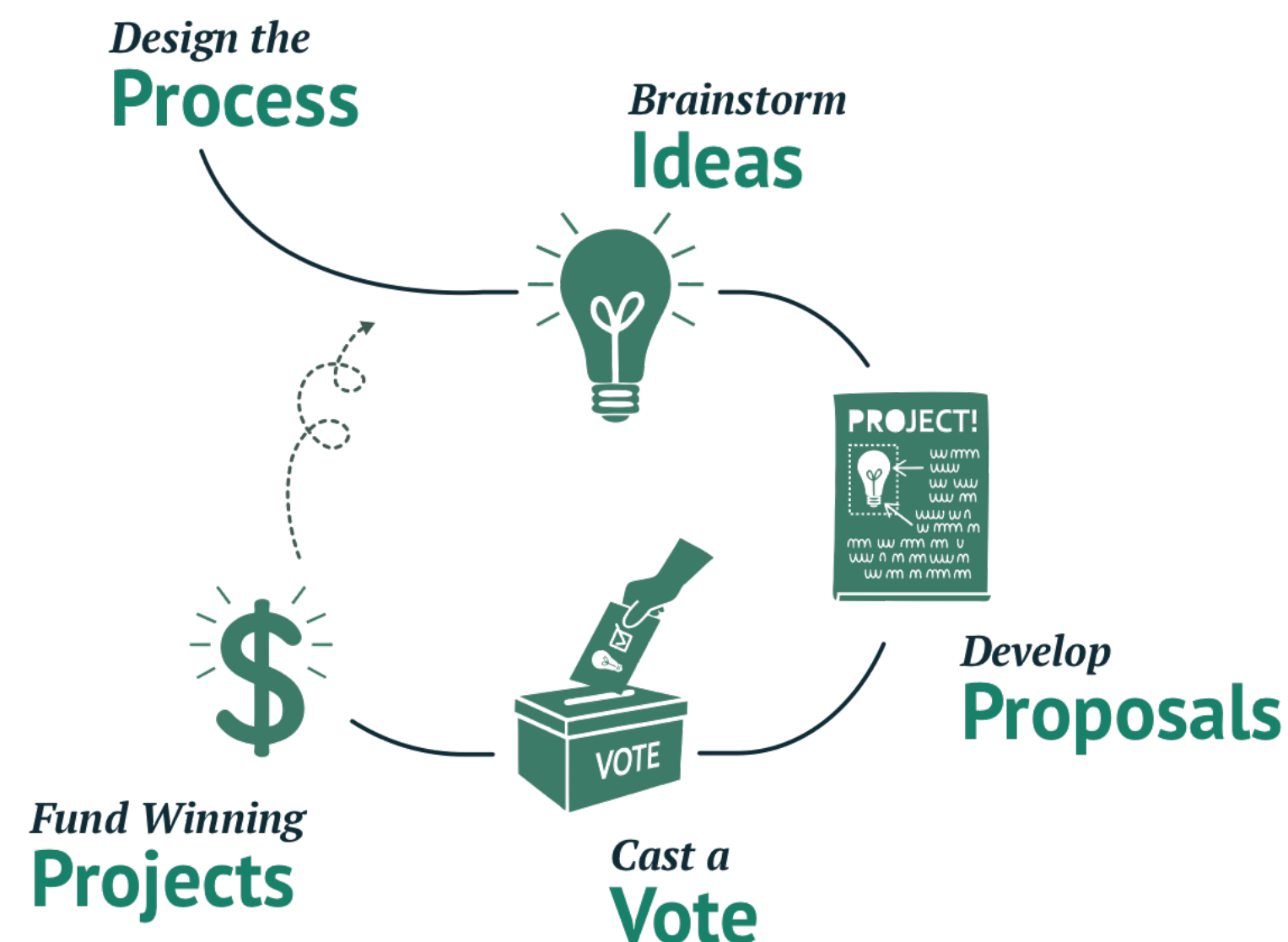


Trends in crowd work / gig work
increase tensions between learning
and earning

- Atomized tasks decrease situated learning
- Lack of collaboration prevents work-based “instrumental relationships”
- “Always on” nature crowds out learning



The Finnish Experiment:
Crowdsourcing Off-road
Traffic Law Reform

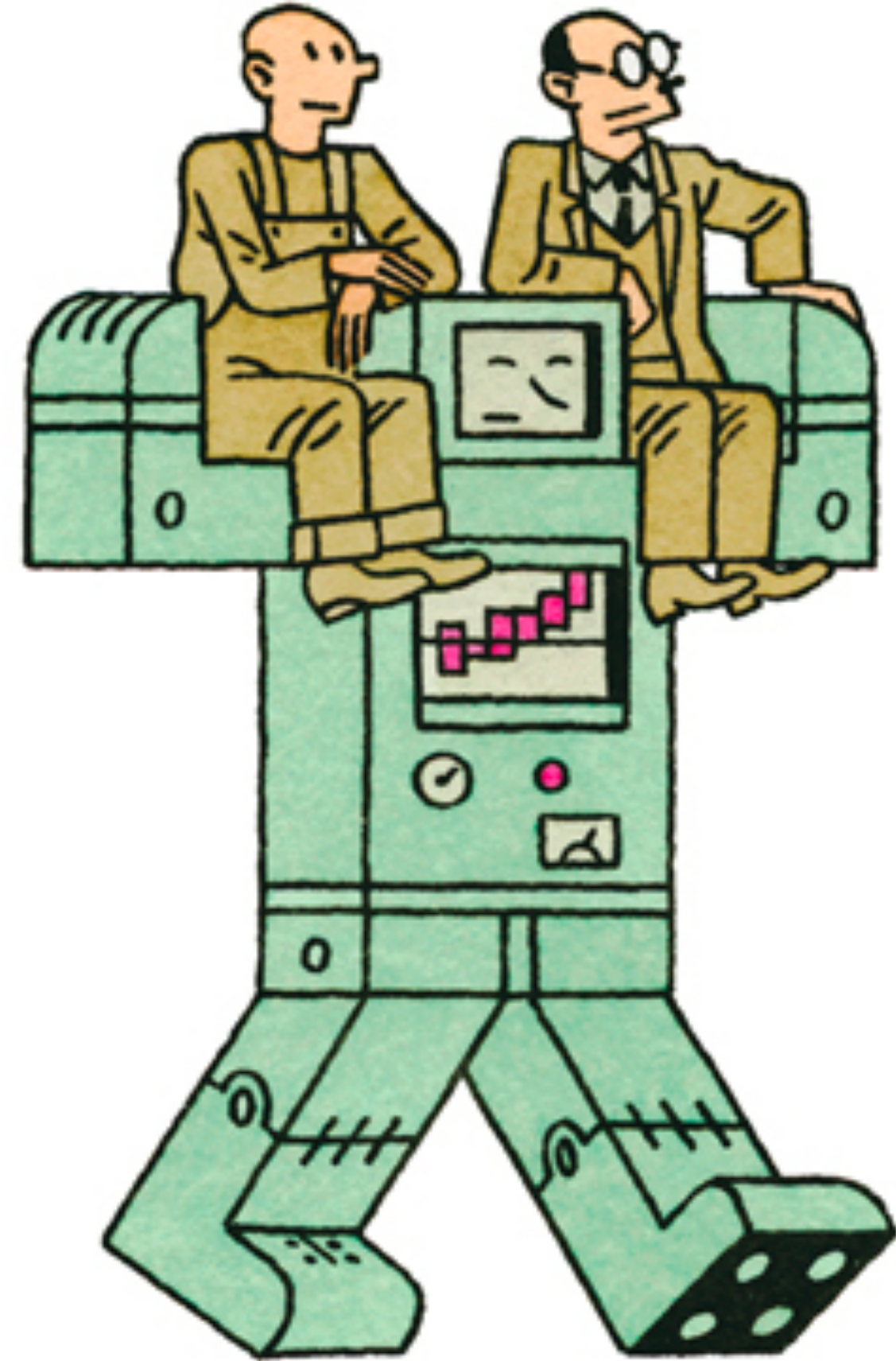
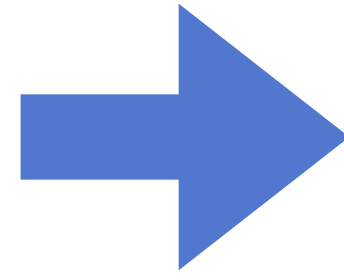
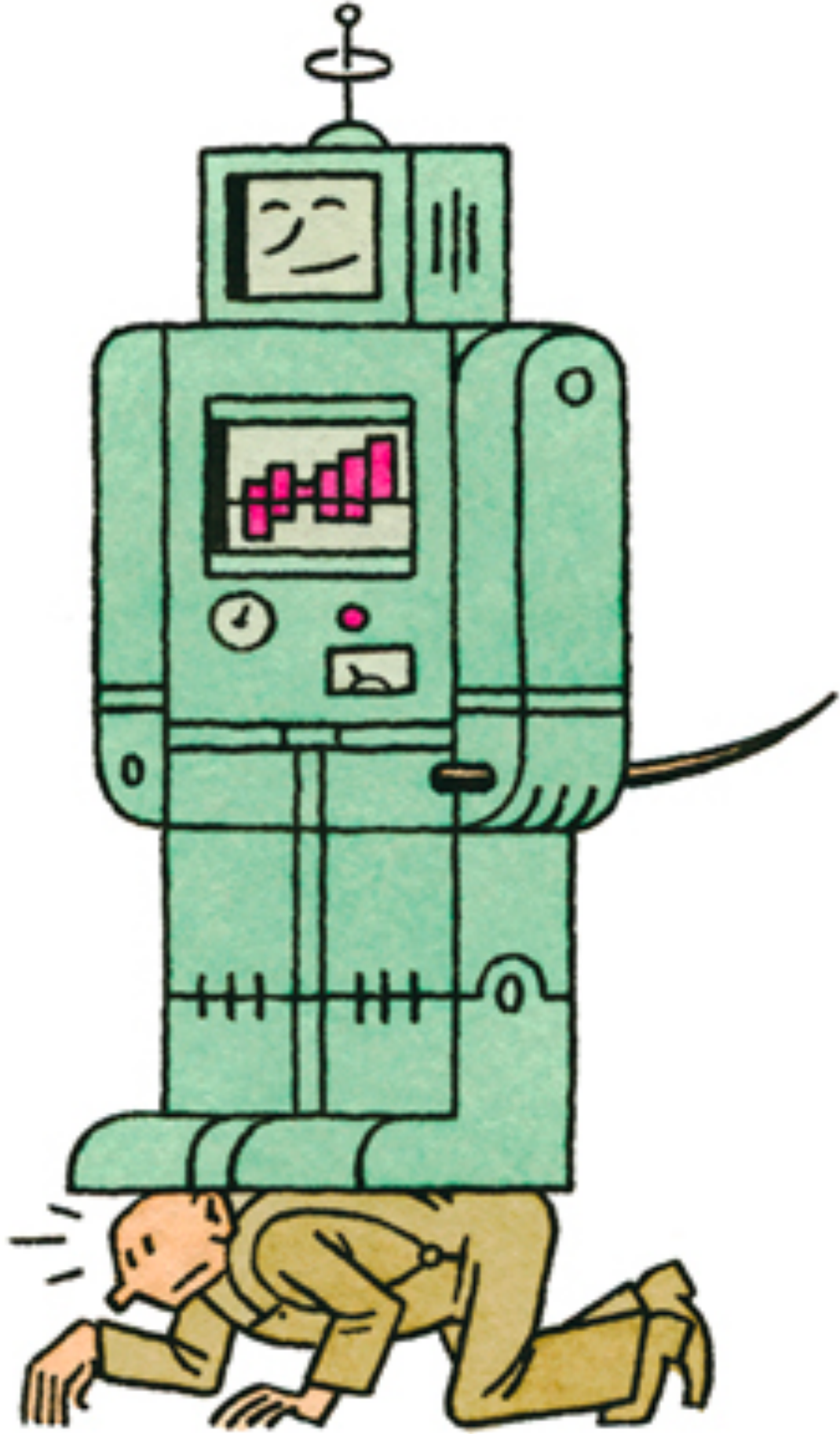


Crowdsourcing for Participatory
Democracies: Efficient Elicitation of
Social Choice Functions
David T. Lee, Ashish Goel, Tanja
Aitamurto, Helene Landemore
AAAI Conf. on Human Computation
and Crowdsourcing ([HCOMP](#)) 2014
Notable Paper Award

Efficient, Private, and eps-
strategyproof Elicitation of
Tournament Voting Rules
David T. Lee
International Joint Conference on
Artificial Intelligence ([IJCAI](#)) 2015

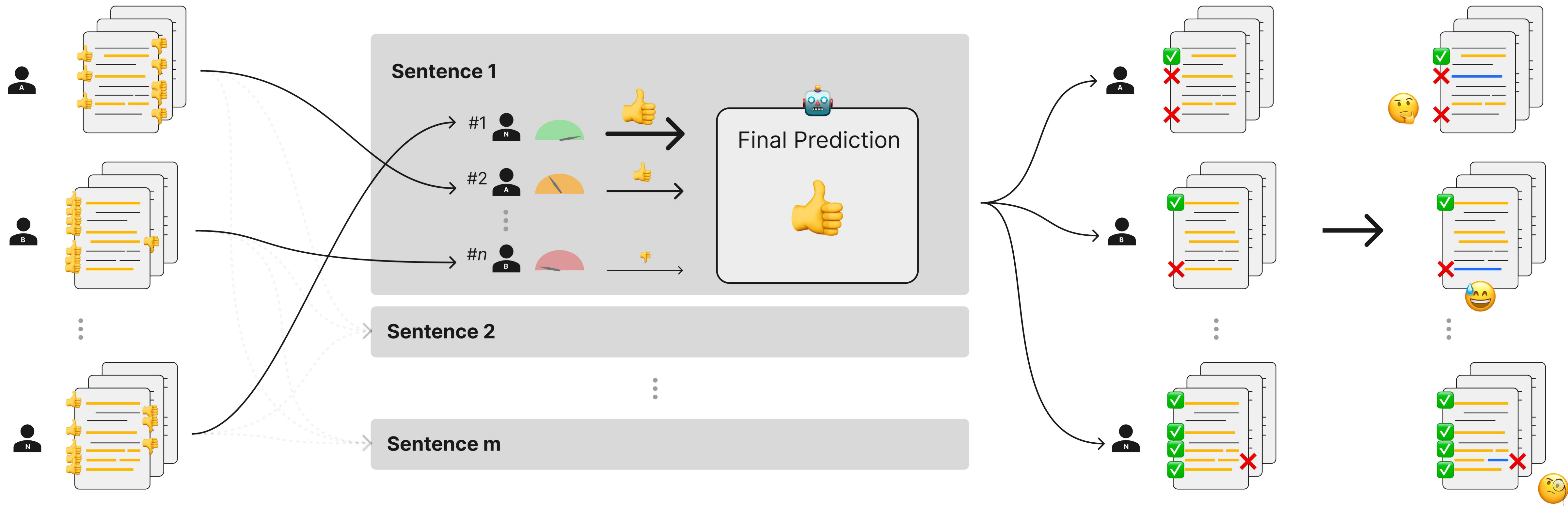
Triadic Consensus: A Voting Rule for
Crowdsourcing Applications
Ashish Goel, David T. Lee
Conf. on Web and Internet
Economics ([WINE](#)) 2012

Towards Large-Scale Deliberative
Decision-Making: Small Groups and
the Importance of Triads
Ashish Goel, David T. Lee
ACM Conf. on Economics and
Computation ([EC](#)) 2016



Idea #1

repurpose micro-task
algorithms for use in rich
collaborative dynamics



Annotations
as 'votes' on
relevance

1

EM-inspired
algorithm predicts
sentence relevance

2

Provide personalized
hints for reflection
and iteration

3

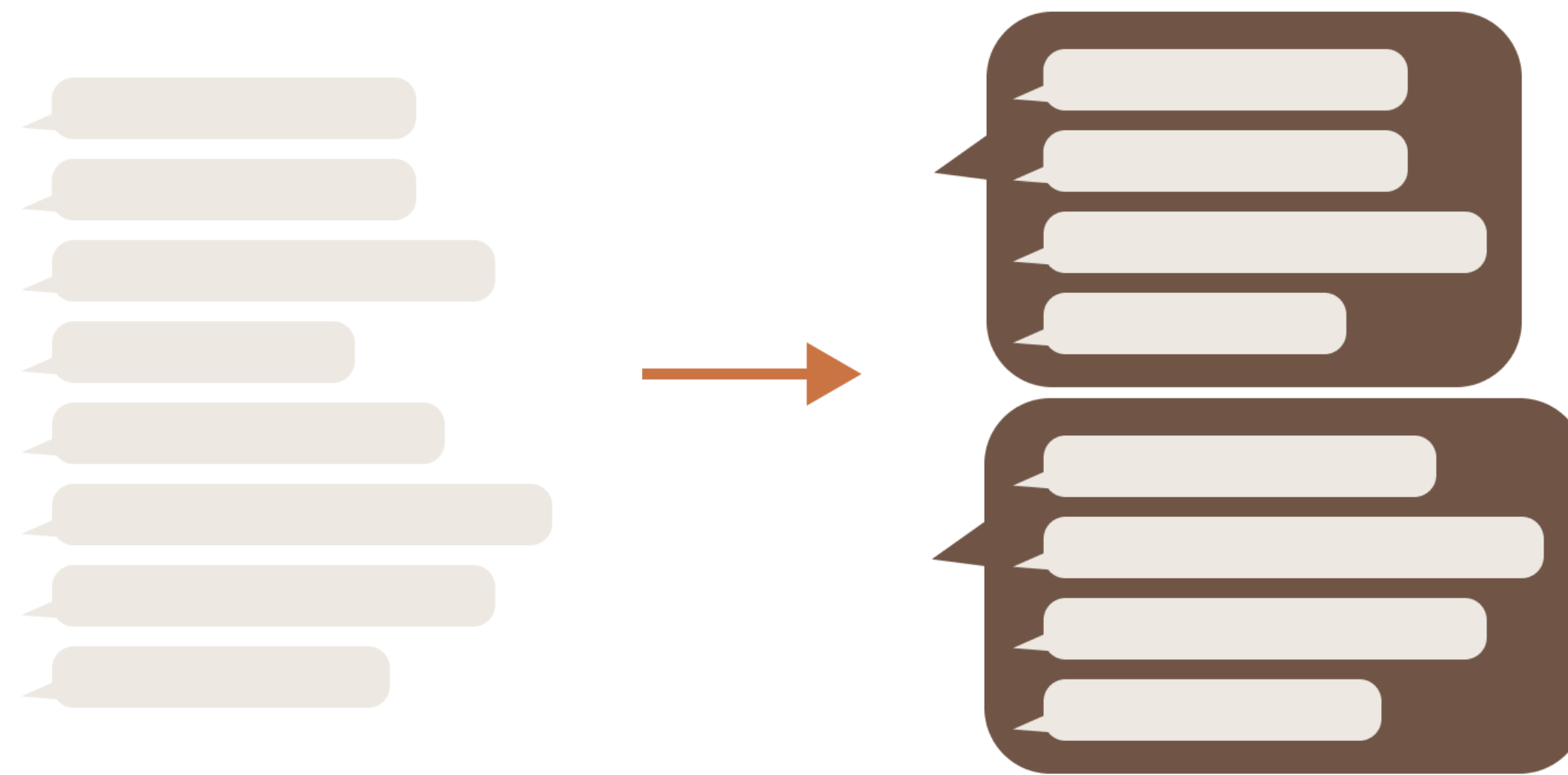
How can we provide
mentorship to support our
undergrads in the transition
into the workforce?



How might structured chat
environments help create
personalized interactions
that also scale?



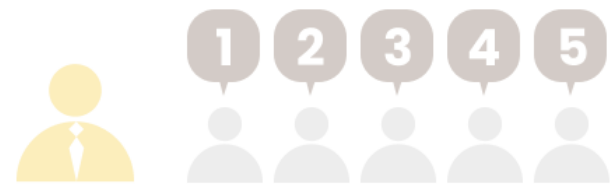
Think of conversations as not built on individual messages, but on *multi-person conversational units*



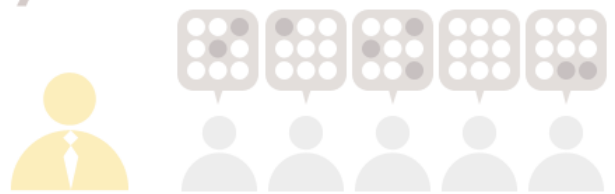
1 Mentor asks a question using a cluster prompt



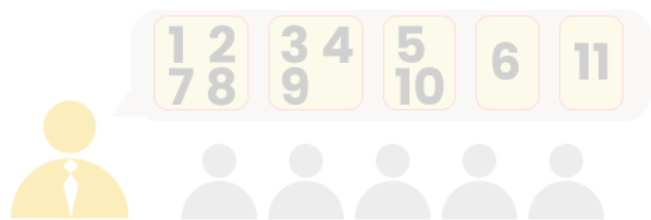
2 Mentees respond within a specified timeframe



3 Mentees are presented with several responses and mark any similar ones



4 Interactions are summarized as clustered responses for the mentor to build on



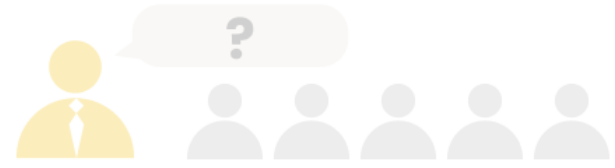
Mentor

Awesome! So cool to hear about everyone's week.

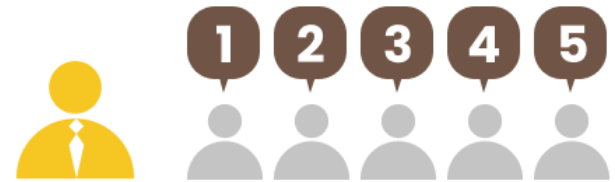


Let's jump in: What do you all want us to spend time on? Any questions or things you'd like to hear/discuss?

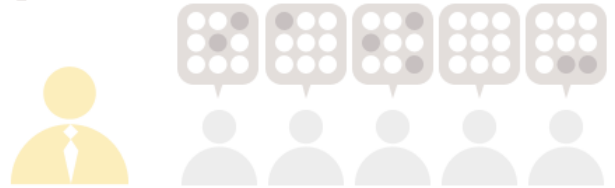
1 Mentor asks a question using a cluster prompt



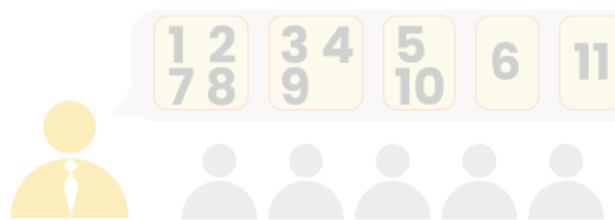
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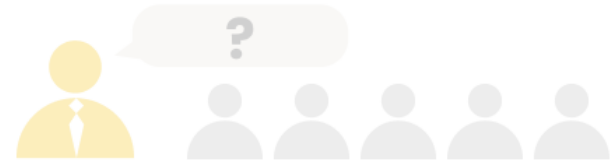
Countdown: 1:30

Received Responses: 10

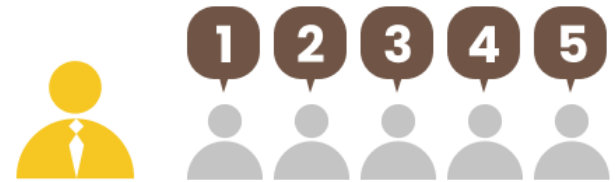
1:30

Finding internships, your journey to your current career

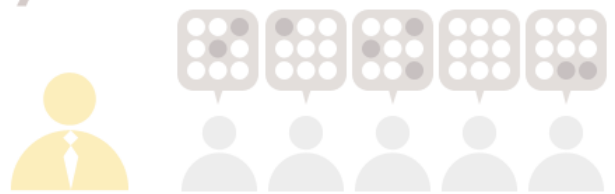
1 Mentor asks a question using a cluster prompt



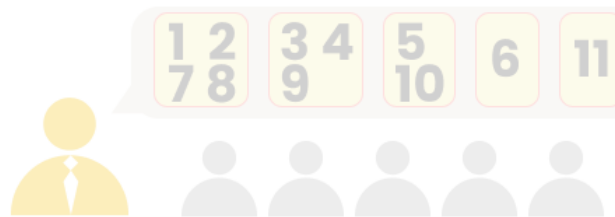
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4 Interactions are summarized as clustered responses for the mentor to build on



Mentor

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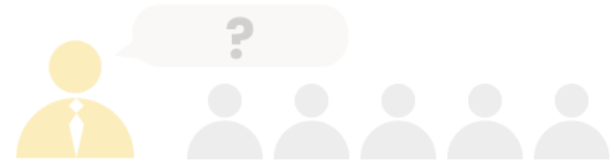
Let's jump in: What do you all want us to spend time on? Any questions or things you'd like to hear/discuss?

You

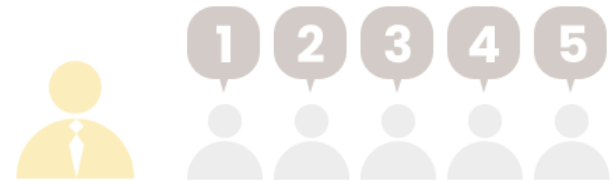
Finding internships, your journey to your current career



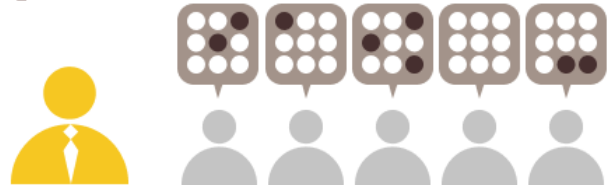
1 Mentor asks a question using a cluster prompt



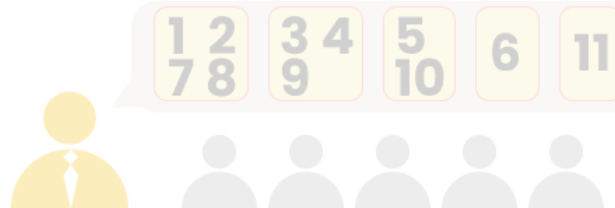
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You

Finding internships, your journey to your current career

Mentor

Take a look at what others said. Were any other responses essentially the same as yours?

Select the answer(s) that are the same or similar to yours. 2:00

When is the best time to start looking for internships?

I'd like to hear about how to explore different career pathways in the field.

I would like to learn more about our mentors' career journeys.

Advice on getting an internship as a freshman would be nice!

Tips on landing internships and also jobs as a new grad.

What was your journey to your present job and is there anything you would've done differently?

What I'd like to discuss is the expectations held for us upon entering the tech job market.

If we are trying to get a software engineering internship, what types of projects make the most impact?

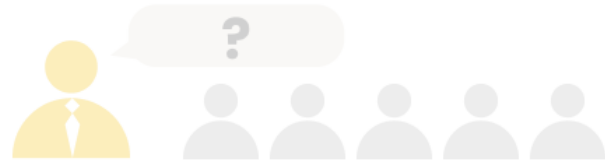
your journey to getting where you are?

How to get an internship?

None are similar

1

Mentor asks a question using a cluster prompt



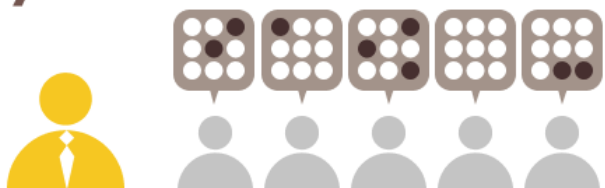
2

Mentees respond within a specified timeframe



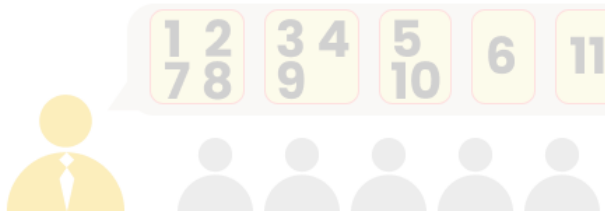
3

Mentees are presented with several responses and mark any similar ones



4

Interactions are summarized as clustered responses for the mentor to build on



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Finding internships, your journey to your current career

Mentor

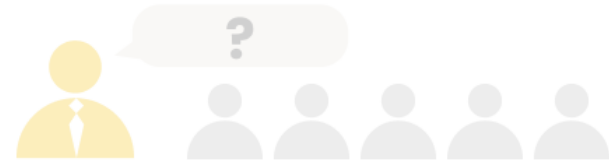
Take a look at what others said. Were any other responses essentially the same as yours?

You

2 of 10 responses viewed were similar. "I would love to to hear internships..." and "Interview tips, how to navigate..."

1

Mentor asks a question using a cluster prompt



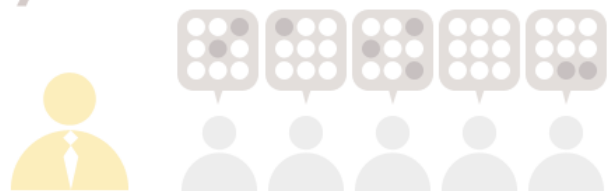
2

Mentees respond within a specified timeframe



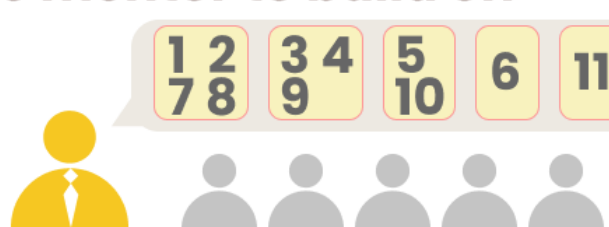
3

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4

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You

Finding internships, your journey to your current career



Mentor

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You

2 of 10 responses viewed were similar. "I would love to to hear internships..." and "Interview tips, how to navigate..."



Mentor

Here's everyone's responses. There were 2 clusters with 3+ similar responses and a few smaller ones. Take a look.



All Clustered Responses ➔

Browse other whispers and prompts

Let's jump in: What do you all want us to spend time on? Any questions or ...

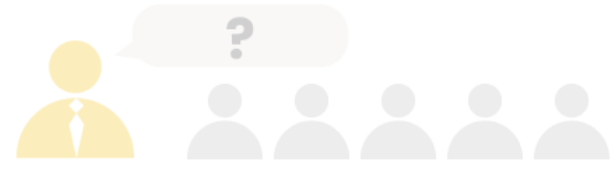
Cluster 1

- Finding internships, your journey to your current career
- Do you have any tips or information on interviews & getting experience and landing internships?
- What is the best strategy to connect with people in the tech industry with the intention of a future job?
- I would love to hear internships; what is the best way to secure one? Would you recommend finding that perfect role or something to build your resume
- Interview tips, how to navigate the job market

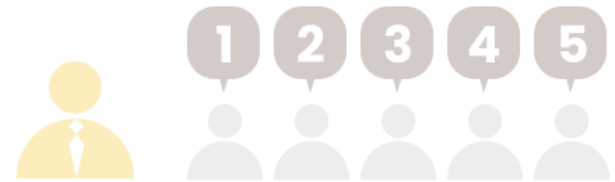
Cluster 2

- I'd love to know more about how to actually land a job.
- Finding a job after college/internships!
- What do you recommend when someone is first starting their job

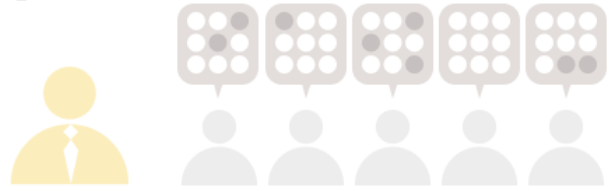
1 Mentor asks a question using a cluster prompt



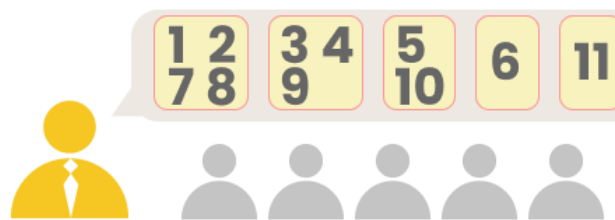
2 Mentees respond within a specified timeframe



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4 Interactions are summarized as clustered responses for the mentor to build on



Mentor

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You

Finding internships, your journey to your current career

Mentor

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2 of 10 responses viewed were similar. "I would love to to hear internships..." and "Interview tips, how to navigate..."

Mentor

Here's everyone's responses. There were 2 clusters with 3+ similar responses and a few smaller ones. Take a look.

All Clustered Responses ➔

It sounds like a lot of folks want to talk about getting an internship. Let's start with that!

in general, internships are a great way to try out something you think you might want to go into as a full time career

Browse other whispers and prompts
Let's jump in: What do you all want us to spend time on? Any questions or ...

Cluster 1

- Finding internships, your journey to your current career
- Do you have any tips or information on interviews & getting experience and landing internships?
- What is the best strategy to connect with people in the tech industry with the intention of a future job?
- I would love to hear internships; what is the best way to secure one? Would you recommend finding that perfect role or something to build your resume
- Interview tips, how to navigate the job market

Cluster 2


- I'd love to know more about how to actually land a job.
- Finding a job after college/internships!
- What do you recommend when someone is first starting their job

Browse all community activities

Set up a new team activity using one of the existing community prompts!

Tech4Good Lab

Modified Supplemental Instruction (MSI)




Draw it Out!

Light-hearted drawing and guessing game doubling as a get-to-know-you survey.

Prompt:

What do you like, dislike, or suggest about MSI?




Six Hats

Brainstorm with the 6-hats framework. Learn constructive and inclusive deliberation.

Prompt:

How can we expand the impact of MSI to reach more people?




Six Hats

Brainstorm with the 6-hats framework. Learn constructive and inclusive deliberation.

Prompt:

What kind of lesson plans would be most effective for mentees?



Two Corners

Fast paced decision-making game for ranking a problem's solutions.




Prompt:

Help us rank the ideas you like most for improving MSI services.

COMING SOON

Your Team Activities

+ Create a team

MSI		
	Draw it Out!	Today
What do you like, dislike, or suggest about MSI?		
	Six Hats	07/14/21
How can we expand the impact of MSI to reach more people?		
	Two Corners	07/16/21
Help us rank the ideas you like most for improving MSI services		

Round 1/3: What type of experiential learning would you most prefer at UCSC?

After selecting an answer, convince your teammates
on the opposing side to agree with your choice.

Internships

OR

Fieldwork

😊 Ashley

😊 Lily

😊 David

😊 Taylor

😊 Krupa

😊 Kehua

😊 Dustin

Browse all community activities

Set up a new team activity using one of the existing community prompts!

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Brainstorm with the 6-hats framework. Learn constructive and inclusive deliberation.

Prompt:
How can we expand the impact of MSI to reach more people?

Six Hats
Brainstorm with the 6-hats framework. Learn constructive and inclusive deliberation.

Prompt:
What kind of lesson plans would be most effective for mentees?

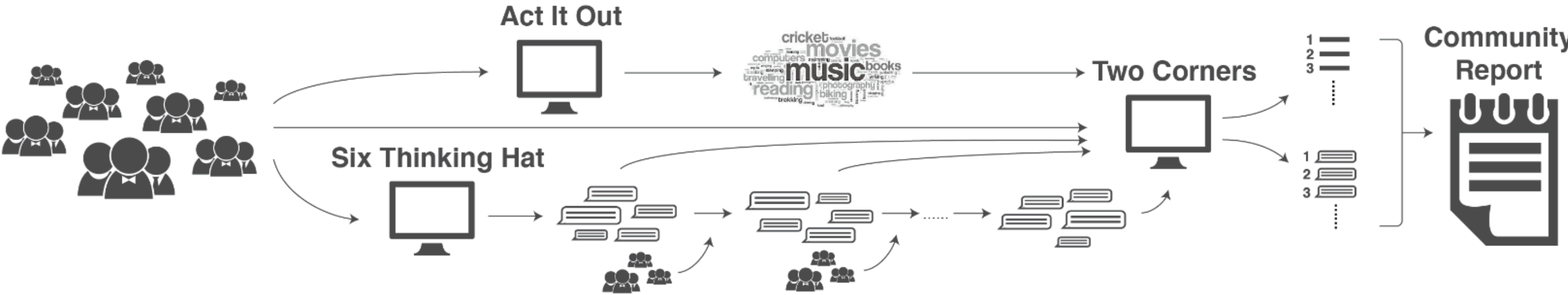
Two Corners *COMING SOON*
Fast paced decision-making game for ranking a problem's solutions.

Prompt:
Help us rank the ideas you like most for improving MSI services.

Your Team Activities

+ Create a team

MSI	
Draw it Out! Today	What do you like, dislike, or suggest about MSI?
Six Hats 07/14/21	How can we expand the impact of MSI to reach more people?
Two Corners 07/16/21	Help us rank the ideas you like most for improving MSI services



Idea #2

*build new models of
human-AI computation
around human strengths*

Imagine an orchestra where...

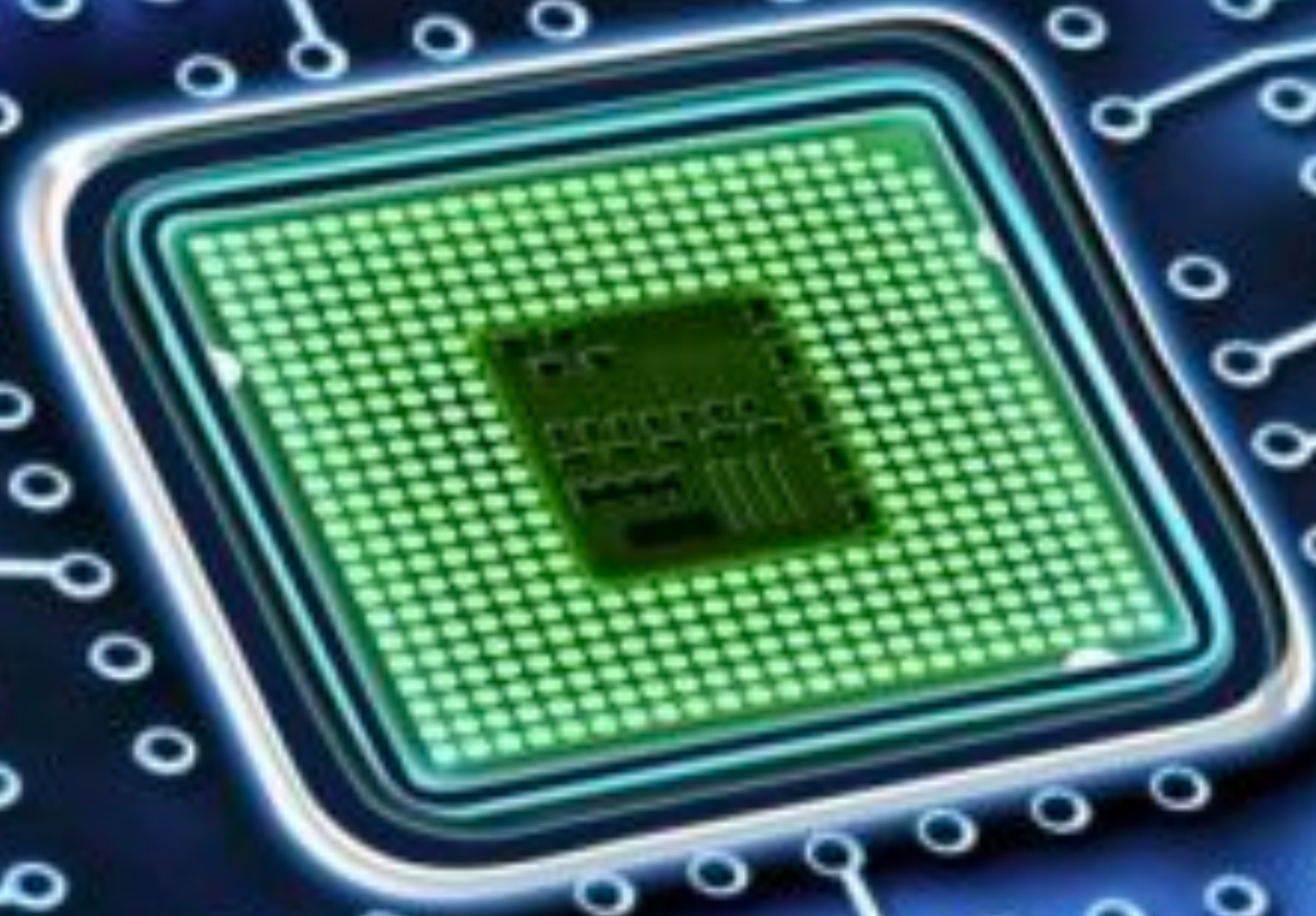
A computer assigns tiny, specific tasks to each musician like playing one note at a time. Yikes!



Analogy and image generated by ChatGPT

Silicon Based Computation

Fast, cheap, reliable primitives algorithmically composed



“

Most successful examples share much in common: the tasks to be performed are **obviously parallelizable**, the unit of human contribution required is **extremely small**, and there is usually very **little coordination**.

”

Mathematical Foundations for Social Computing

**CCC**

Computing Community Consortium
Catalyst





Human-Centered ‘Computation’

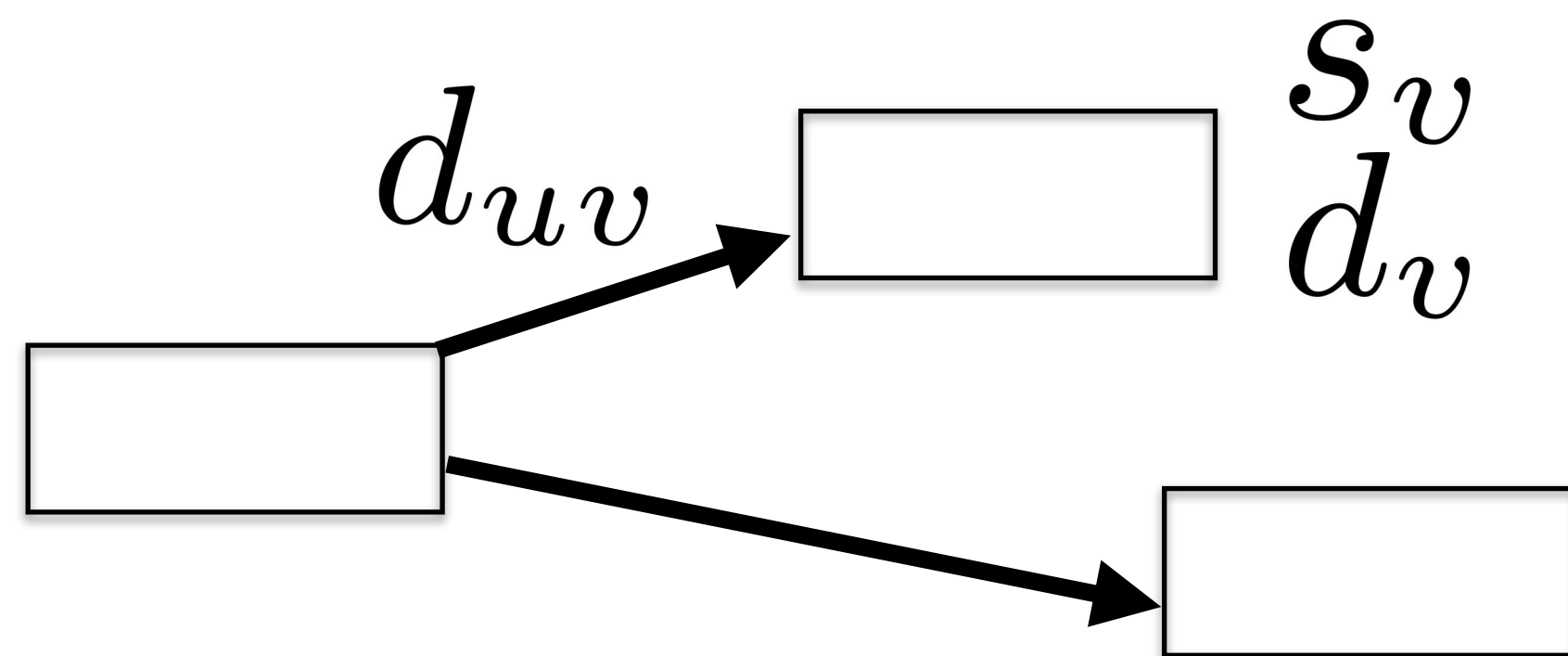
Creativity and collaboration to tackle large underdefined tasks

“At the core of this conception of cooperative work is the notion of **interdependence** in work.”

“...by entering into cooperative work relations, the participants must engage in activities that [are] extraneous to the activities that contribute directly..., [implying] an overhead cost in terms of labor, resources, time, etc.”

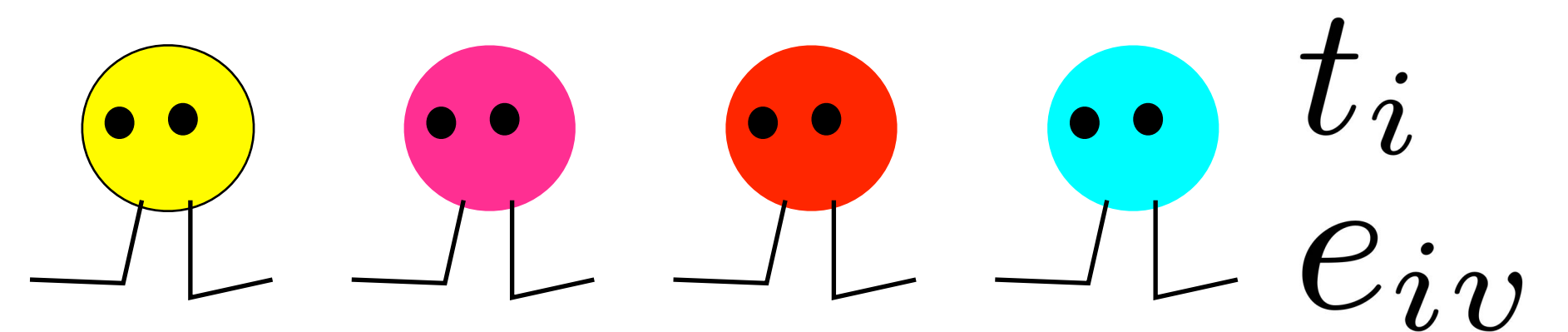
Schmidt, Bannon, CSCW 1992

Taking CSCW seriously: supporting articulation work



TASK GRAPH

$$G = (V, E, s, d)$$

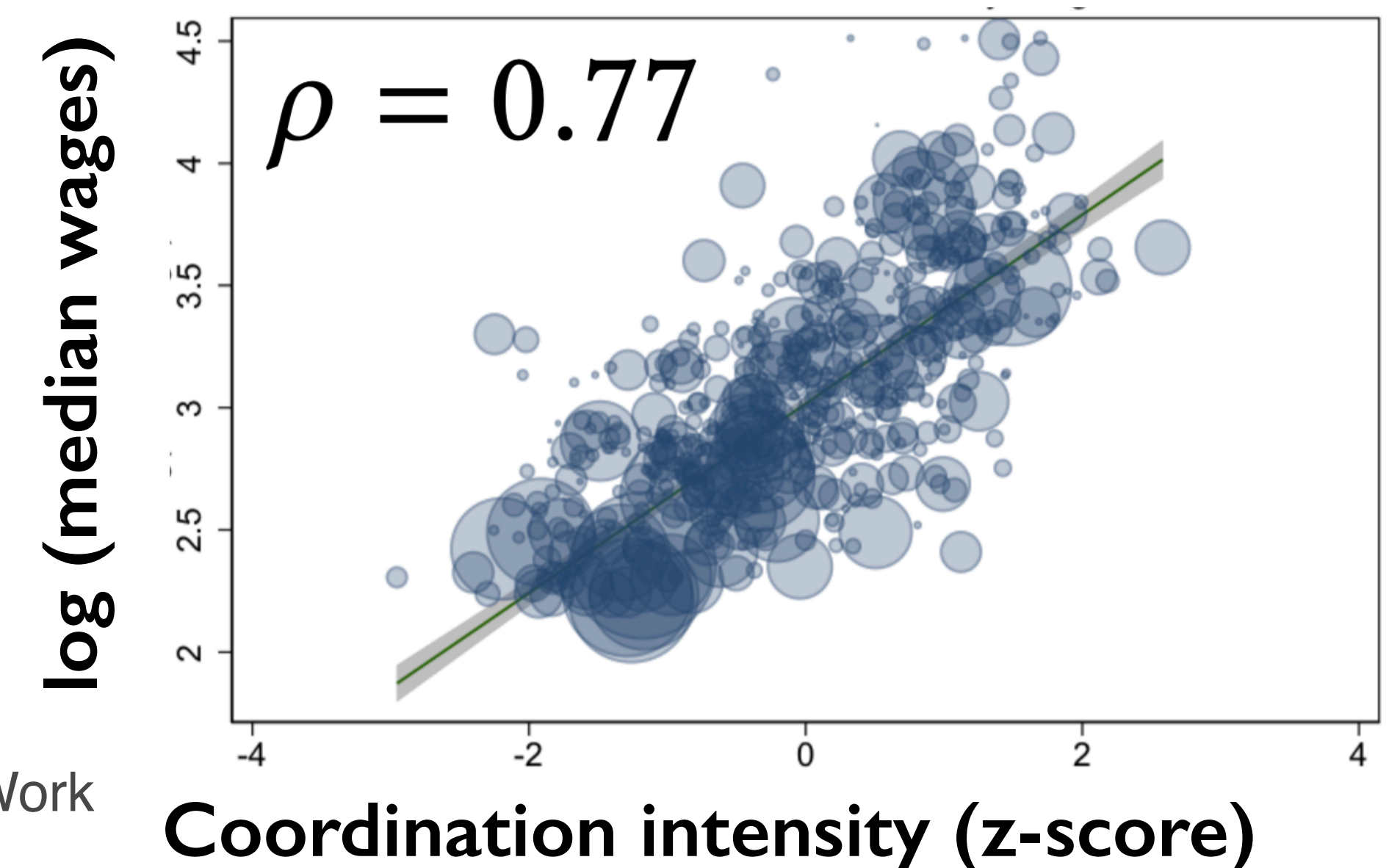


WORKERS

$$I$$

Findings from our task-interdependency model of human-AI work

- 1 Scalability:** there are fundamental limits to feasible work even with infinite workers, and these limits give insights on trends in complex crowd work
- 2 Learning:** experiential reskilling will be limited when interdependencies are high, but situated learning also requires some interdependence
- 3 Occupations:** simple analyses on occupational coordination intensity and wages were reflected in data on the US economy



Idea #3

*design AI to support
reflective journeys
and communities*

How might we support people in taking time to reflect and find their center to help them navigate change?

Theories of identity development describe it:

- Providing a sense of coherence to self-knowledge and goals,
- Involving an extended process of exploration, making, and reconsidering commitments,



To what extent are #DayInTheLife videos helpful for career exploration?

Benefits include:

- Valuable first-hand depictions
- Digestible formats reduce barriers

However:

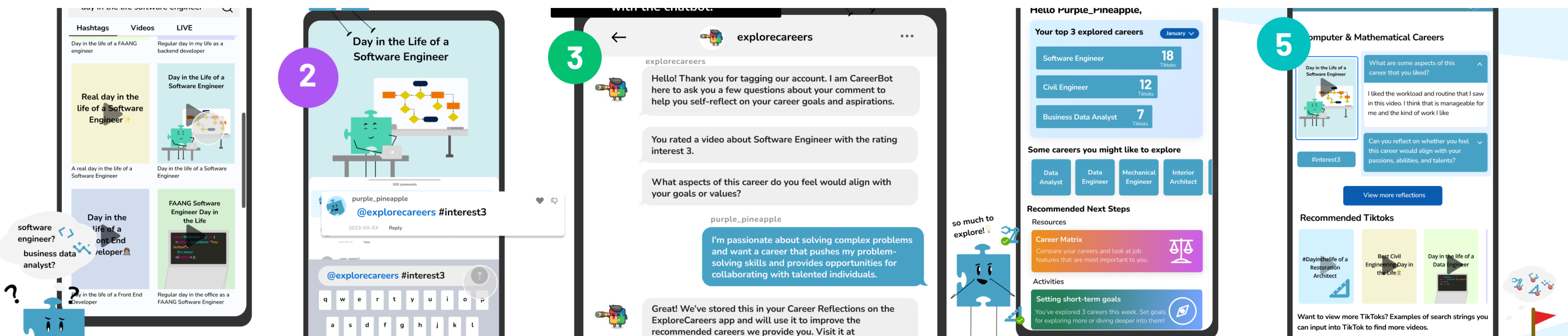
- Lack of integration and design of environment limits these benefits



How might we design AI agents that help to facilitate reflection across longer timeframes to support identity formation?

"... I feel like the chatbot helped me slow down a little bit and realize, okay, like, what are the important things in that video? Like, what did I like the best."

"... fun... way more interactive than just TikTok on its own... it gave me like a sense of agency... I felt like I was like, deciding on if this job would work out or not."



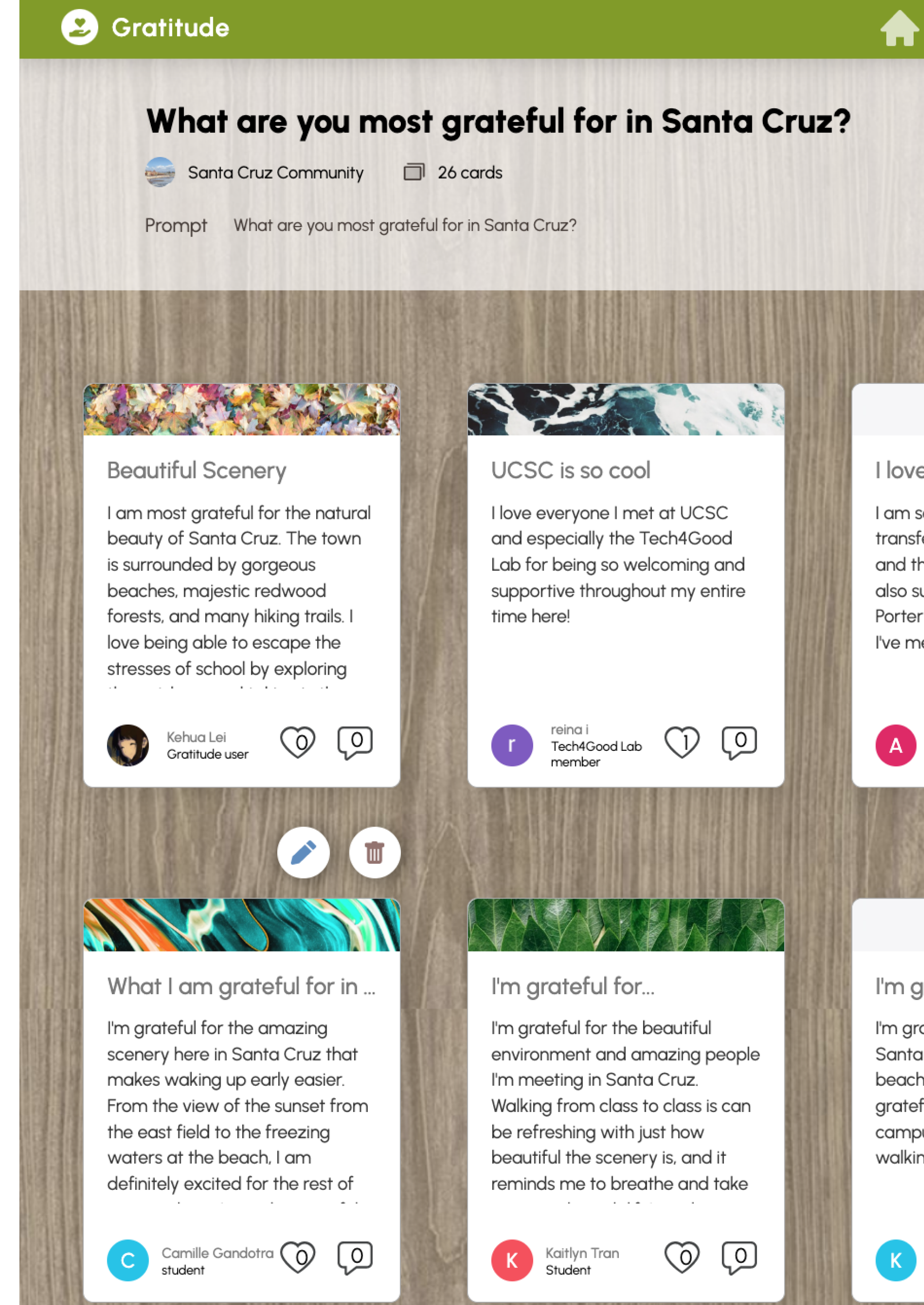
How might we design communities that support authentic reflection?

"...helped me recall things that I have complex feelings around... my most worthy failure, or how I learned to value myself... things that once made me feel extremely depressed. Gratitude provided me a platform to regain my power and encouragement by sharing these."

"...I'm grateful that it made me reflect on past experience of prejudice, bullying, and thinking about what the bullies think, and also my own cruelty to others sometimes."

Exploring Communal Gratitude in Online Communities

Kehua Lei, Kathleen Lum, Namrata Keskar, Saba Kheirinejad, Shivani Potnuru, Amy Xing, Reina Itakura, Simo Hosio, David T. Lee
Submission Under Review





Review the unsung heroes underlying your note

Gratitude will try to identify groups of people who might appreciate reading your note such as relevant unsung heroes in the community or particular topics people can follow. **Hover over tags to read more.**

What are you deeply grateful for in Santa Cruz? Share your moments, memories, or experiences that have left a lasting mark on your heart.

I am immensely grateful for my time at UCSC, as it has been a truly unforgettable experience. The breathtaking ocean view that greeted me daily was a constant source of inspiration and tranquility, making every day on campus feel like a gift. The winding trails nestled in the lush redwood forests allowed for moments of reflection and a connection with nature that was simply magical. But above all, it was the caring and supportive faculty and staff that made my journey exceptional.

Recipient Groups

UCSC Faculty and Staff ×

Environment Conservationists and
Park Rangers ×

Gratitude Topics

UCSC Memories ×

Back

Next



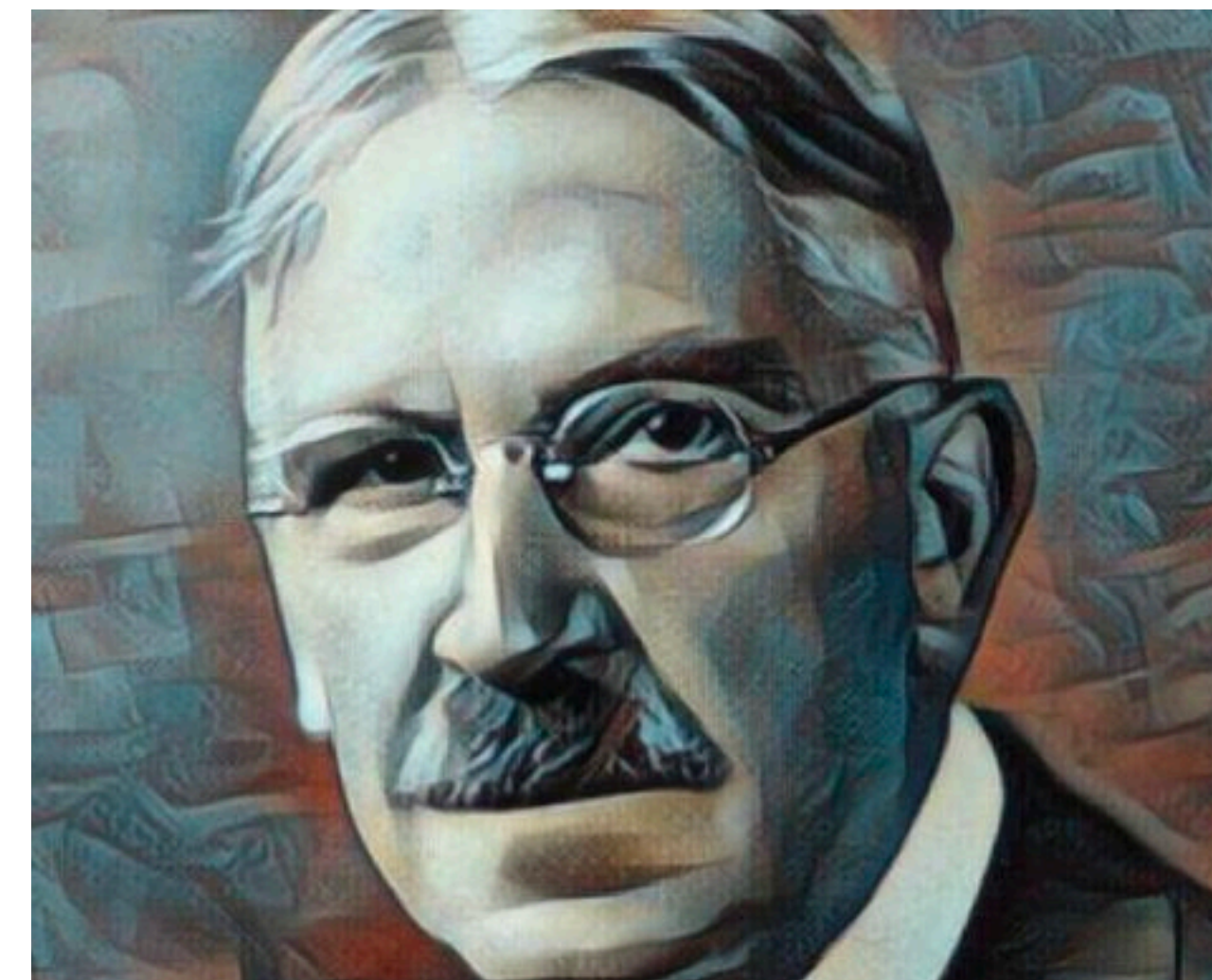
School must represent present life—life as real and vital to the child as that which he carries on in the home, in the neighborhood

Education proceeds by the participation of individuals in social life... shaping the individuals powers, saturating his consciousness, forming his habits, training his ideas, and arousing his feelings and emotions... to have the full and ready use of all his capacities for society.

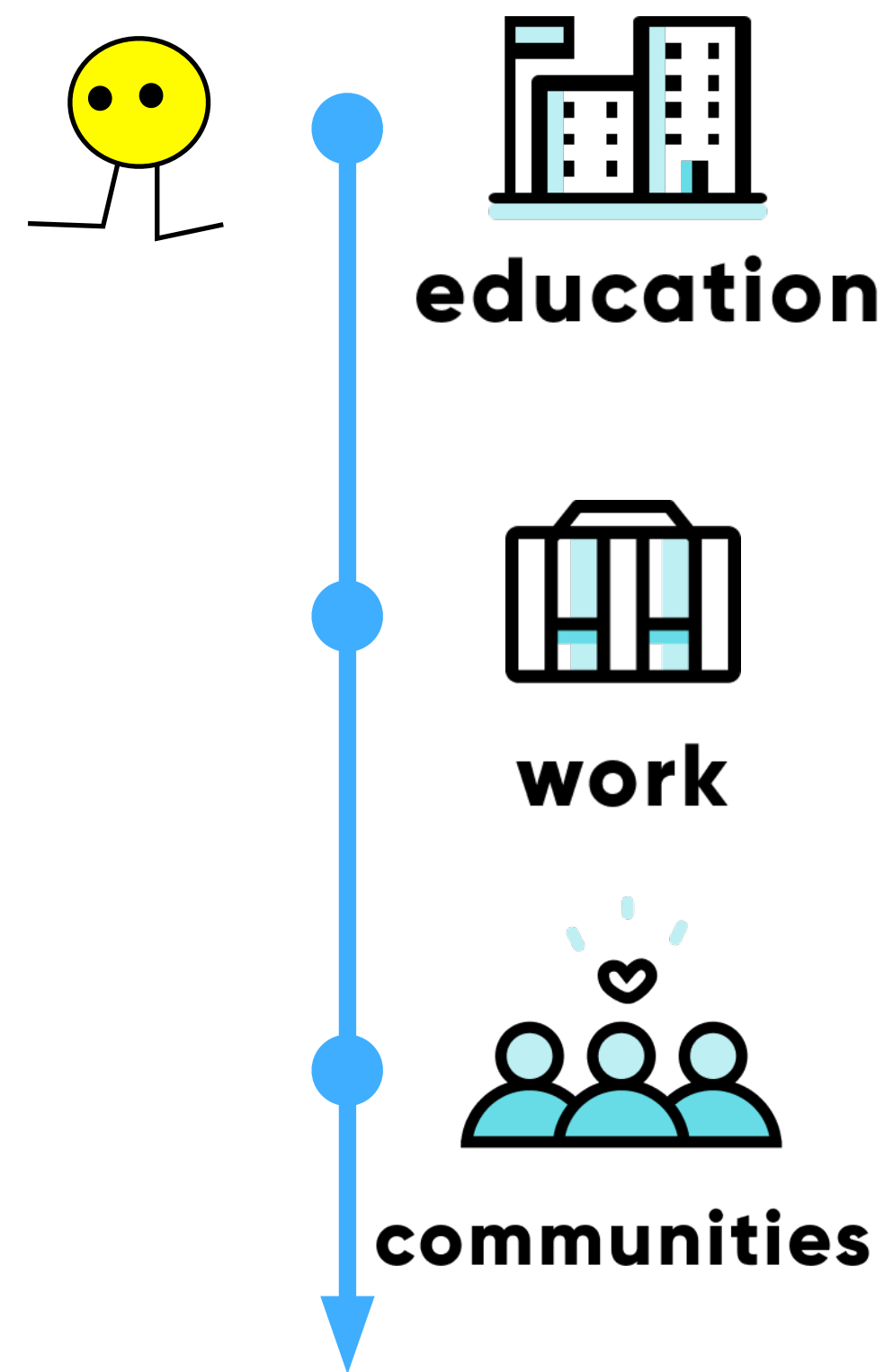
— *My Pedagogic Creed* (1897)

John Dewey

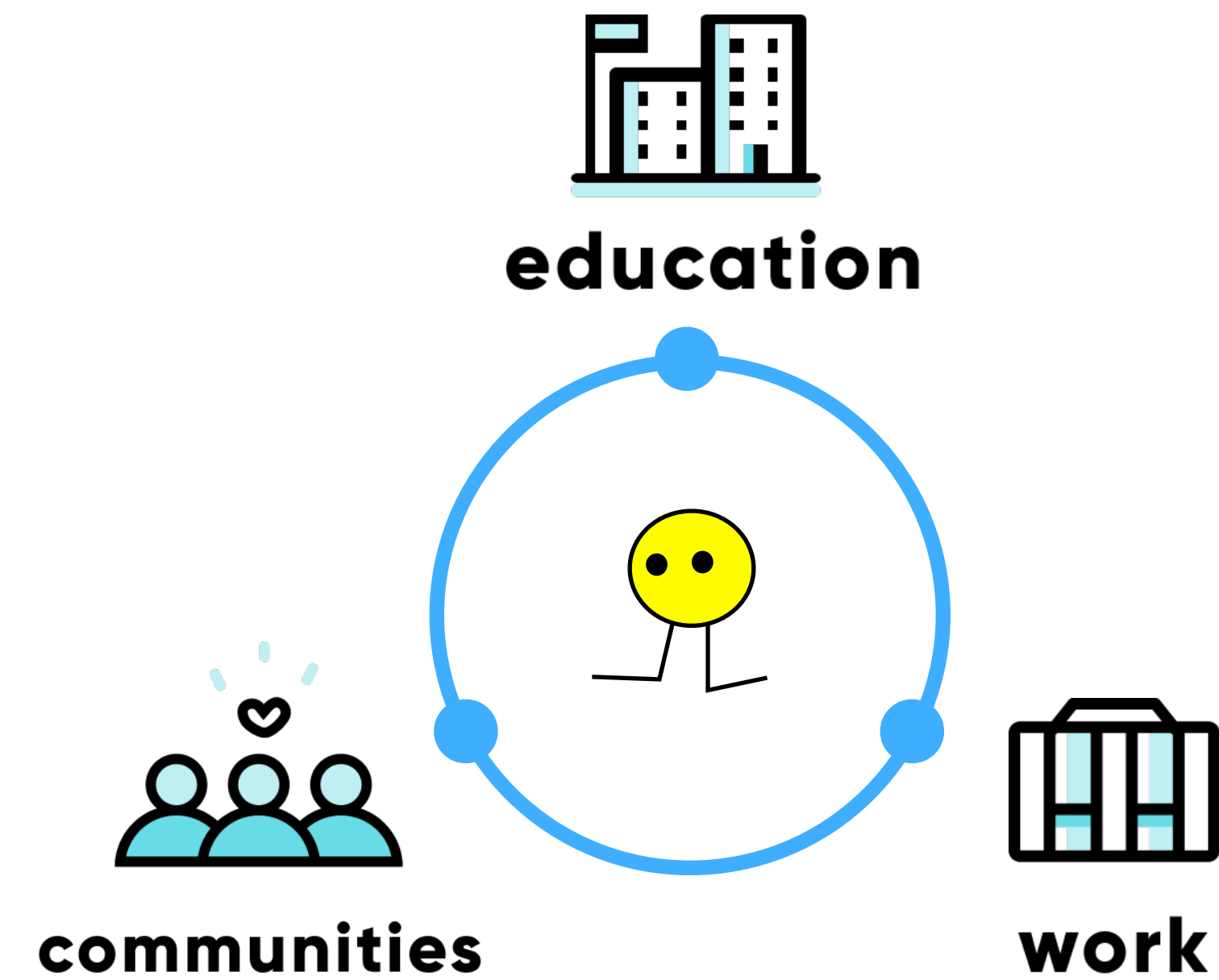
Philosopher and educational
reformer, 1859-1952



Our system



Our vision

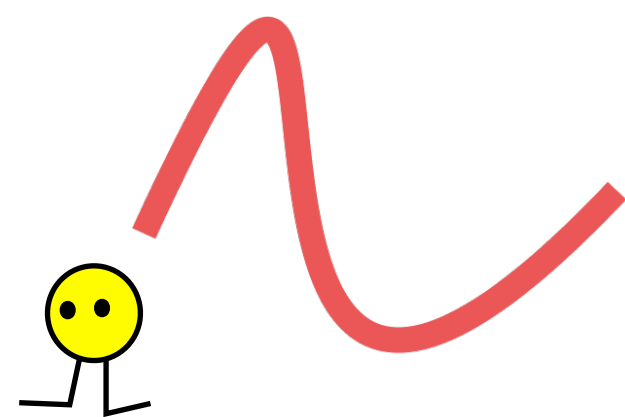


This talk is about exploring, asking, and speculating:

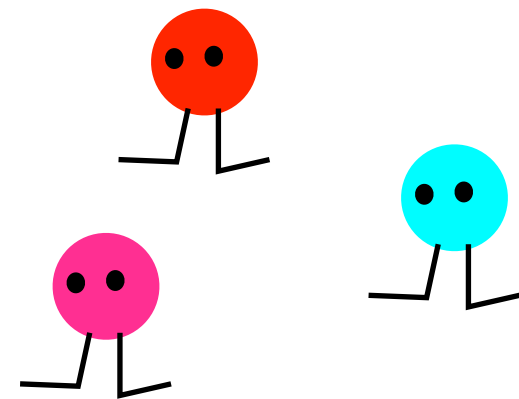
designing ecosystems for flourishing in a whitewater world

1 reinventing education for continuous learning

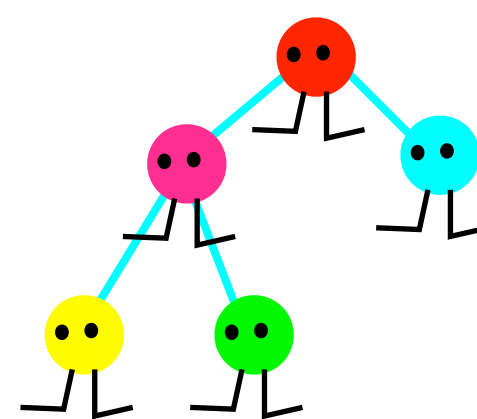
2 societal collaboration to support communities



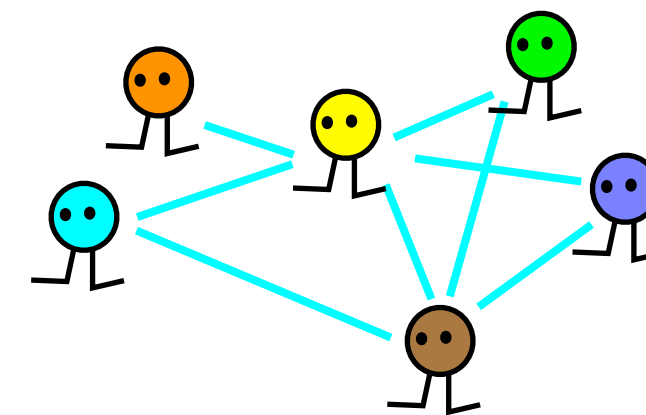
Tailored to
individual journeys



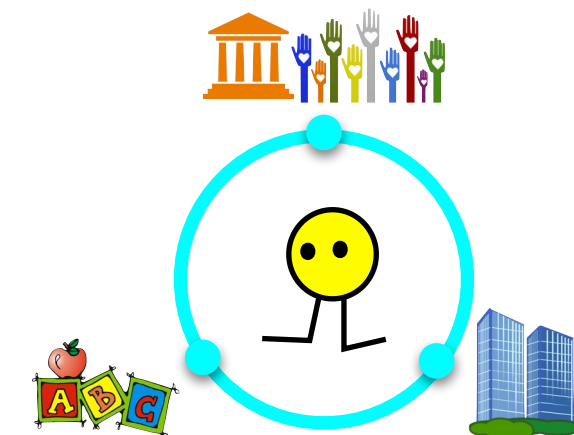
In relational small
group interactions



Supported by
org. structures



In networked
communities



Fostering a flourishing
political economy

Tech4Good Lab

Social Computing, HCI+AI+EconCS

Interdisciplinary research tied to impact in education, work, and communities

Crowdsourcing and Learning in Groups

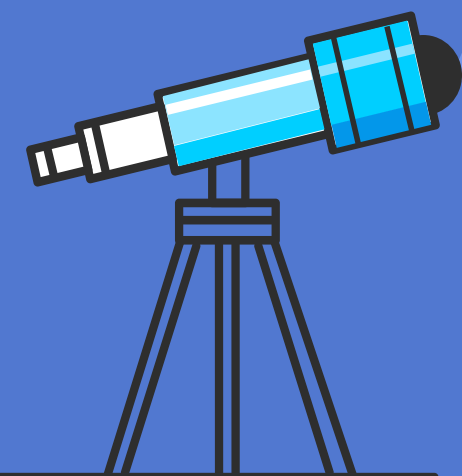
Experiential Learning at Scale

Career Journeys & Mentorship

Community & Societal Collaboration

Humane Futures of Crowd Work

Human-AI Collaboration



Collaborators, Sponsors, and Partners

(only a subset of our student co-authors and leads)



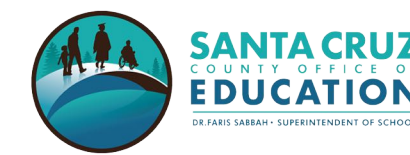
Google newventurefund



Baskin Engineering



YOUR FUTURE IS OUR BUSINESS



Rotary Santa Cruz Sunrise



CIED



+ many amazing individual donors and mentors we are grateful to!