ClassInSight

Encouraging teacher immediacy behaviors through persuasive design

ORGANIZATION
Carnegie Mellon
Human-Computer Interaction
Institute

ROLE
Research Assistant

TIMELINE
Jan-June 2020

CONTEXT

ClassInSight is a teaching tool developed at Carnegie Mellon. It uses sensors in the classroom to capture student and teacher nonverbal data, with the goal of **improving teacher efficacy.**

An understudied measure of efficacy is "**immediacy**" - a teacher's perceived psychological closeness to students that leads to students' improved engagement. Nonverbal behaviors like gaze, physical closeness, and movement can improve immediacy.

TEAM

Dr. Amy Ogan
Dr. John Zimmerman
Franceska Xhakaj, year 5 Ph.D.
Undergraduate researchers

MY ROLE

Backend technologies enabling ClassInSight, including OpenPose and Edusense, have been in development at Carnegie Mellon since 2019. I joined the ClassInSight design team in January 2020, immediately after its first teacher-facing user study, to **generate insights** and **develop the next phase of testing** that would drive its interface design.

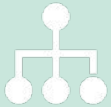
CHALLENGE

Teachers participated in a pilot study in summer/fall 2019 using sensors in their classrooms. When presented with their nonverbal behavior data, including recommended benchmarks for immediacy behaviors, many teachers were resistant to change and cited some behaviors as out of their control.

How might ClassInSight provide teachers with clear, actionable, & persuasive nonverbal data that will encourage them to improve their immediacy behaviors?

PROCESS

Analyze



Design Study

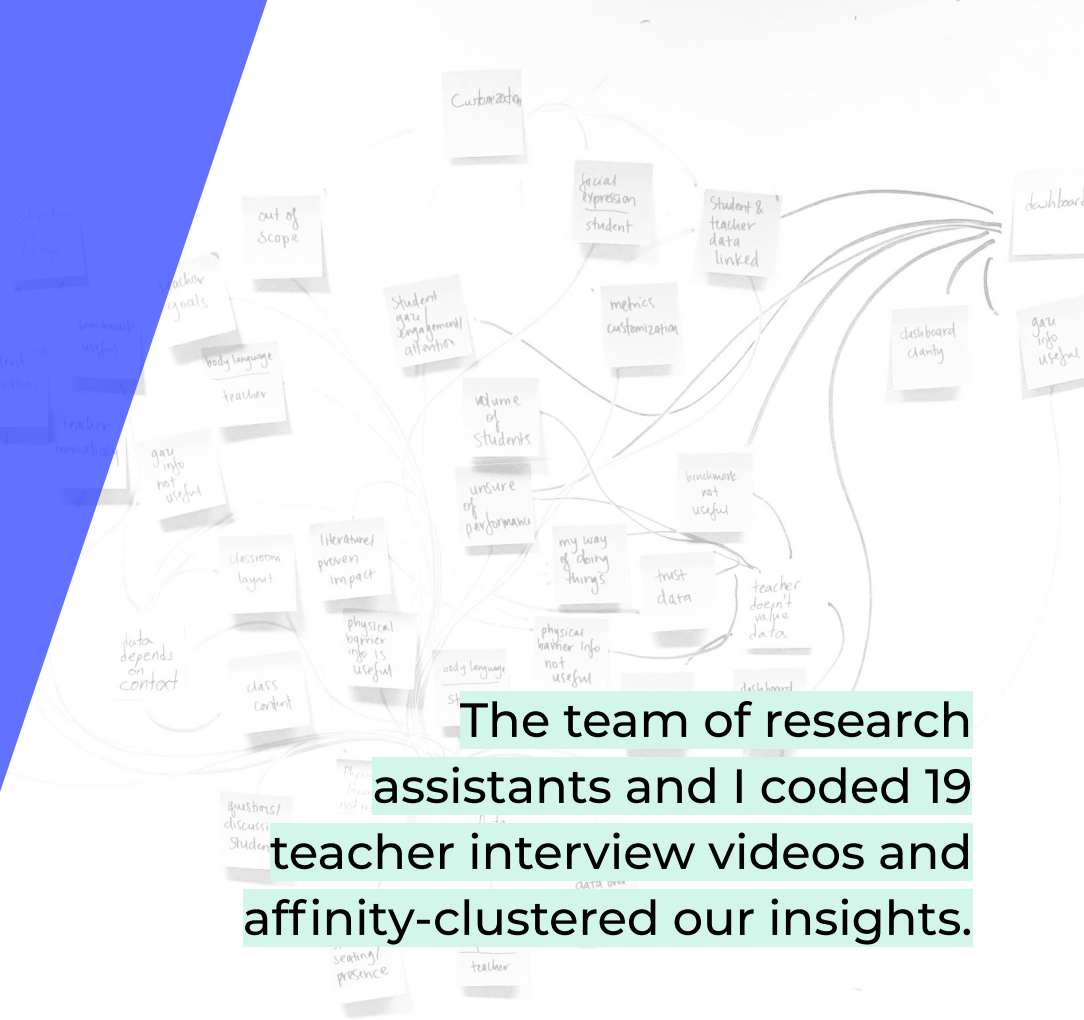
Prototype

Test

ANALYZE | GOALS

1. Understand nonverbal data teachers are interested in

2. Understand how teachers evaluate their nonverbal performance using comparative benchmarks



The team of research assistants and I coded 19 teacher interview videos and affinity-clustered our insights.

Teachers were resistant to change their nonverbal behaviors unless they could have immediate impact on student learning.

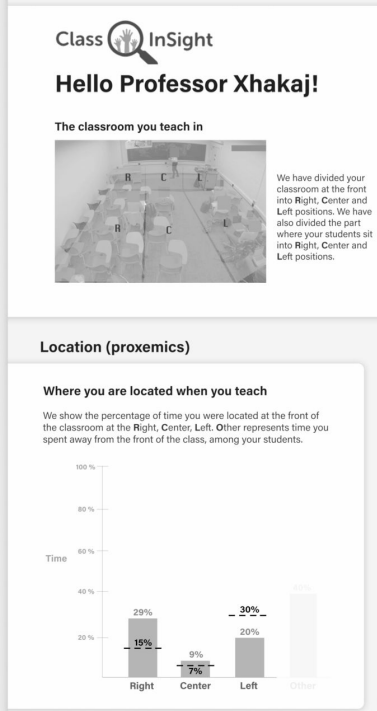
However, teachers did value “attention grabbing” behaviors in their practice and aligned with the immediacy goal of engaging students across the class equally through their gaze and presence.

Some teachers were willing to improve their immediacy behaviors if they fit within their teaching practices or were easy to change.

One teacher cited that she would *not* move more dynamically because it would not create a calm, focused environment.

Other teachers agreed that they could spend less time behind the podium, and this would be easy to address.

ANALYZE | INSIGHTS



Teachers were interested in their data, but reacted negatively to the quantified level of precision.

Some said the benchmarks were unrealistic or unattainable, or showed little interest in bridging an arbitrary gap between percentage points. Many suggested that numbers alone were misleading and needed to be interpreted with additional context — the way they teach or the limitations they face.

Teachers valued the opportunity to reflect on their teaching behaviors through the data.

“What I see as the real strength [of ClassInSight] is helping me think through why I'm doing what I'm doing.”

Find the right levers	Motivation to change varies by teacher.
Test visualizations	Teachers want a less quantified, more “ballpark view” of their performance.
Test flexible benchmarks	Teachers need benchmarks to interpret how they are doing, but would like the opportunity to adjust them based on their own circumstances and goals.
Add personalization	Teachers want to customize their ClassInSight data view based on the metrics most relevant to them.

DESIGN STUDY | GOALS & STRUCTURE

I devised a **three-part protocol** to test these hypotheses for our next phase of research, which would inform the content, architecture, and form of the ClassInSight interface.

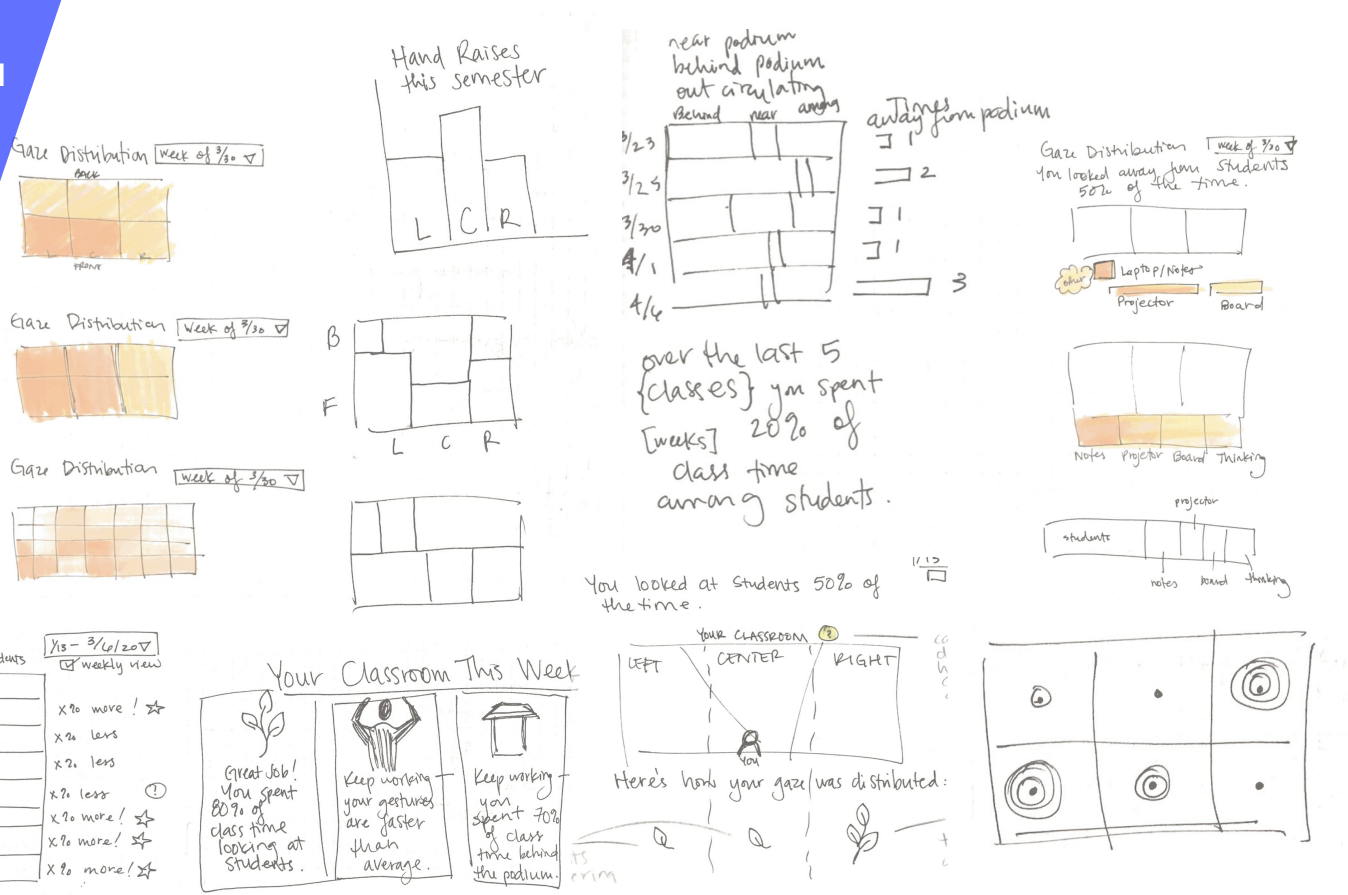
Uncover teachers' mental models of effective behavior in the classroom and motivations to change using structured interviews

Present 5 visualization styles for teacher feedback on data format in user interface

Allow teachers to "build their own dashboard," uncovering the ranked value of various nonverbal behavior data points

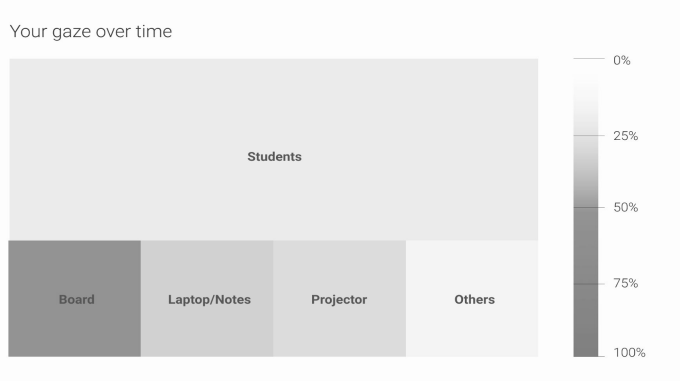
PROTOTYPE | SKETCH

I brainstormed a multitude of data visualization styles to test in Part II.



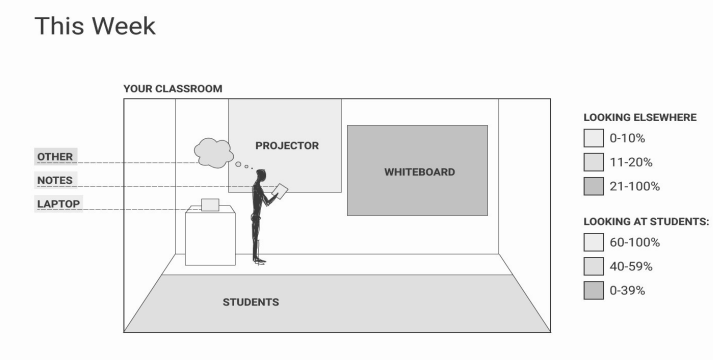
PROTOTYPE | BUILD

The research assistants and I finalized 4 low-fidelity visualizations to test in Part II.



HEATMAP

- Least quantitative
- Loosely maps to classroom layout



CLASS VIEW

- Most quantitative
- Maps to class layout
- Uses benchmarks for target ranges

PROTOTYPE | BUILD

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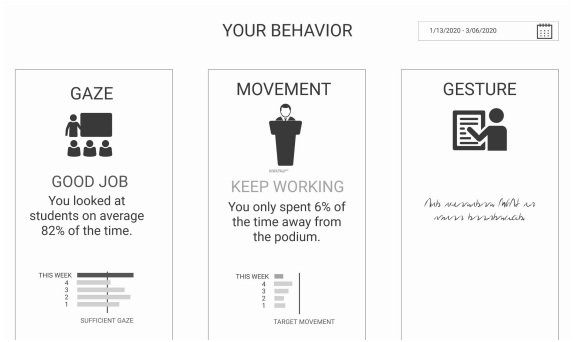

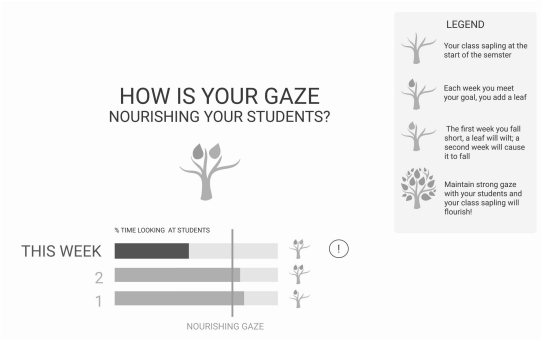

HIGHLIGHTS

- Most verbal
- Includes benchmarks and weekly progress

METAPHOR

- Abstracts progress over time into tree with leaves

TEST

In progress - results available July 2020