

Voice AI for **Step-by-Step** Learning & Doing

CS 147

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Meet the team!



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Domain Selection

How do people learn
and/or practice a skill?

```
graph TD; A("How do people learn and/or practice a skill?") --- B(Cooking); A --- C("Public Speaking, Presenting"); A --- D("Memorization (e.g. notecards)");
```

Cooking

Public Speaking,
Presenting

Memorization (e.g.
notecards)

Needfinding Methodology

Participants:

Why & how they were chosen

Recruitment:

Found via NextDoor, LinkedIn, coffee shops, and chance encounters.

Compensation:

Participants were not financially compensated; they contributed voluntarily, motivated by interest in the project.

Why they were chosen:

We focused on domains where *step-by-step preparation* is critical:

- Presentations
- Public speaking
- Interview prep
- Cooking

Why participants were appropriate:

- College students and professionals bring lived experience in high-stakes preparation
- Cooking is widely relatable and highlights everyday challenges of following structured steps

Meet our interviewees



“Antonio”

*Frequent homecook,
Data Engineer
Mountain View, CA*



“Jessica”

*Amateur cook,
Biomedical Engineer
Fremont, CA*



“Jason”

*Stanford Chef
Palo Alto, CA*



“Claire”

*Masters of Public
Health Grad
Student,
Athlete (track)
Tennessee*

Where were our interviews conducted?



01

Antonio's home in Mnt. View

We interviewed Antonio a frequent home cook and data engineer at his home in Mnt. View



02

Center for Academic Medicine

We interviewed Jessica an amateur cook, and Biomedical Engineer outside the Center for Academic Medicine



03

Athlete Dining

We interviewed Chef Jason the head chef of Stanford Athletic dining inside of Athlete dining.



04

Coffee shop in San Francisco

We interviewed Claire a MPH Grad Student, and track athlete for Tennessee at a coffee shop in San Francisco

“Extreme User”

Chef Jason has to **cook for hundreds of student-athletes** each morning and night and he has to manage his staff, food deliveries, menu creation, dietary restrictions and more. This is a unique job that requires **attention to detail** and **step-by-step learning and instruction**.



Chef Jason

Head chef athlete dining

22 years of work at Stanford

10 years working with athlete dining

We asked them

Can you tell me about the last time you tried a new recipe?
How did it go?

What do you think would make you more confident as a cook?

Tell me about the last time you had to learn something new!

If you've used voice assistants before, in what situations did they help you or frustrate you?

Recall the last presentation you gave. Can you walk me through how you broke your preparation into steps?

What role does cooking play in your life?

Can you tell me about a recent activity where you had to follow a set of steps?

Team member roles for interviews

Antonio

Jasleen S. led the interview while Jasmine A. took notes

Jessica

Jasmine T. led the interview while Mara took notes

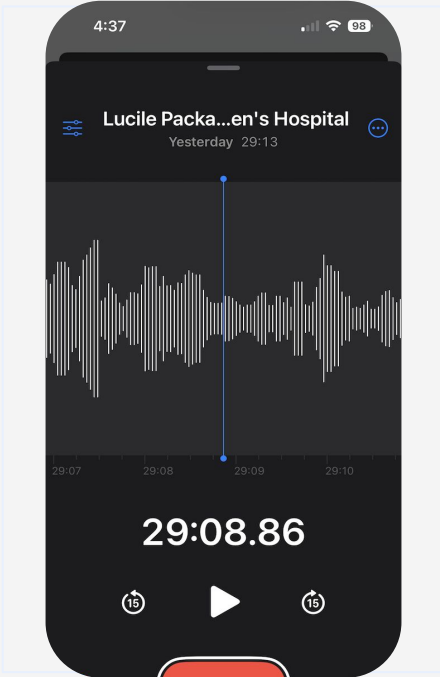
Jason

Jasmine A. led the interview while Jasleen S. took notes

Claire

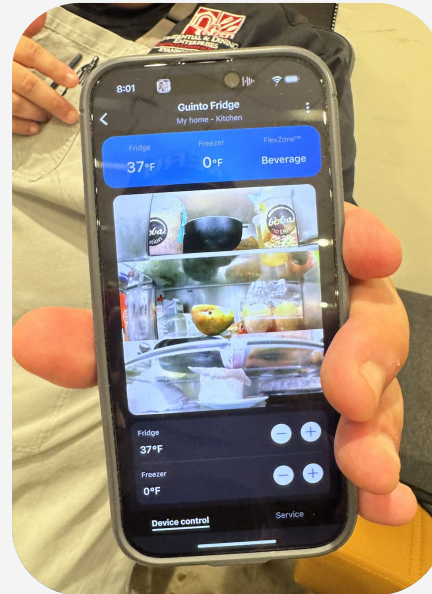
Mara led the interview while Jasmine T. and Jasmine A. took notes

Equipment used



Voice Memo

We utilized voice memo during some interviews so that we were able to pull direct quotes after the fact



iPhone camera

We took photos of important moments in the interviews if interviewees showed us something we wanted to document

Interview Results

Key Quotes & Artifacts

Interview results - **Antonio** - *Pictures and Artifacts*



Quote

“When **cooking with the help of Chat-GPT**, the AI response tells me to add 5 teaspoons of this, 2 tablespoons of that, and I **often lose track of the instructions**”

Surprises

- ❖ He **enjoys the complexity of trying new recipes** despite calling cooking a chore he has to complete
- ❖ He **wants cooking to be faster** (wishes note-taking and timing was easier) but he also invests extra time into prepping ingredients (Speed vs. thoroughness)

Interview results - **Jessica** - Pictures and Artifacts



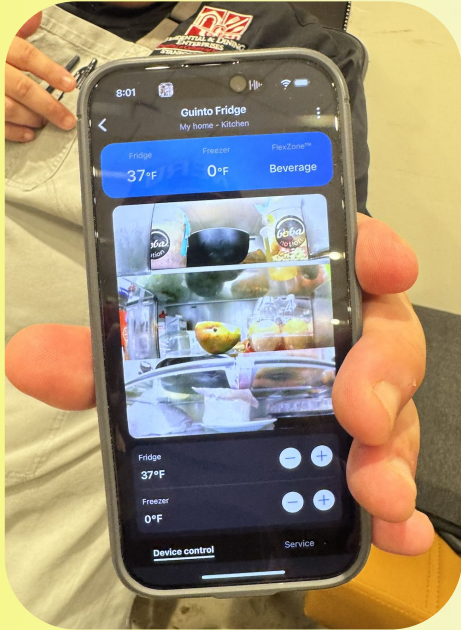
Quote

“I feel like **every time I have followed written instructions when cooking, something goes wrong**”

Surprises

- ❖ Says she **doesn't like to cook but looks for recipes that challenge her cooking/baking skills**
- ❖ She **turns to TikTok for recipes despite finding it time-consuming and inefficient** (convenience vs. clarity of instructions)

Interview results - **Jason** - *Pictures and Artifacts*



Quotes

“Food is tied to our most important moments, from **birth** to **death**.”

“**Technology should** be able to **handle things like ‘150 pans in 30 minutes’**”

Surprises

- ❖ Even after **25 years as a chef**, he still **struggles with basic recipes** like pasta
- ❖ Views **food as deeply tied to life events**, not just nutrition

Interview results - **Claire** - *Pictures and Artifacts*



Quotes

“I want recipes to tell me **how substitutions will change the outcome**”

“When I **prepare for a presentation**, I think about reiteration — **learning from my mistakes**”



Surprises

- ❖ She **embraces mistakes** as necessary for learning and **creates detailed checklists to avoid mistakes**
- ❖ Despite being **extremely structured in schoolwork and interviews**, she **cooks more improvisationally**
- ❖ **Cooking is both a chore and a hobby for her** — she frames it as exhausting but also energizing/creative

Analysis

Empathy Maps & Insights

As the person managing the robot used to operate, technical issues in surgery create high-stakes stress — especially with a child under anesthesia and a team relying on her.

"I feel like every time I have followed written instructions when cooking, something goes wrong"

Looking for a recipe on TikTok is time consuming

She felt excited to have her friends try her cake and give her feedback

Thinks cooking is enjoyable when she is learning in the process

Cooking is not a social activity (other people distract her)

Missing a single small detail can compromise the entire outcome

Repetition feels like detail can compromise the entire outcome

I don't like the repetitiveness of cooking

Likes learning and is curious - "So if I tie that into cooking and baking, it gives me more energy and drive to bake."

I don't see a point in cooking/ baking if I am not learning anything from it

When not following a recipe: "All of my focus has to be on the cooking"

"I want visual instructions so that I can see what they mean when they say beat until ___"

Learning is easier when I can replicate the step I am seeing someone else do

Wants to prove to her friends that she can do really challenging recipes and do them well.

Cooking and work both challenge her to problem-solve creatively.

I need a clearer way to keep track of ingredients and steps.

When improvising: everything can get mixed up, is not sure what step is next

It's annoying to have to re-watch the intro of the TikToks

I want to do things correctly the first time — mistakes in my work environment have real consequences

Cooking should bring greater value to someone's life - it is not just about making a meal/eating

There should be a faster, more straightforward way to get recipes.

I have to solve problems at work immediately

If I can see the texture or consistency, I can better judge timing and avoid mistakes

SAYS

Observations: What did this person SAY that surprised you?

THINKS

Inferences: Based on what they SAY and DO, what might they be THINKING?

DOES

Observations: What did this person DO that surprised you?

FEELS

Inferences: Based on what they SAY and DO, what might they be FEELING?



"Jessica"

Chooses to cook recipes that challenge her

When following written instructions, she confused baking powder for baking soda

Filter recipes on a website for what she is looking for (eg servings)

Tries to recreate dishes with vegetarian alternatives - often with no recipe

When following a TikTok recipe she has to re-watch the video many times while cooking

Does not let other people in the kitchen when she is improvising (not following a recipe)

Cooks/bakes when she WANTS to, not when she HAS to

After work, she does not cook and usually eats out

Feels overwhelmed when steps are not written out for when cooking

Relieved to avoid the stress and effort of cooking after a long shift.

Feels satisfaction when she figures out troubleshooting on her own

Feels motivated when learning connects to curiosity and growth.

Seeks vegetarian substitutions and experiments without written guidance

Troubleshoots encryption/ transfer issues under surgical time pressure

Frustrated at making a mistake over something small (mixing baking soda and powder)

Cooking feels like a routine task without much variety

Frustrated by the ambiguity of purely verbal instructions

Feels stressed if jargon or vague instructions create confusion

Feels anxious when juggling multiple instructions at once

“I don’t like the repetitiveness of cooking”

“I don’t see a point in cooking/baking if i am not learning anything from it”

Thinks cooking is enjoyable when she is learning in the process

Cooking should bring greater value to someone’s life - it is not just about making a meal/eating

SAYS

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Contradiction

Chooses to cook recipes that challenge her

Feels motivated when learning connects to curiosity and growth.



Insights

- ❖ She finds everyday cooking repetitive, but experiences satisfaction and engagement when it allows her to learn and develop new skills.
- ❖ Finds pride in proving to her friends that she can cook and bake really challenging recipes.
- ❖ She feels stressed and distracted when cooking with others, so she prefers to focus alone to maintain control and accuracy.
- ❖ She learns best when she can **see or replicate each step**, and feels overwhelmed when instructions are unclear or incomplete.

Needs

- ★ Engaging cooking experiences that teach her something new and satisfy her curiosity.
- ★ She believes achieving mastery in cooking will make her to feel confident and recognized.
- ★ Needs to concentrate fully on the cooking process without interruptions in order to feel confident and avoid mistakes.
- ★ To successfully complete a recipe without confusion she wants observable, clear steps to follow

Has to keep mind of food restrictions when cooking
Mara B.

"You cannot teach greatness."
Jason K. Shultz

Confidence for chefs is how they flow in the kitchen.
Jason K. Shultz

"Food is personal, food is life and death."
Jason K. Shultz

"Technology should be able to handle things like 150 pans in 30 minutes."
Jason K. Shultz

"I've been a chef for 25 years but I hate cooking, science, and mathematics."
Jason K. Shultz

"Communication breaks down most often."
Jason K. Shultz

"Take the time to taste, spend time to understand flavor profiles."
Jason K. Shultz

"Hell yeah" when asked about mistakes happening.
Jason K. Shultz

"Give me 30 pounds of this recipe that feeds X people."
Jason K. Shultz

"Making an omelette is the test to see if they are precise."
Jason K. Shultz

Recipes need to be simple enough that anyone can follow them.
Jason K. Shultz

Cultural recipes and classical techniques are hard for cooks to memorize.
Jason K. Shultz

Step-by-step reminders could free up my mental load
Jason K. Shultz

Food is personal, food is life and death. When people die, people get together over food, when someone is born people get together over food
Jason K. Shultz

AI could reduce mistakes by helping with reminders and translations.
Jason K. Shultz

Consistency matters more than complexity.
Jason K. Shultz

Technology should support, not slow down, the flow.
Jason K. Shultz

Visual presentation is just as critical as flavor
Jason K. Shultz

Good cooking is about patience and understanding flavors.
Jason K. Shultz

Simple tools and clear instructions prevent mistakes under pressure
Jason K. Shultz

Chefs need reminders to stay on top of timing.
Jason K. Shultz

SAYS

Observations: What did this person SAY that surprised you?

THINKS

Inferences: Based on what they SAY and DO, what might they be THINKING?



"Jason"

DOES

Observations: What did this person DO that surprised you?

Eyeballed pasta measurements and ended up with mushy pasta.
Jason K. Shultz

Tastes dishes with a range of staff (dishwashers to chefs) for feedback
Jason K. Shultz

Uses smart fridge at home with Alexa for recipe suggestions
Jason K. Shultz

Runs tasting sessions with staff at the start of each shift to ensure consistency.
Jason K. Shultz

Dissects dishes to find exact reason if not good
Jason K. Shultz

Builds menus around culture, popularity, and cost
Jason K. Shultz

Makes huge batches (one recipe feeds 100)
Jason K. Shultz

Adapts menu for fan favorites like Taco Tuesday
Jason K. Shultz

Meets with storekeeper daily to track inventory and seasonality
Jason K. Shultz

Prioritizes plating and presentation as part of quality control
Jason K. Shultz

Breaks down recipes into precise steps and quantities so anyone can follow
Jason K. Shultz

Used pictures to defend against allergy incident blame.
Jason K. Shultz

FEELS

Inferences: Based on what they SAY and DO, what might they be FEELING?

Frustrated when cooks don't take time to learn flavors
Jason K. Shultz

Responsible for the athletes' safety (allergies)
Jason K. Shultz

Pressured to balance cost, culture, and taste.
Jason K. Shultz

Stressed when communication breaks down
Jason K. Shultz

Proud of making dining feel like an extended family.
Jason K. Shultz

Relieved when technology like Alexa helps at home
Jason K. Shultz

Disappointed when dishes don't turn out (like mushy pasta)
Jason K. Shultz

Calm and composed during hectic service, but it takes effort
Jason K. Shultz

Motivated to innovate while keeping tradition alive.
Jason K. Shultz

Protective of his team and their learning process
Jason K. Shultz



“Communication breaks down most often.”

“I’ve been a chef for 25 years but I hate cooking, science, and mathematics.”

Simple tools and clear instructions prevent mistakes under pressure

Consistency matters more than complexity.



SAYS

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FEELS

Inferences: Based on what they SAY and DO, what might they be FEELING?

Tastes dishes with a range of staff (dishwashers to chefs) for feedback

Builds menus around culture, popularity, and cost

Feels motivated to innovate while keeping tradition alive.



Insights

- ❖ Cooking at scale requires balancing precision with cultural and personal meaning.
- ❖ Communication failures, not lack of skill, cause the biggest breakdowns in kitchens.
- ❖ Confidence for chefs comes from flow and timing, not just recipes.
- ❖ Technology that supports reminders and translation could reduce errors without replacing human judgment.

Needs

- ★ Stay on track with timing, temperature, and plating.
- ★ Scale recipes accurately and quickly for large groups.
- ★ Train staff effectively with step-by-step guidance.
- ★ Understand and communicate culinary terms clearly.
- ★ Avoid miscommunication and maintain consistency under pressure.

Summary

Key Learnings

Contradictions

Chore vs. Passion: Antonio and Jessica sometimes see cooking as a chore or frustrating, while Jason and Claire tie it to pride, confidence, or recharging.

Precision vs. Improvisation: Jason preaches precision yet eyeballs pasta, Antonio preps carefully but forgets steps, Jessica experiments without recipes but gets anxious when instructions aren't clear.

Food as Personal vs. Functional: Jason says food brings people together in life and death, while Claire and Antonio often approach it as efficiency, planning, or fueling health and performance.

Tensions

Chef Jason wants food to feel personal and cultural, but also has to manage cost, scale, and efficiency.

Jessica finds cooking repetitive and uninteresting, yet insists it requires her full focus and no multitasking.

Antonio wants cooking to be faster and easier, but invests extra time in prepping ingredients.

Claire values improvisation when cooking, but relies on strict structure and checklists in other parts of her life.

Surprises

A professional chef with 25 years of experience still struggles with simple dishes like pasta.

Jessica says she doesn't like cooking, yet deliberately chooses recipes that challenge her.

Antonio calls cooking a chore but enjoys the complexity of trying new recipes.

Claire embraces mistakes as essential for learning, yet also makes highly detailed checklists to avoid them.

Looking Ahead:

A2 POV, HMW, Experience
Prototypes

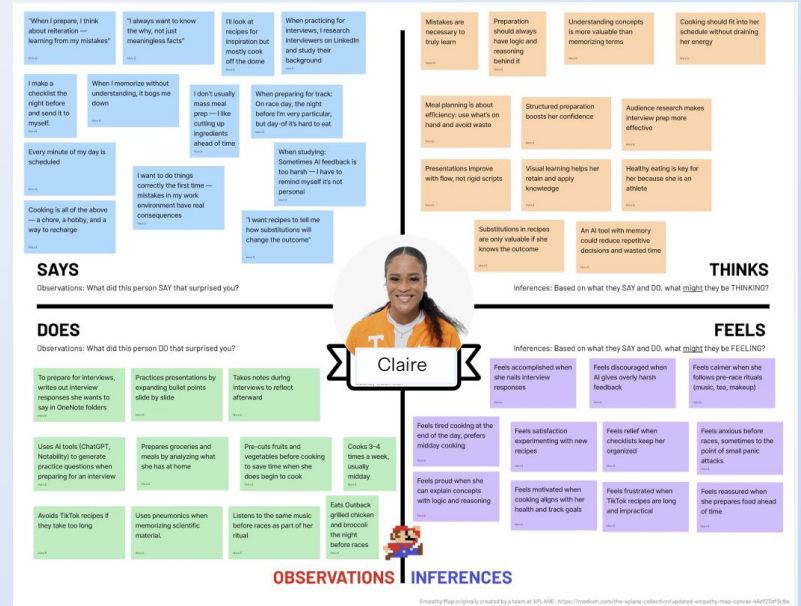
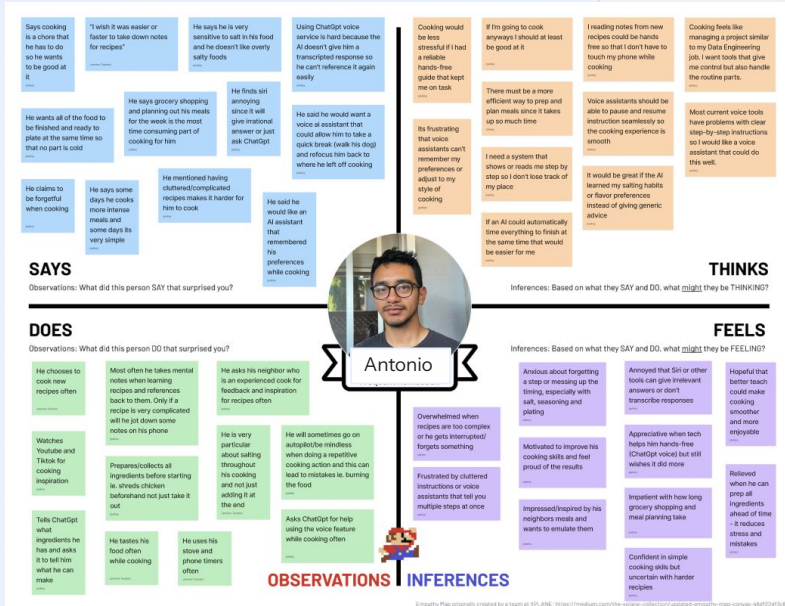
- Refine interview takeaways into clear POV statements.
 - Translate insights into actionable user needs.
- Narrow scope to **one** domain (cooking)
 - Conduct additional interviews within this domain.
 - Uncover deeper needs around step-by-step learning in cooking.

Thank you!!



Appendix

Other empathy maps:



Appendix

Interview guide Antonio:

Intro: Tell me about the last time you tried a new recipe. How did it go? What role does cooking play in your life — chore, hobby, tradition? Can you tell me about a recent activity where you had to follow a set of steps?

Process & Behaviors: Walk me through how you follow a recipe step by step. What do you do if you get confused, distracted, or pulled away? When your hands are messy or full, how do you keep track of what's next? (recipe cards, memory, YouTube, asking a partner, etc.) How often do you cook for your family during the week? What feels hardest or most frustrating about following recipes while also managing kids? Have you ever lost your place, made a mistake, or had to stop mid-recipe? What caused it — interruptions, multitasking, noise? How do you balance speed, accuracy, and safety when kids are around?

Tools & Support: What tools (timers, phones, apps, YouTube, voice assistants) do you use while cooking? What works well when you're also managing kids, and what doesn't? Have you ever used voice assistants in the kitchen? Did they help, or make things more difficult?

Voice Agent Probes: Imagine a voice agent guiding you step-by-step. How would you want it to handle interruptions (pausing, repeating, catching you up)? Would reminders or encouragement (“check on the oven now”) help you stay on track, or just add noise? If you had to leave the kitchen for a moment, what would be the most useful way for the agent to help you resume? How should it handle misunderstandings — repeat instructions, slow down, or adjust for your pace? Think back to a stressful cooking moment when kids needed attention — how could a voice agent have reduced that stress?

Technology & Voice AI: Have you used Alexa, Siri, or Google Assistant while cooking with kids around? What worked, what failed? If you could design the “perfect helper” voice guide for cooking with children in the background, what would it need to do differently from what's out there now?

Extreme User Probes (tailored to parents): What's it like juggling kids and cooking at the same time? What usually breaks down? Do you ever adjust recipes for picky eaters, allergies, or speed? How do you make those decisions in the moment? If you had a second pair of hands (real or digital), what would you delegate first?

Appendix

Interview guide Jessica:

Intro: Thank you for making time to meet with us. If at any point during the interview you need a break please just let us know. To start off we would like to learn a bit more about you. What do you do for work? Degree: Where do you live (city/neighborhood) and do you live alone or with roommates or family?, lives in fremont robot for neurosurgery, works for company that uses the robot. What does a typical day look like for you?

General Step by Step Learning: Can you recall the last time you performed a routine procedure relevant to your role? Walk me through every step you took from preparation to completion. Probes: What did you check first? How did you verify readiness? Were there any deviations from the standard sequence? Why did you deviate? How did you feel during those steps? How do you decide what to do first/what to do next? What do you find hardest or most frustrating about following step-by-step instructions? Tell me about the last time you had to learn something new at work (a new device, software, or clinical protocol). How did you approach learning it, step by step? When your hands are full or you're focused on the task, how do you deal with needing more information? Describe a recent emergency or urgent situation where you had to follow a protocol under pressure. Tell me about the last time you taught a junior colleague a procedure. How did you break the task down into teachable steps? If you've used voice assistants before, in what situations did they help you or frustrate you? Imagine a voice agent could guide you step-by-step. What would you want it to do (or not do)? Would reminders, corrections, or encouragement be helpful while you're working? Why or why not? Can you recall a time when having this kind of support could have saved you time, reduced stress, or improved results?

Cooking: TRANSITION: I am curious about how following steps while cooking is for you. Do you ever cook after a long hospital shift? What's that like? How often do you cook or bake, and what kinds of things do you like to make How do you usually feel while cooking? What role does cooking play in your life — chore, hobby, tradition? Can you tell me about the last time you tried a new recipe? How did it go?

Process & Behaviors: Walk me through how you follow a recipe step by step. What do you do if you get confused or distracted? When your hands are busy or messy, how do you keep track of the recipe? (cards, YouTube, memory, notes, etc.) What do you find hardest or most frustrating about following recipes? Have you ever lost your place, made a mistake, or had to stop to look something up? How did that affect you?

Tools & Support: Do you currently use any tools (apps, timers, YouTube, TikTok, assistants like Alexa/Siri) when cooking? Have you used Alexa, Siri, or Google Assistant for cooking? If yes: what worked and what failed? If no: why not? If you could design the “perfect cooking helper,” what would it sound like? How would it interact with you? Can you recall a time when having a voice agent to support you could have saved you time, reduced stress, or improved your results?

Probing Amateurs: What do you think would make you more confident as a cook?

Presentation - if time allowed: Tell me about the last presentation or speech you gave. How did you prepare for it? Can you walk me through how you broke your preparation into steps (research, outlining, rehearsing, etc.)? How do you usually practice your delivery? (e.g., speaking out loud, memorizing, using notes/slides). Can you share a time when you forgot a key point or lost your place during a presentation? How did you handle it? What kinds of tools, aids, or cues do you rely on when preparing or presenting (notecards, slides, outlines, memory tricks)? Have you ever had to adapt mid-presentation (audience reaction, tech failure, unexpected question)? What did that feel like? Think back to a time when presenting felt smooth and confident — what made that experience work so well?

Appendix

Interview guide Jason:

Intro: Tell me about the last time you tried a new recipe. How did it go? What role does cooking play in your life? I think before I've seen a quote where you want to help the people dining with you feel at home, how does that manifest in the recipes or food you cook?

Process & Behaviors: Walk me through how you approach a recipe in a professional setting — do you rely on it, adapt it, or go by memory/technique? How do you ensure consistency when you or your team are making the same dish multiple times a night? When things get hectic in service, how do you keep yourself (and others) organized? What's most frustrating about following or giving step-by-step instructions in a kitchen? Have you ever had a situation where losing your place or miscommunicating steps caused issues in a service? What happened?

Tools & Support: What tools (ticket systems, timers, prep sheets, checklists, plating guides) do you use to manage flow? Do you use digital tools or apps in your work? What helps, what slows things down?

Technology & Voice AI: Have you ever used Alexa, Siri, or Google Assistant for cooking — at work or home?

Extreme User Probes (tailored to chefs): What breaks down most often in a professional kitchen: communication, timing, multitasking, or something else? How do you train apprentices or junior cooks to follow recipes and processes — where do they struggle? If you had a voice agent that could free you up from one repetitive task or mental load, what would you offload first?

Appendix

Interview guide Claire:

Intro: Thanks again for meeting with us! We're excited to learn from your perspective. We're exploring how people prepare for things that require structured, step-by-step practice. We're not testing or pitching anything today — we just want to understand your experiences and perspectives. Everything you share will help us think about challenges and opportunities in this space. There are no right or wrong answers

Background: Can you tell us a bit about how preparation shows up in your life — whether that's for work, hobbies, or personal interests? You've worked across Bloomberg and Altruist, and you've studied HCI at Stanford. In those contexts, what kinds of things have you had to prepare for carefully? Outside of work — like racing, yoga, snowboarding, golf — do you approach preparation differently? What does 'practice' mean for you in those areas?

Exploring your Methodology for Step-by-Step Preparation: Think of a time you had to prepare for something high-stakes (e.g., a presentation, interview, technical challenge). Can you walk us through how you went about it, step by step? What worked well for you in that process? Where did you feel friction? When you're practicing and you get stuck, what do you usually do? How do you balance memorization vs. flexibility — like knowing the exact words vs. knowing the structure? Have you noticed any gaps in tools or resources you use when preparing? Have you ever noticed differences in how you prepare for technical vs. non-technical challenges? What stands out to you in those comparisons? If someone shadowed you during a week of your life, where might they be surprised to see that you actually prepare step by step? Are there any strategies/hacks that you have found yourself doing to prepare?

Wrap-Up: Is there anything in your life that you find yourself preparing for through some structured process that we have not asked about? Has our conversation sparked any advice or ideas that you want to share with us?