

# AutoWhisk

## *Matcha Made Easy*

IEOR 170: Food (Group 19)  
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# Meet the Team



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# Executive Summary

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Summary

A large, light blue ceramic cup filled with a dark green matcha latte. The surface of the latte features a white, stylized leaf-shaped latte art design. The cup sits on a matching light blue saucer. The background is a soft yellow with faint, sketchy line art of tea leaves and branches. A large, dark green abstract shape is in the top right corner. A small, light brown circular badge with the number '01' is positioned above the cup. Several small, detailed illustrations of matcha preparation, including a tea caddy and a whisk, are scattered around the cup.

01

# Challenge Overview

# Design Challenge Overview:


**Problem:** Musculoskeletal disorders from repetitive wrist exertion in matcha whisking

**Target Demographic:** Baristas and frequent at-home users

**Impact:**

- Tendonitis, Carpal Tunnel Syndrome, etc.
- **47%** of baristas reported **repetitive stress injuries** linked to **repetitive drink preparation** (Koszdin, "Are Baristas At Higher Risk Of Repetitive Stress Injuries?", February 2020.)

**Solution:** Redesign the hand-whisking portion of the matcha-making process!

The image features a central illustration of a light blue ceramic cup filled with green matcha, topped with a white latte art design of a stylized plant. The cup sits on a matching saucer. To the right of the cup is a light brown circle containing the number '02' in a dark green serif font. The background is a pale yellow, decorated with faint, sketchy line art of tea leaves and small cups. A large, dark green abstract shape with wavy edges is positioned in the upper right corner. In the bottom right corner, there is more faint line art of tea leaves and a small cup. The overall style is clean and modern, with a focus on tea and abstract design.

02

Abstraction



## Assumptions:

- 1) Users usually apply **moderate force** in an **up-and-down** (M-shaped) motion rather than circular stirring.
- 2) The bowl will be used primarily in a café setting, where **time effectiveness** and **reducing strain** on the barista is crucial due to repetitive and constant movements.
- 3) Due to the café setting, the workspace may be limited, so a **compact yet stable design** would be best for storage and accessibility.

## Constraints:

- 1) The bowl must be **lightweight** yet **durable** to ensure it is easy to move around and can last a long time.
- 2) The whisking mechanism must function **without requiring additional sources of force** (excluding a button push or slight external adjustment).
- 3) The design should be **intuitive to users** who may have **varying levels of experience** with traditional matcha preparation.

## Functional Requirements

- 1) Must deliver a smooth, continuous up-and-down (M-shaped) whisking motion that **mimics traditional hand-whisking**, operating without requiring any manual stirring once activated.
- 2) It should also allow users to **select between different whisking intensities and timing** to suit personal preferences, offering greater flexibility in achieving the desired matcha texture.

## Success Criteria:

- 1) **Compare** users' reported **levels of wrist and hand discomfort** after preparing matcha using our product vs a traditional matcha bowl.
- 2) Measure/compare the **average amount of time** it takes users to fully prepare a serving of matcha using the automated system versus traditional hand-whisking.
- 3) Analyze % **and reasons behind user preference** — such as ease of use, consistency, comfort, or final matcha quality.

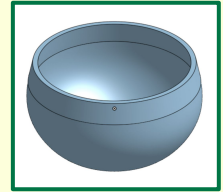
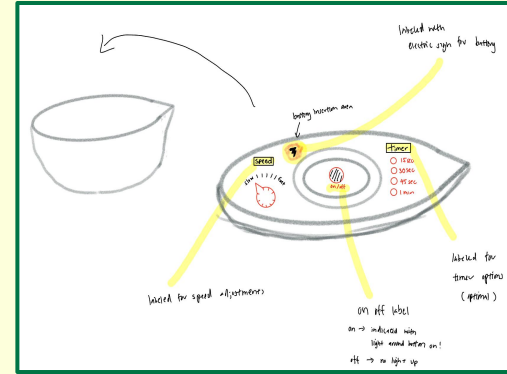
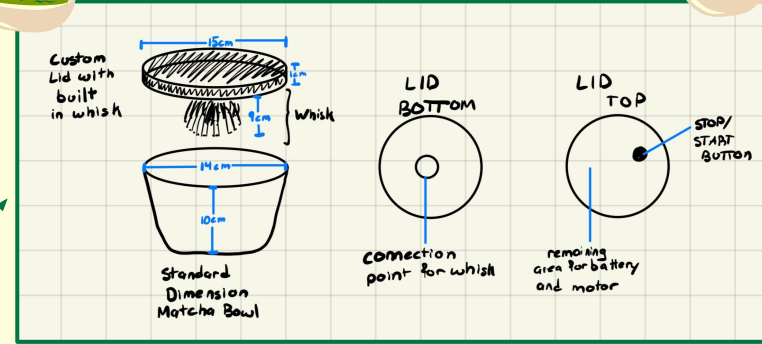
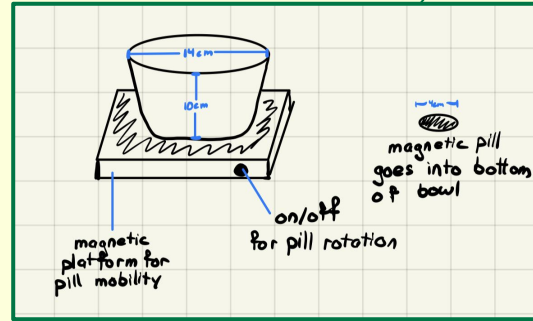
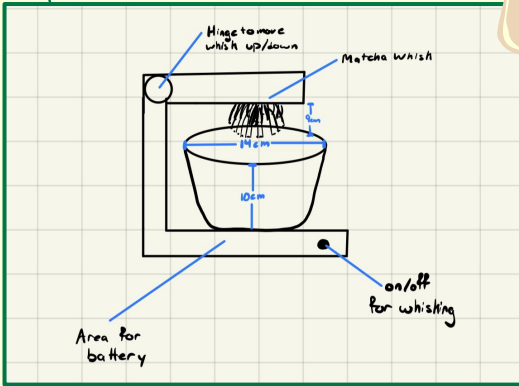


The image features a central illustration of a light blue cup filled with green matcha, topped with white foam in a heart-shaped latte art design. The cup sits on a matching saucer. To the right, a large, dark green wavy shape is partially visible. The background is a light cream color, decorated with faint, sketchy line art of tea leaves and branches. Several small, detailed illustrations of tea-related items are scattered around: a small green cup, a tea caddy, and a tea strainer are in the upper left; a small green cup, a tea caddy, and a tea strainer are in the lower left; and a small green cup, a tea caddy, and a tea strainer are in the lower right. A large, light brown circle containing the number '03' is positioned above the cup.

03

# Conceptualization

# Iterative Design Process



Concept 1 —> Concept 2 —> Concept 3 —> Final Design

Mechanical Whisker (Mixer)      Magnetic Stirrer      Whisking Lid      Complete Whisk Lid Design



04

# Realization

# Usability & Testing



## Learnability & Memorability

- ❑ Simple, intuitive parts
  - ❑ Easy & consistent assembly
- ❑ Easy to remember
- ❑ Clear affordances as guide
- ❑ Minimal need for recall

## Error Reduction

- ❑ Simplified assembly and operation (Design Out Failure)
- ❑ Lid made to fit bowl one way
- ❑ Simple on/off button
- ❑ Whisk fixed to lid
- ❑ Controlled M motion prevents spills/splashes
- ❑ Clear, visual instructions with logical task flow

## Evaluation Plan

- ❑ **Usability Tests:** Conduct tests with 3-5 diverse users to gather feedback on usability
  - ❑ Metrics: Track task completion time, error rates, and comfort ratings to assess effectiveness
- ❑ **Heuristic Evaluation** to identify issues with visibility, error prevention, and consistency in the prototype
- ❑ **Qualitative Feedback:** Collect user feedback through open-ended surveys to identify pain points and areas for improvement



05

# Summary

Our matcha bowl automates the whisking process, significantly reducing repetitive wrist exertion and improving user comfort, speed, and ease of use.



## Wrist Discomfort

Expected to lower reported wrist and hand discomfort compared to traditional whisking.



## User Preference

Users expected to prefer the automated bowl for increased efficiency and ease of use.



## Preparation Time

Expected to reduce the average time needed to prepare matcha.

### MATCHA-WHISKING BOWL INSTRUCTION SHEET

#### 1) BOX CONTENTS

- 1 Ceramic Mixing Bowl
- 2 Removable Whisking Lid  
Here is where you will be attaching your whisk!
- 3 Batteries  
As our lid is battery-powered, we have provided 2 Duracell AA batteries for power.
- 4 Instructions Manual  
This is what you are reading right now!

#### 2) SET-UP

- 1 Insert the Batteries  
On the top of the lid, you will see a small rectangular area with an electric sign on it. Prop it open and insert the two batteries in.
- 2 Assemble the Lid  
Snap your whisk into the socket located on the underside of the lid. Twist gently until it clicks into place.
- 3 Attach the Lid  
Place the lid on top of the bowl. Twist to lock. You should feel a soft click.

#### 3) OPERATING GUIDE

- 1 Power Button ON  
The power button at the center of the top of the lid controls the whisking mechanism. Turn the power ON before adjusting any other setting. When ON, the button should be lit up.
- 2 Speed Knob  
A knob on top of the lid lets you adjust the whisking speed at any point, with a range of settings to create your ideal foam level.
- 3 Timer Buttons  
Timer buttons on the lid provide four preset options. Simply press the button that matches your preferred whisking duration. If no timer is selected, the whisking mechanism will continue running until the power button is switched to OFF.
- 4 Power Button OFF  
When you're done whisking, turn the power OFF. Then, remove the lid and pour your matcha into your favorite cup!

#### 4) CLEANING GUIDE

- 1 Remove Whisk  
Detach lid from the bowl and remove whisk.
- 2 Wash Parts  
Hand wash the bowl and whisk with warm, soapy water. Do NOT submerge or rinse the lid; this may damage electronic components. If necessary, wipe down the lid with a damp cloth.
- 3 Drying  
Thoroughly dry the bowl and whisk, and wipe the lid dry before reassembling or storing.



The background is a light cream color with faint, stylized line drawings of tea leaves and branches. On the left and right sides, there are large, dark green abstract shapes. A central white rectangular box with a thin green border contains the text "THANK YOU!". Several green leaves are scattered around the box: one at the top center, one at the bottom center, one in the top left, and one in the bottom right. In the bottom right corner, there are three small, light brown teacups filled with green tea, and a small bowl of green tea leaves in the bottom left corner.

THANK YOU!