TasteBud | mobile app enhancing your restaurant experience

Team

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Problem & Solution

The problem we first identified was the mismatch between the expectation and reality of dining experience, as there was limited information that customers can find regarding the dishes just from the menu. Through the design research, we identified other problems in the dining experience as well, most notably the need of research participants to have a more efficient, convenient food ordering process. Thus, our design, through a mobile app, attempts to provide more intuitive and helpful information about the menu as well as make the process of choosing, ordering, and waiting for dishes more efficient and convenient.

Research Goals, Stakeholders & Participants

Our design aims to address the problems in consumers' dining experiences, specifically regarding menu and food choices, as we thought the available information in the status quo is insufficient. For example, a menu without any pictures does little to convey the actual dish to customers. Neither is the price indicative of the portion. Also, some restaurants have limited/unhelpful information online. Thus, the goal of our research was to scrutinize the process of ordering food in restaurants, and identify the problems as well as ideas for the design.

In order to fully understand the various situations and interests involved in restaurant finding and dining experience, we identified two main stakeholders - general consumers and travelers, though we also included restaurant owners and chefs as indirect, broader scope of stakeholders. For our research, however, we decided to focus on our main stakeholder group, general restaurant consumers, who could provide information about how people find and evaluate restaurants.

In our design research, we used two main methods.

1) Contextual inquiry: The participant went into the restaurant and looked at the menu, and then chose the dish while we observed and questioned. The process was videotaped under the participant's consent.

2) Interview: After the meal, the interviewer asked the participant to rate the food they had, and asked some questions about the difficulties they had when looking at the menu and whether the information they wanted was available.

Research Results & Themes

Through the design research, we were able to understand how people choose their dishes in restaurants, how they behave when looking at the menu, and the important factors that they consider when making the choice. Providing more visual information and reflecting the specific needs of the different consumers will be at the center of our design.

We were able to find common themes from our research:

- Tendency to look at the special menu first.
    - Most of the restaurants had either a different menu or a section on the menu with special offers like lunch specials, and participants tend to look at this before looking at the main menu.
- Difficulties with the names of dishes, especially when in a different language
    - Participants reported that it was difficult to know what the dish is by its name, especially when the name was basically in a different language but just written in English
- Hard to get information about how salty/sweet/spicy a certain dish is
    - Participants were unable to tell how salty or sweet a certain dish is just by looking at the menu.
    - Even when the restaurant provides level of spiciness in the menu, participants have little idea of what level of spiciness they could handle.
- Tendency to base their choices on past experiences
    - Participants, when looking at unfamiliar dishes, often compared with their past experiences of trying a similar dish or other dish with similar ingredients.
- Pictures help a lot, but there is not enough of them
    - Because menu is long, participants tend to skim through it by looking at the pictures. Also when making the decision, picture of the dish was an important influence on whether he/she would choose it or not. Participants also stated that there were not enough pictures of dishes on the menu. Also, when the picture was present, participants seemed to be more willing to take risks (i.e. trying out new dishes).
- Difficulty in estimating the portion of the dish
    - Participants also faced difficulties when trying to estimate the portion of the dish. Some were concerned about whether it would be worth the cost while others were worried about whether it would simply be too much or little, and the menu did not provide enough information about the dish.
- Budget matters, even when looking at the menu
    - Participants seemed to have a budget in mind when deciding what to eat, and would skim through the ones that were over the appropriate price range. Also, a person's willingness to try new dishes was influenced by his/her budget.
- The process of ordering is inefficient, especially when the restaurant is busy

    - When the restaurant is busy, participants find it difficult to call a waiter when they need it. The process of ordering food is prolonged especially when the participants need to call the waiter multiple times asking questions before they finalize the order.
- Unfamiliarity with table manners, dining etiquette and traditions
    - Sometimes our participants are unfamiliar with the dining etiquette or doesn't know the proper way to eat a certain dish. In addition, they may be hesitant or unable to ask a waiter for reasons such as that a waiter isn't available.

Task Analysis

1) Who is going to use the design?

   All restaurant customers could use our design, especially those who find traditional menus ineffective or inefficient in providing the information they need to make a decision when ordering at a restaurant.
2) What tasks do they now perform?

   People look at the menu and check the ingredients, pictures, and names to collect information about the various dishes. People usually refer to past, similar experiences when they make the choice. Asking the waiter for more information or recommendations or searching online are available options, yet people tend to make the decision by just looking at the menu.
3) What tasks are desired?

   People want to receive more information regarding the dishes, some of them include pictures, information about spiciness/saltiness/sweetness, better translation of foreign language-based names of dishes, etc., but in a convenient way, without having to directly ask the waiter or search online.
4) How are the tasks learned?

   Tasks tend to be learned by the users themselves by interacting with the given menu, but the tasks can also be learned by the waiter/waitress.
5) Where are the tasks performed?

   Tasks are generally performed in restaurants. But it could also extend to places such as homes and offices where people order food for delivery or pickup.
6) What other tools does the person have?

   Physical menus, menu boards, crowd-sourced reviewing platforms such as Yelp, and recommendations from other people, including friends and restaurant staff.
7) How do people communicate with each other?

   If dining in a group, people can discuss with their group verbally, and by pointing out texts and pictures (either in a physical menu or in a digital display) to other people.

   People can call a restaurant staff either verbally, with gestures, or through a digital system (e.g. with a push of a button similar to the one on airplanes).

   People can ask questions verbally with staff. People can order food by either talking to a staff, writing down items to order on a piece of paper, or through a digital ordering system.

8) How often are the tasks performed?

   The task is performed every time a person orders food from a restaurant (including dine-in, take-out, and delivery).

9) What are the time constraints on the tasks?

   Depending on the type of restaurant, people may spend less than a minute (in a fast service restaurant) or 5 to 10 minutes (in a sit-down restaurant) to order food. After ordering, people may spend 10 minutes upto a few hours in a restaurant.

10) What happens when things go wrong?

   If the system failed to provide necessary information, users may make suboptimal decisions when ordering food, which leads to suboptimal dining experiences.

   If the system provides incorrect or misleading information, users may be surprised or annoyed by the unexpected dishes.

   If the system is inefficient in providing the information that the user need, then the process of ordering becomes longer for customers, and the restaurant operation may be less efficient.

Product Design Sketches

From our design research, we were able to come up with three initial designs.

Design 1: Interactive display projected onto tables

Our first design was a tabletop interactive display that consists of a gesture-tracking tabletop projector (e.g. Sony Xperia Touch) and a bright-colored tabletop (to function as a dining table as well as a proper display). The projector would project an interface onto the table, and users can interact with it using touch gestures like any other touch interface.

With this design, task 1 could be performed (Ordering food directly and checking with the progress of the food being prepared without waiting for a waiter to come up to the table) (Figure 1a). The menu interface can be projected onto the tabletop which allows users to order directly from the table, and the users could track the status of their order by interacting with the menu. Task 2 could also performed (Visualize dishes and their size and portion) (Figure 1b), as a picture of the dish can be projected onto the tabletop with calibrated scale, to show the actual size to the users. Task 4 (Provide an overview of ordered food and make suggestions based on what was ordered) (Figure 1c) could also be done through this design. A summary consisting of dishes ordered, total cost, and other information such as nutrient info can be projected onto the tabletop, which allows users to keep track of their budget and diet goals. Also, a recommendation system can be integrated here to make automatic suggestions to users. Lastly, task 5 (Allow people to understand the menu regardless of the language they speak) (Figure 1a and Figure 1b) can be done. The whole system can display a wide variety of languages, with easy to understand icons that allows users to navigate even if they don't understand the language. Pictures will also help users decide what to order even without text descriptions.

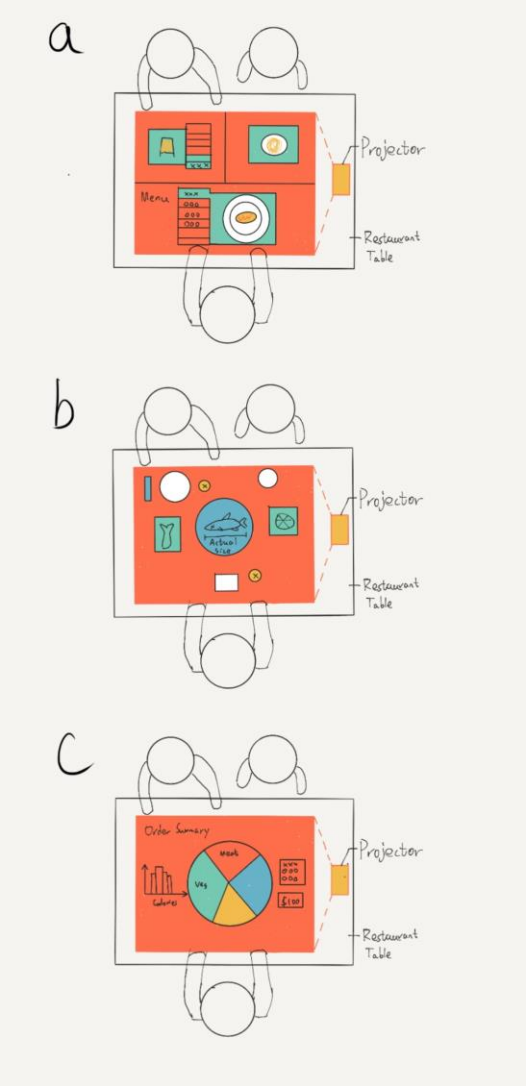

Figure 1. Design Sketch: Interactive display projected onto tables

Design 2 - Mobile Application

The second design is a mobile app that aims to improve the restaurant experience for the customer. The app provides an inventory of all the food that the customer ordered. It also tracks the progress of the food, updating the customer when a dish has reached the next stage of completion. To give the customer a better sense of the taste of the dish, it also provides comprehensive user-generated statistics about how the food tastes (sweet, salty, sour, etc.). Finally, it provides suggestions for other restaurants that the customer may like, based on the restaurant that he or she is currently at. This design is targeted to users who are interested in having these features in their pocket, essentially available to them at every restaurant they visit.

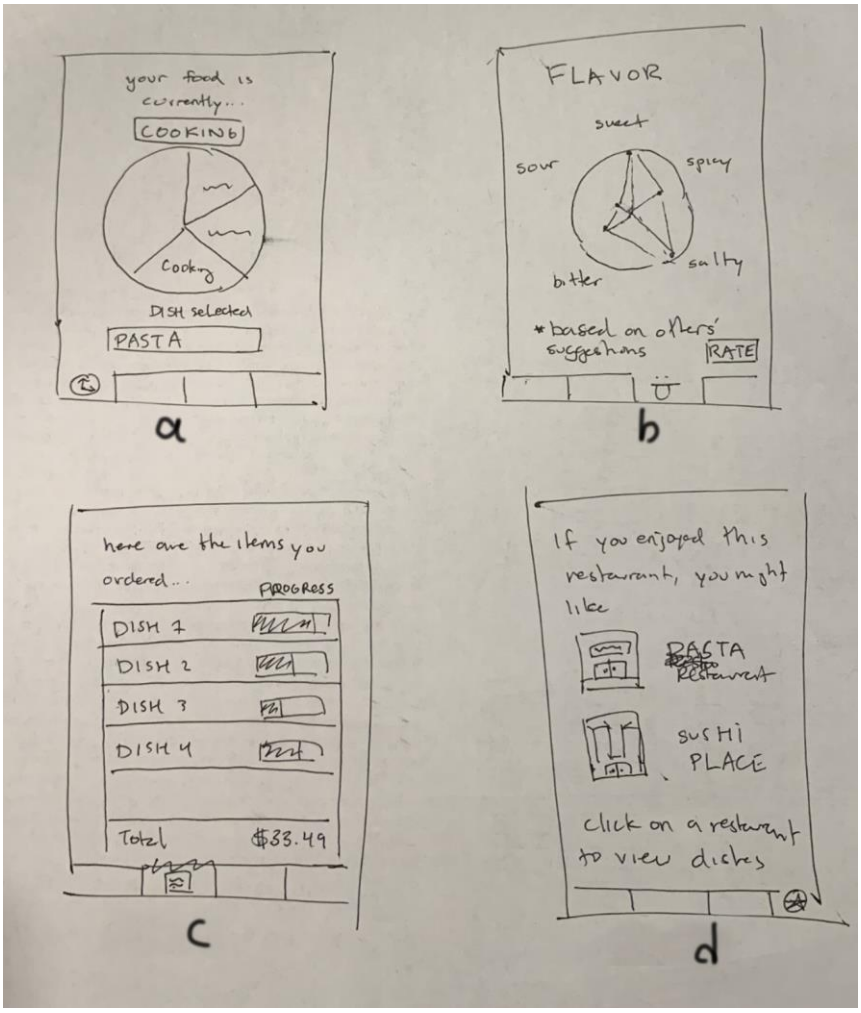

Figure 2. Design Sketch: Mobile application

The first task that can be done is task 1 (Ordering food directly and checking with the progress of the food being prepared without waiting for a waiter to come up to the table - Figure 2a). Specifically, the app tracks progress of completion in real time, and provides updates when food has reached next stage of completion. The design can also help perform task 3 (Convey flavor in an intuitive way (amount of salt, sugar, spice - Figure 2b). The app shows degree of flavorfulness for each of the five tastes: sweet, sour, bitter, spicy, salty in the form of a radar chart, shown in the figure, and the magnitude of each taste is represented in the chart. The app also provides a button that allows the user to add their own ratings by changing the chart. Task 4 could also be done through this design (Provide an overview of ordered food and make suggestions based on what was ordered - Figure 2c). The app keeps track of which dishes were ordered and displays them all in one screen, shows progress of each dish in the form of a progress bar, and the total cost of all dishes ordered is shown. Lastly, the design could help perform task 6 (Encourage people to try out new cuisine / restaurants/ dishes - Figure 2d). The app displays a list of restaurants, where you can click on a restaurant to view a list of all dishes available to you at that restaurant, and these recommendations are generated based on location and the restaurant you are currently at.

Design 3 - Plate-shaped conversational robot with display screen

The third design is the plate-shaped conversational robot with a display screen that could interact with the consumers by understanding what they say, respond by voice, and also display necessary information. The overall shape will be a size of an actual plate, with a screen on the center of the plate, as well as on the periphery of the plate. With NLP, the robot will understand (like voice assistants Alexa, Google Assistant, etc.) what people say, and the robot will sometimes answer with voice, and sometimes with the visual screen. The bots will be connected to the central server/computer of the restaurant to process order-related information as well as store customer preference data.

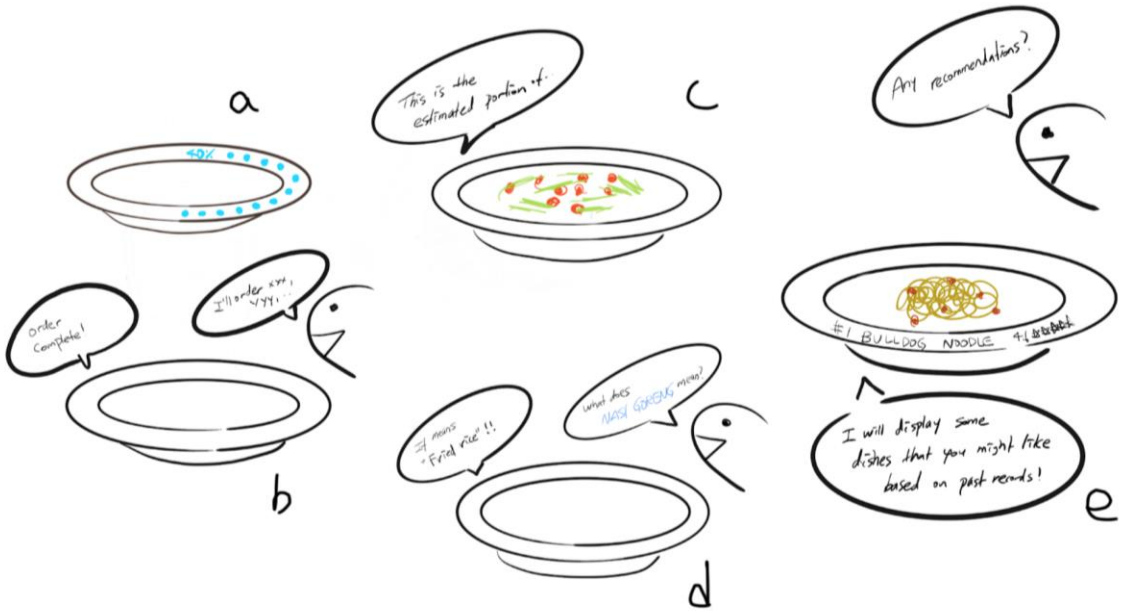

Figure 3. Design Sketch: Plate-shaped conversational robot with display screen.

With this design, task 1 can be performed (Ordering food directly and checking with the progress of the food being prepared without waiting for a waiter to come up to the table - Figure 3a). People can *talk* to the robot to order food, without having to wait for the waiter as in conventional restaurants, and the progress of the food being prepared will be shared to the customers by the screen on the robot. Task 2 can also be performed (Visualize Dishes and Their Size and Portion - Figure 3c). The portion of the dishes will be shown on the screen on the robot, and as the robot is the size of an actual plate, it will be easier for customers to estimate the portion size of the dish. Task 5 can also be completed (Allow people to understand the menu regardless of the language they speak - Figure 3d). The robot will translate some of the dish names that are foreign language-based, and thus difficult to understand. By using translation function, it can also translate the menu names to foreign languages, so that people from different countries could also understand the menu. Lastly, task 6 can also be done (Encourage people to try out new cuisine /restaurants/dishes - Figure 3e). Based on the prior stored information about the customer or by applying special offers in the restaurant, the robot can recommend new dishes and display it on the screen along with the reviews from other customers.

Chosen Design & Tasks

Our chosen design is a mobile application where users can easily order dishes and gain necessary information about the dishes using their own phones. There are two main parts of the app - ordering/checking the progress, and visualization of the dishes. For the first part, users will be able to join a *table group* inside the app and make an order together by each customer using his or her phone. After the order is made, customers can check the progress of the dish through the app. For the second part, the app will use augmented reality (AR) to approximate the size and portion of the dish, so the users will be able to intuitively look at the dish as if it is on the table through looking at their phone screen.

Task 1: Ordering food directly and checking with the progress of the food being prepared without waiting for a waiter to come up to the table

We chose this task because this is a major concern for customers; having to flag down a waiter and inquire about the status of a dish is an inconvenience all around. We wanted to show clearly and succinctly how our app could streamline the process and provide better clarity for the users. The storyboard below shows how the app keeps the user informed on the process of their order and lets them know when there is a new update (such as when the food has begun or finished cooking).

Task 2: Visualize Dishes and their Size and Portion

This task was compelling to us because it is a cornerstone for the app. We wanted to show how a customer could use the app to visualize the dishes in restaurants menus and essentially add a visual aspect to the ordering process. The size of the dishes is something that a lot of users from our research wanted to know more about, yet from the available resources currently (images online or from menu) the information regarding the portion could be lacking or sometimes misleading. As seen from the storyboard, our design enables users to easily estimate the size of the dishes by using the augmented reality capabilities of the phone app, by projecting a virtual dish of the actual size onto the tabletop that intuitively conveys the portion to the users. Because augmented reality shows the dish in a 3D space, the users wouldn't be confused by scale or perspective issues that is present with 2D pictures.

Written Scenarios

Alex is a college student studying Computer Science in his senior year. He lives in an apartment, but due to the heavy workloads of his classes, he rarely has time to cook himself. As a result, Alex visits restaurants frequently. Due to the cost of housing and frequent restaurant visits, Alex plans his budget weekly and usually has a budget for each meal he has at the restaurant.

On a Wednesday evening, Alex walks into an Italian restaurant to get dinner (Figure 4). Realizing that he has a lot of work to do later in the evening, he wants to be as efficient as possible while enjoying the dinner. The menu provided by the restaurant has 5 pages of text, and does not have any pictures of the dishes. Alex finds it cumbersome to read through all of the text to find the dish he wants, so he turns to the TasteBud app, which contains a digital

copy of the menu with pictures of every dish (Figure 4a). He skims through the pictures and lands his eyes on a pasta. Alex tries to call the waiter to place the order, but he notices that the waiter is busy serving other customers. Fortunately, he notices that he can place the order right in the TasteBud app and does so with a push of a button (Figure 4b). After a few minutes of wait, Alex starts to wonder the status of his order. Instead of asking a waiter, he checks the progress with the TasteBud app, which shows that “the pasta is currently cooking,” along with an estimated time of arrival of 5 minutes (Figure 4f). 5 minutes later, the waiter delivers the food, and Alex starts to enjoy his pasta (Figure 4h).

Two days later, on a Friday evening, Alex goes to an American restaurant with his friends to celebrate the end of their week-long project (Figure 5). After checking his weekly expense tracker, Alex determines that he has a budget of $30 for this meal. He wants to make sure that he sticks to his budget, and at the same time, we wants to enjoy a large, filling dinner and avoid pricey dishes with small portions. As he browses through the menu provided by the restaurant, Alex notices that the restaurant is doing a promotion where a 6 oz steak is only $6 (Figure 5a). Because Alex rarely cooks himself, he is not sure how large a 6 oz steak is. Looking at the picture in the menu, the steak looks reasonably large (Figure 5b). But Alex knows that pictures in the menu can’t be trusted. He opens the TasteBud app, finds the 6 oz steak in the app, and uses the augmented reality functionality to project a virtual dish of actual size onto the table (Figure 5c). It turns out that the steak is a lot smaller than it appeared on the menu. Although a little disappointed by the actual size, Alex decides that it is still a good deal, and proceeds to order 3 of them, along with other side dishes for his dinner (Figure 5d).

Storyboards of the Design

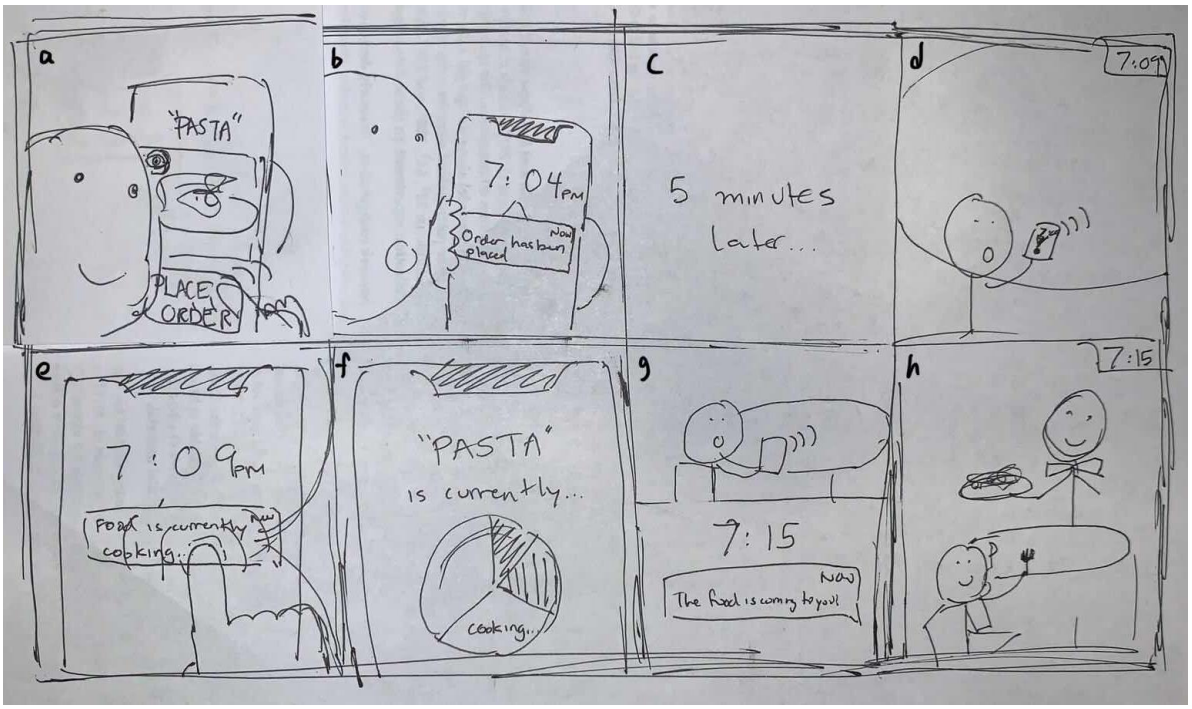

Figure 4. Storyboard for Task 1: Ordering food directly and checking with the progress of the food being prepared without waiting for a waiter to come up to the table.

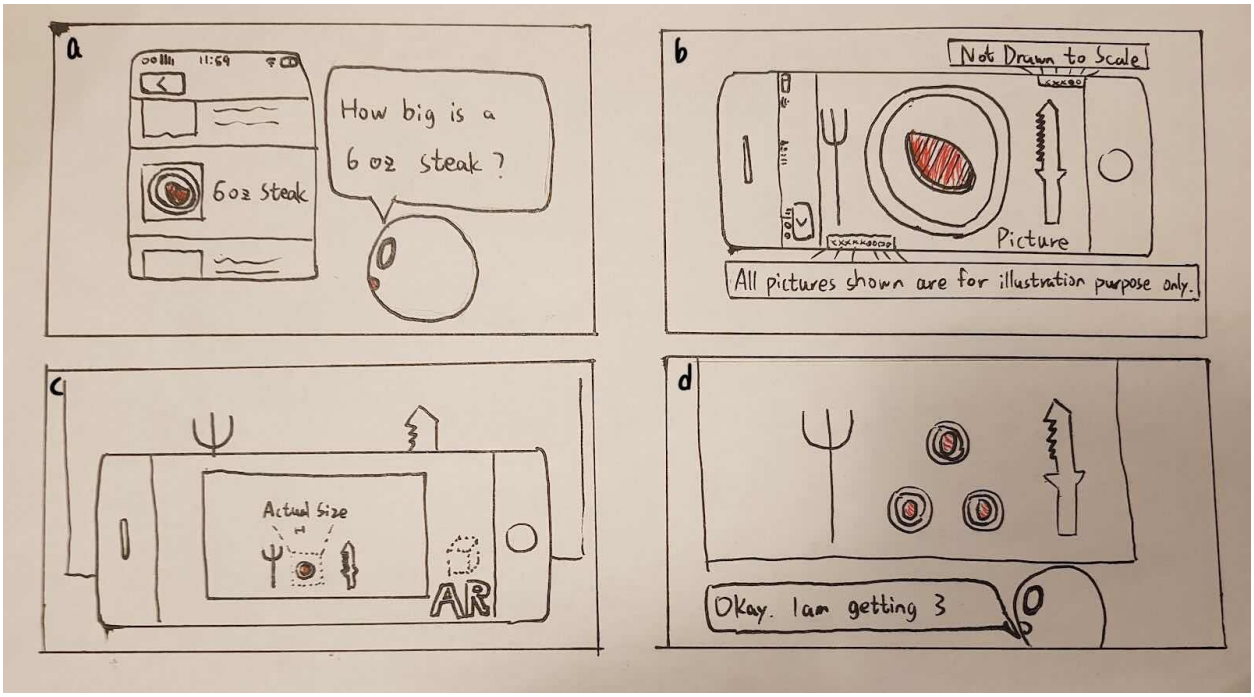

Figure 5. Storyboard for Task 2: Visualize dishes and their size and portion.