



TEAM

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PROBLEM AND SOLUTION OVERVIEW

People with busy schedules and preoccupied minds often forget to drink enough water throughout the day, even if they know how important water is for their health and for maintaining proper body function. Some people have tried to manually track their water intake or use alarms to remind themselves to drink water periodically, but these methods are inconvenient and intrusive to daily life. There are also other factors that affect the amount of water each person needs to drink in a day, such as body type, diet and exercise, current health (mental and physical), environment, and many more. Our challenge is to create a design that promotes hydration for a healthier life and changes people's relationship with drinking water. We have come up with the combination of a smart water bottle with special sensors and a smartphone application that allows users interaction as a solution to this problem. The focus of the design is on the phone application with the water bottle as a major supplement to its functionality. The water bottle will track details of the user's water intake, display simple information about the user's hydration, and provide passive reminders to drink water. While the phone application gives the user more power to interact with and interpret their hydration data and integrates other aspects of their lives to provide appropriate reminders to drink water.



CONTEXTUAL INQUIRY PARTICIPANTS

We did four contextual inquiries in total to gather data and understand more about our potential users: people who are busy and have a packed schedule. During the contextual inquiry, we followed the master/apprentice approach; we would observe and interview participants in their environment (UW campus, office room, etc.), and share our interpretations with the participants for immediate feedback.

Brad, our first participant, is a principal product manager in Concur technologies, who has been working in this industry for over 15 years. His working schedule is packed with meetings, phone-call conference, and he spends most of the time sitting in his workspace, working on his computer. The contextual inquiry took place in his office room, where we sat together and had a casual talk. Brad is a big fan of biking, and usually spends an hour doing biking everyday. Also, Brad cares a lot about his diet, that he would usually avoid taking food with carbohydrate, and would take a lot of vegetables, fruits, and food with high protein. Brad used to be a coast guard, so he follows a very regular diet and water-intake schedule.

Richard is our second participant. Richard is a software developer working at Concur. Richard is a big fan of cool, cutting-edge technologies, and he is also very busy with his work. The contextual inquiry with Richard happened in the common kitchen area in his workplace, where he usually has his lunch and coffee with his co-worker. Richard likes milk a lot, and from his interview results, we can see that he consumes a lot of milk in a day. Richard runs three to four times a week around green lake in the evening after dinner, and has been doing this for many years.

Avery, the third participant, is a third-year Ph.D. student at the University of Washington. She is a teaching assistant of an undergraduate class and also participates in several projects, so there are lots of meetings and course arrangements that occupy her daily life. During weekdays she usually spends 7 to 8 hours in her office in UW reading papers, working on her research projects and meeting with her advisor. Badminton is her favorite leisure activity and she always spends 4 hours playing badminton with her friends on Sunday afternoon (14-18 pm). She also likes to take a 30-minute walk in nearby parks after dinner if there is less work to do in that night. Avery is sensitive to caffeine, so she doesn't drink any coffee, but she drinks a lot of herbal tea.

Truman, our fourth participant, is an undergraduate student studying Aerospace Engineering at the University of Washington. He spends most of his time in his dorm studying or playing video games. Truman also works part time as a valet at the W Hotel in downtown seattle. He is quite busy throughout the week with school and work and doesn't exercise much. The contextual inquiry with Truman took place in his dorm room where he drinks water most often. Truman drinks a cup of coffee and water every morning when he wakes up but only drinks water when he feels thirsty for the rest of the day. While doing homework and when at work, he drinks water to take a little break. Even though Truman does not drink that much water throughout the day, he does not feel like he needs to.



CONTEXTUAL INQUIRY RESULTS

Most of our participants are trying to get into a good habit of drinking water and keeping themselves hydrated. Some people were very good at that, while others may need additional tools to remind them and track their progress for them.

According to our contextual inquiry results, the most common thing we encountered is that most people prefer things with flavor over plain water. For example, people would like to have milk, tea, soda, or seltzer water with enhancers when they feel thirsty. Water is the last thing that people think of when their bodies want some hydration. People's drinking habits are very hard to change by a single design, but we can think of this theme from another perspective. The design would be more helpful and useful to people if it recommends some healthy water enhancers that adds color and flavor to water or other healthy beverages (like fruit smoothies, milk, herbal teas, etc.) rather than keeping on reminding people to drink plain water.

Also, almost all the participants have a variety of drinks and beverages to choose from, and their selections are very personal. Most of our participants did not drink only water, or one kind of beverage throughout the day. People may highly prefer one kind of beverage but they would also drink many other types of beverages during the day. This brings up another idea that the design should segment and customize peoples' drink plan. For example, after you finish a 40 minute run, the product should know what kind of energy drink or beverage you usually take after exercise, and remind you to have one to keep yourself hydrated.

In addition, an important theme we found from our contextual inquiry is that most people do not want to be reminded regularly. Three of our interviewees point out that they do not want to be reminded to drink water all the time since they already have enough interruptions in their life. The people we observed are always busy in a day and already have too many schedules and plans, so most of them are sick of notifications and do not want to introduce any more complications. This is very important to our design, and it is totally different from what we have been thinking of before. Therefore, we need to design a better way to "remind" people so that they will not feel interrupted and begin to ignore or disable the reminders.

Finally, another aspect that we thought about and explored was including users that have some illness or condition that is affected by water consumption. Sometimes, drinking water and keeping the body fully hydrated is very important when recovering from a sickness or surgery. It can also reduce the symptoms of a disease or medical condition like eczema. Helping people be more aware of the benefits of water will motivate them to drink more. This does not only pertain to those who need to drink more water for medical reasons. Providing people with the knowledge of the negative effects of dehydration and the benefits of water will show them how to achieve a healthier lifestyle.

In retrospect, we gained a lot of valuable insight into the way people think about and interact with drinking water through the contextual inquiries. Most people enjoy some flavor, or even texture, in their water and also prefer various beverages, like tea or soda, over plain water. Simple reminders are also too intrusive for most people so it would be better to find other ways to motivate them to drink water.



TASK ANALYSIS QUESTIONS

Who is going to use the design?

This design will be useful to people who usually do not drink enough water each day or often forget to drink water and want to change their habits. The design could also be for people who want to track their drinking in order to monitor their water intake for health reasons. In general, people who want to adopt a healthier lifestyle are going to use the design.

What tasks do they now perform?

Most of people do not have a plan for water intake and sometimes feel dehydrated. Usually, they drink more soda or coffee than water. Currently, they have to remember what and how much they drank by retracing their steps for the day, which takes time and is prone to be full of errors. Some people use alarms to remind themselves to drink water, but these are easily and often ignored.

What tasks are desired?

We want people to be able to see how much water they drink in a day and for longer periods of time too. Also, they will be able to see the amount of each beverage they have taken. Another task is that we want to give warning or reminder to people to ask them drink more water depend on their dehydration level. Our overall goal is to motivate people to drink more water, so there may be another task to motivate people drink more water.

How are the tasks learned?

Customers usually learn these tasks in various ways, like from books, health magazines, and online articles about drinking water and dehydration. Most people know the general consequences of dehydration and health benefits of hydration but do not have a clear understanding of how each symptom manifests itself and what is the best way to rehydrate themselves. It is also commonly known that the color of your urine can be an indication of your hydration level. Clear urinating means proper hydration while yellow or even brown urine could mean severe dehydration. Most of the general public and our customers know about this and may use it to gage their hydration levels.

Where are the tasks performed?

The tasks should be performed throughout the day at time or place, like at the office, at home, or when exercising. For our target users, it is more likely that these tasks are performed in schools or workplaces because our target users usually spend most of their day time (at least 8 hours) in such places. When traveling, the task may sometimes be performed but is harder to do because people need to carry water with them in some way.

What is the relationship between the person and data?

People have to remember how much water they have drunk and how much they still need to drink later to achieve their daily water requirement and keep their body healthy. Also, everyone needs to drink a different amount of water based on his or her body and environmental situation. The amount of water an individual needs varies on their age, height, and weight, their diet and exercise, and the nature of the work they do everyday.



What other tools does the person have?

Some people may have already figured out some ways to track their daily water intake and make sure that they achieve their daily water requirement. An example would be marking their water bottle with timestamps of when and how much they should drink.

There are also a lot of activity recording applications for smartphones that can log users' daily activities, including water intake, but it heavily requires users to input their data manually, which most users are reluctant to do so.

How do people communicate with each other?

We target mainly towards solo users, so most of the time users do not need to communicate with each other. It is possible to include a function to allow users to share their water consumption data with friend or family, but it is not an essential aspect of the design. This may encourage other people to drink water by following the example of a well hydrated person who has shared their progress.

How often are the tasks performed?

The tasks are performed whenever our customers either drink or need to drink water, so it depends on individual preferences. Usually, people would take a glass of water every hour or two. From our contextual inquiry, our participants normally drink a glass of water (or something equal) about every two hours during the day, which can be observed from his liquid-intake notes. A general estimation would say that the tasks are performed 8-12 times a day, as people drink different beverages other than water.

What are the time constraints on the tasks?

These tasks do not have any time constraints because our design focuses on recording water-intake activity automatically as well as providing long-term monitoring information. But in general, we want to create a design that allows users to quickly log liquid they finished in a few seconds or a few taps on the mobile phone so our design can have quality data for a long period of time. As for reminding and encouraging people to drink water, the sooner they pay attention to their hydration status and drink water, the better.

What happens when things go wrong?

Our interview with P3 showed that if people are busy, they will forget to drink water. Also, sometimes people do not remember to bring their water bottle. These will all affect people's water drinking schedule and increase the possibility of dehydration. In the worst case scenario, people might ignore or completely stop using the tool. At this point, knowledge is the best weapon and we can still educate people about water and dehydration.



PROPOSED DESIGN SKETCHES

Design 1

This first design is a smart water bottle and all of the functionality of the product is within the water-bottle itself. The water bottle has a sensor to detect how much water it has and remembers how much water the user has consumed, displaying a graphic to show the users their progress on their preset daily water intake (figure 1). It reminds the user to drink and refill water at the best times using additional color cues (figure 4). The bottle has two compartments for different beverages and will learn the user's drinking habits and suggest different beverages to drink (figure 3). And the smart water bottle allows the user to set various goals on how much water he or she wants to drink which can motivate user to have more liquid intake (figure 2).

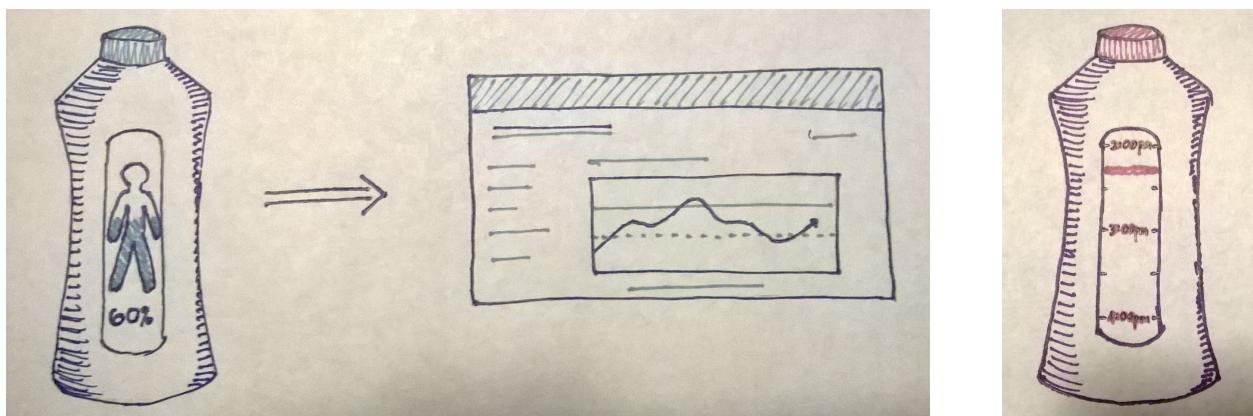


Figure 1: Tracking Liquid Intake Over Time

Figure 2: Finding Motivation for Proper Hydration



Figure 3: Smart Beverage Suggestions

Figure 4: Convenient Reminders to Drink Water



Design 2

This second design features a special sensor and a mobile app that comes with it. The water sensor consists of a mass detector, a ingredient detector, a bluetooth transmitter and a rechargeable battery and users can throw this sensor in any bottle or cup they desire. After pairing with users' smartphones, the phone will receive data about the amount of liquid consumed over time and the ingredients of the liquid from sensor. (figure 1 & 2) The application will log these data and analyze them with the predefined goal and timetable and then notify user when needed.(figure 3) When needed, application will notify and suggest user stopping drinking a specific beverage or drinking more water after it receive the data of ingredients inside the bottle and log the amount of each ingredient consumed.(figure 4)

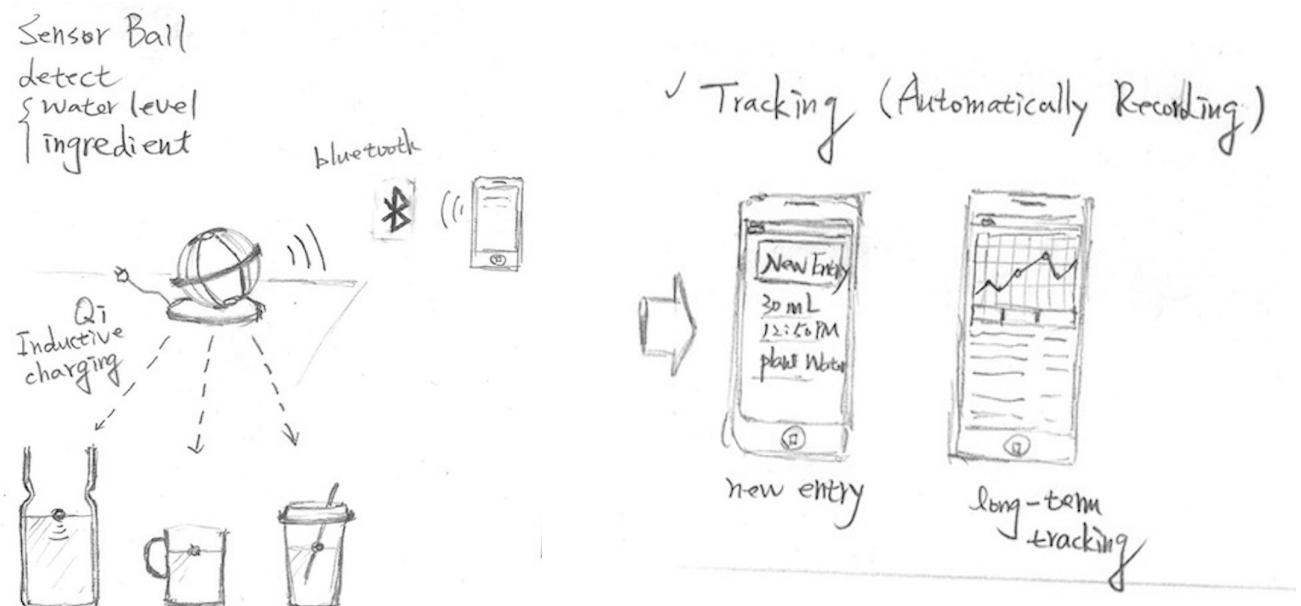
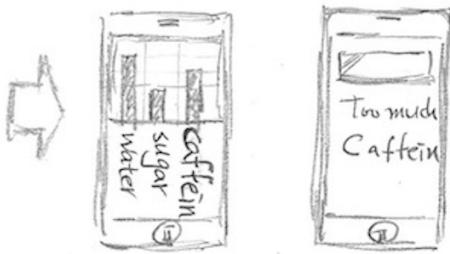


Figure 1: Tracking Liquid Intake Over Time



Figure 2&3: Education on Hydration & Convenient Reminders

✓ Suggestions



detect ingredients
& give suggestions

Figure 4: Smart Beverage Suggestions

Design 3

The design merely focused on mobile app, it can help users track their liquid intake. Users first select which type of drink they just finished. Then choose a specific drink in that category and choose or manually enter the amount of the drink. (figure 1) It can remind user smartly to drink water during the day by allowing users to fill or import the calendar (google calendar, apple calendar) and set up locations where they don't want to be notified. The reminder will be automatically turned off when user don't want to be interrupted based on his/her calendar and location. (figure 2) Also, the design will occasionally provided useful water drinking tips, and give suggestion about water intake to different users. (figure 3 & 4)

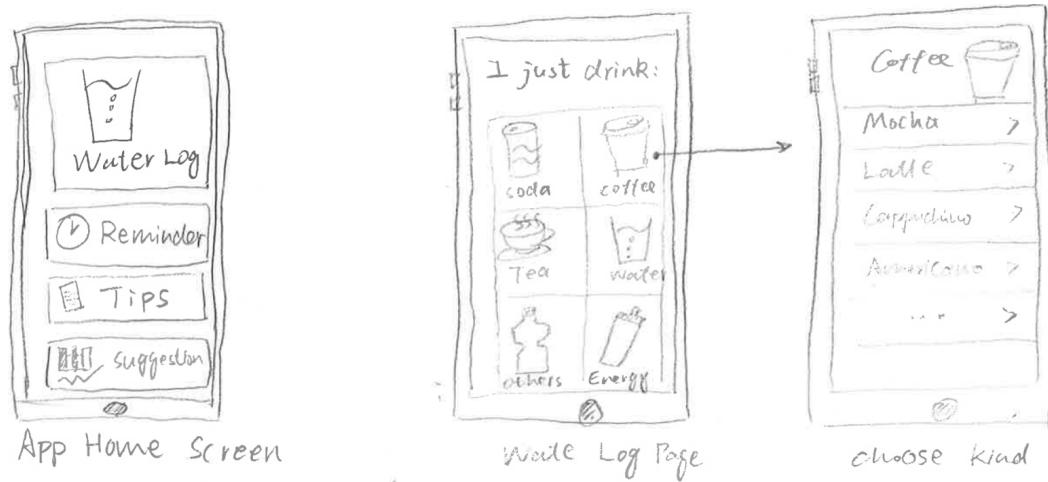


Figure 1: Tracking Liquid Intake Over Time



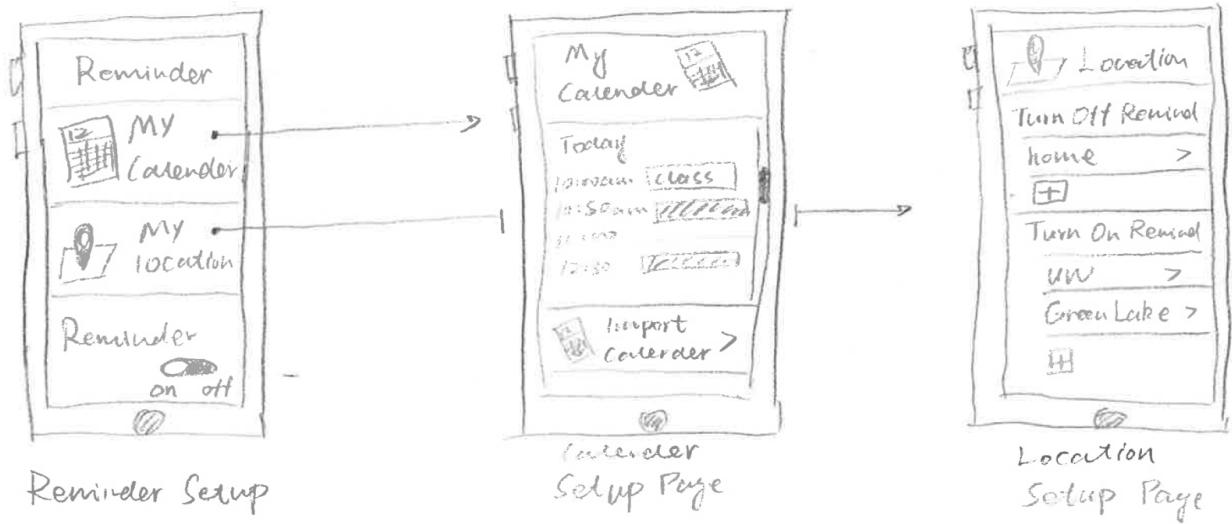


Figure 2: Smart Reminder Setup

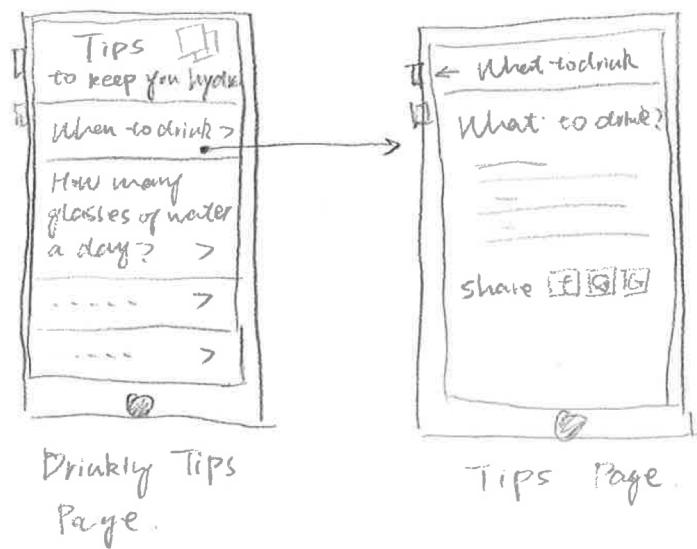


Figure 3: Tips for Water Intake



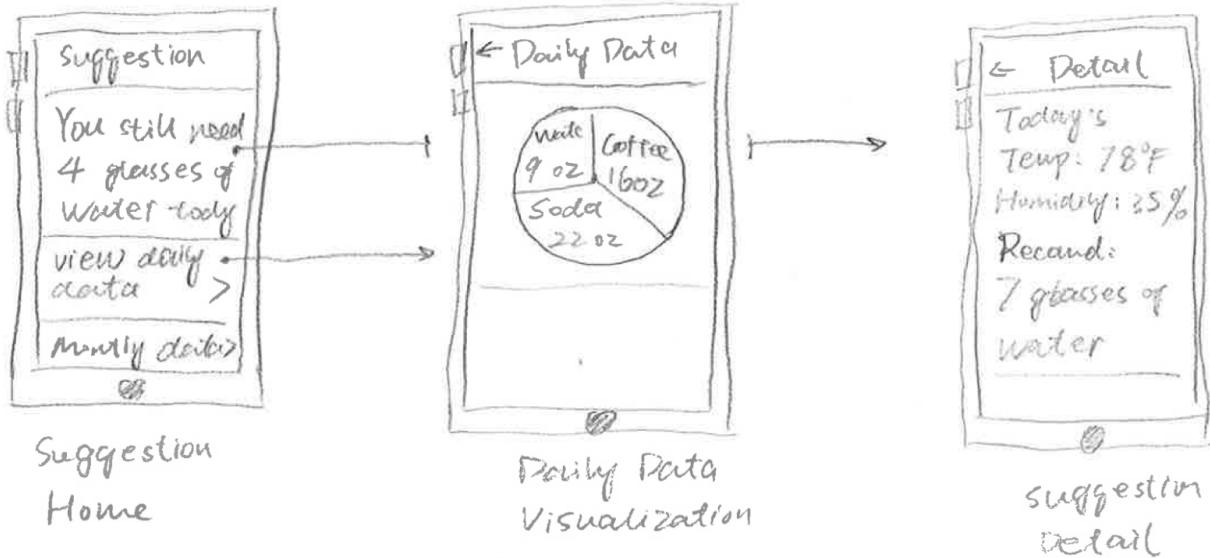


Figure 4: Water Intake Suggestion for the Day

CHOICE OF DESIGN AND TASKS

Our group decided to choose the tasks of tracking users' liquid intake, and remind users to drink water. We choose these two tasks because they are the most fundamental tasks for our design and are about collecting and allowing reflection on personal information. For the final design, we merged all our three previous designs together, taking the best aspect from each of them. We are going to focus on creating a mobile application, but we included the design of smart bottle that has a built-in sensor built. The bottle can detect users' liquid intake (type, amount, time), and can have other indicators and displays. Most importantly, the bottle will push the liquid intake data to the users' mobile app, which will be the main interaction with users. This design best suits our target users for two reasons. First, users do not always have to manually log what they drink; the bottle can automatically push the data to the mobile app. Since our target users are normally busy during the day, this design can save them time and record more accurate data. Second, users can have better interactions and user experience with the mobile app. Most of our users are tech-savvy and carry smart phones with them. The mobile app can interact with users in a smart and friendly way, and allows them to check on their drinking progress and data visualization at any time.



WRITTEN SCENARIOS

Task 1 (Storyboard 1)

Annie is a junior student at University of Washington lives in an apartment in U-district. Annie wakes up at 8:00 AM, and drinks some water from her Aqueous water bottle. The bottle then sends a data to her mobile app about what kind of liquid she drinks and the amount. On her way to school, Annie stops by a coffee shop and gets a cup of Latte for herself. Since Annie doesn't want to pour the coffee to Aqueous bottle, she opens her Aqueous app and manually input her coffee drink for tracking. In the afternoon, Annie refills her bottle with orange juice. As she drinking the juice from the bottle, her phone app keeps tracking her beverage intake by data received from the bottle. Annie finishes her day in school, and she opens her Aqueous app as she is waiting for the bus. The app tells her that she has finished her liquid intake goal for today, and also shows a line chart of her weekly liquid intake.

Task 2 (Storyboard 2)

Bob is a senior designer at Google. Bob starts working at 9:00AM with his design work. Bob has a Aqueous bottle with him at the office. Latter in the morning, the bottle turns red to remind Bob to drink some water. But Bob is too busy with his work, and just ignores the bottle. After three hours of working, it is 12:00 PM and Bob decides to get some lunch. Then, Bob's phone is vibrating and sending him a reminder to remind him take some water during lunch break. Bob then realizes that he didn't take any water for morning, and grabs his bottle to drink water.



STORYBOARDS OF SELECTED DESIGN

Storyboard 1: Liquid Intake Tracking



Storyboard 2: Smart Reminder

