

# HUMAN-CENTERED DESIGN

HUMAN-CENTERED DESIGN (HCD) IS AN APPROACH TO DESIGNING AN INTERACTIVE SYSTEM, WITH THE GOAL OF MAKING THE SYSTEM USABLE AND HELPFUL BY FOCUSING ON THE USER'S NEEDS AND REQUIREMENTS. IT'S DONE THROUGH A REPETITIVE FOUR STEP PROCESS THAT HAS A STRONG EMPHASIS ON THE APPLICATION OF HUMAN FACTORS AND FIELD RESEARCH AS WELL AS BASIC USABILITY KNOWLEDGE/TECHNIQUES. IN THIS CASE THE HCD PROCESS WAS USED TO REDESIGN THE INTERFACE FOR A SMART WATER HEATER WITH THE GOAL OF MAXIMIZING USER EFFICIENCY AND COST SAVING.

## 1 RESEARCH

FOR RESEARCH, THE WAY THE SYSTEM IS INTERACTED WITH IS OBSERVED. IT CAN INVOLVE A VARIETY OF METHODS SUCH AS CONTEXTUAL OBSERVATION AND OBSERVATION OF THE SYSTEM IN CURRENT SMART WATER HEATERS USE. BOTH OF WHICH I USED FOR MY RESEARCH. I EXAMINED A VARIETY OF SMART WATER HEATERS AND CONSULTED WITH THOSE THAT OWN WATER HEATERS. I FOUND THAT THE WATER HEATER REQUIRES OCCASIONAL INTERACTION IF THE USER WISHES TO CHANGE THE TEMPERATURE OR TRAVELS FREQUENTLY (CAUSING THEM TO TURN IT OFF). A WATER HEATER ALSO REQUIRES YEARLY MAINTENANCE THAT CONSISTS OF FLUSHING THE TANK, AND THERE IS ALWAYS THE RARE AND HEAVILY DREADED LEAK THAT CAN LEAD TO WATER DAMAGE.

## 3 BRAINSTORMING

BRAINSTORMING IS GENERATING IDEAS AND CREATING SKETCHES. DURING THIS STEP, ITS IMPORTANT TO CONSIDER A VARIETY OF IDEAS AND CREATE MULTIPLE SKETCHES TO EXPLORE THESE IDEAS. FOR MY SMART WATER HEATER INTERFACE, I LISTED ALL THE KEY FEATURES I FOUND IMPORTANT AND NECESSARY TO THE FUNCTIONALITY OF MY DESIGN, I THEN MADE A SEPARATE LIST OF FEATURES THAT WOULD BE HELPFUL TO THE USER, IN REGARD TO THE IDENTIFIED ISSUES/INCONVENIENCES.

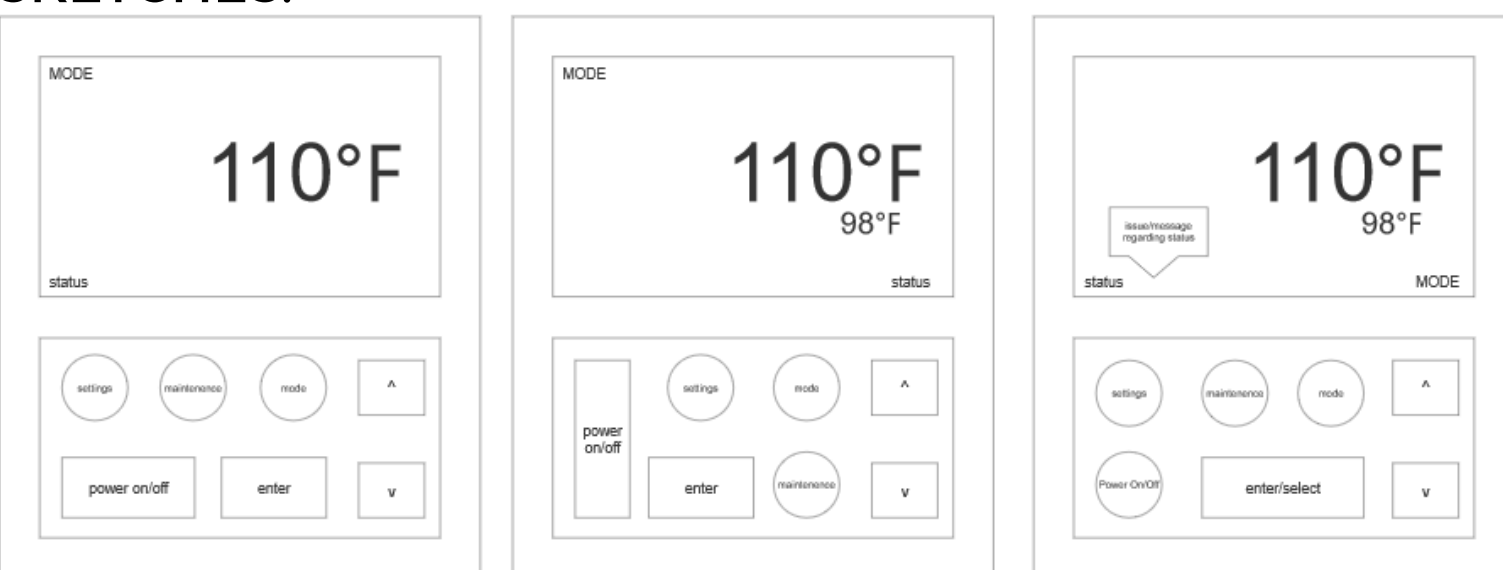
### IMPORTANT/NECESSARY FEATURES

- TEMPERATURE VIEW
- TEMPERATURE CONTROL
- ON/OFF
- MAINTENANCE TRACKING

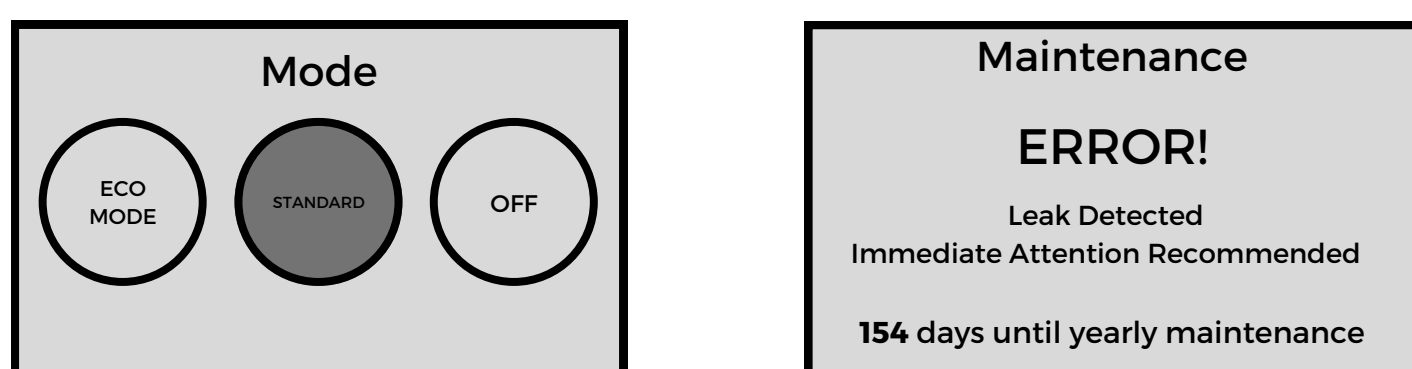
### PROBLEMS/SOLUTIONS

- NOTIFICATION OF ISSUES/SMART PHONE APP INTEGRATION
- ADAPTIVE WORK MODES/ECO-MODE

### SKETCHES:



### ALTERNATE PROTOTYPE SCREENS:



## 2 FRAMING

IN FRAMING, THE PROBLEM TRYING TO BE SOLVED AND THE CONTEXT AND CONSTRAINTS ARE ALL CONSIDERED. A SMART WATER HEATER HAS TO ALLOW FOR THE USER TO CHANGE THE TEMPERATURE AND TURN IT ON/OFF, AS WELL AS BE NOTIFIED OF ANY ISSUES WITH THE WATER HEATER. THE INTERFACE WILL ALSO HAVE TO BE BIG ENOUGH TO BE INTERACTABLE, BUT IT'LL STILL HAVE TO BE COMFORTABLY SIZED ON THE WATER HEATER. IT'D BE EXPECTED TO BE USED BY HOMEOWNERS, WHICH CAN RANGE FROM A VARIETY OF DEMOGRAPHICS MEANING THE SYSTEM SHOULD ACCOMMODATE FOR THIS DIVERSITY. FROM USERS WHO MAY BE UNFAMILIAR WITH SMART TECHNOLOGY TO THOSE WHO MAY NOT UNDERSTAND THE TECHNICALITIES AND INNERWORKINGS OR A WATER HEATER.

## 4 PROTOTYPE

THE FINAL STEP IS PROTOTYPING, WHICH COMBINES ALL PRIOR STEPS TO CREATE A MORE REFINED AND DETAILED MODEL OF THE SYSTEM. BELOW IS THE FINAL PROTOTYPE FOR MY DESIGN, IT ENCOMPASSES A VARIETY OF DIFFERENT VIEWS AVAILABLE ON THE SCREEN, AND IT ALSO AFFORDS FOR AN APP VERSION WHICH IS SHOWN ALSO SHOWN BELOW.

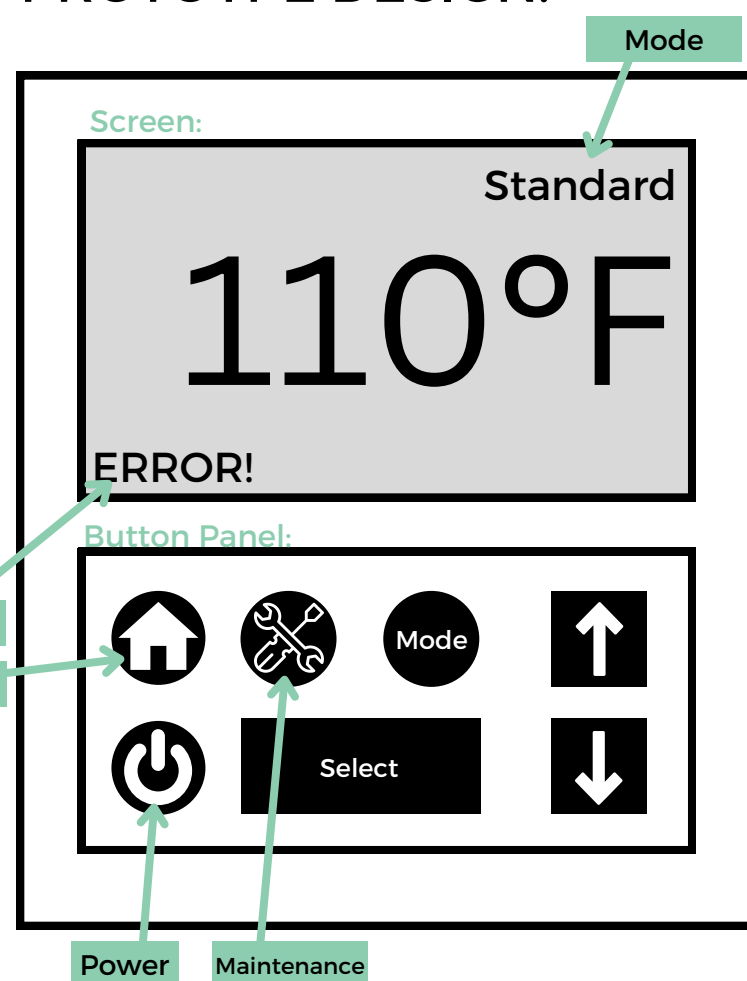
THE APP VERSION IS THE KEY SOLUTION TO THE MAIN PROBLEM PROPOSED (NOT KNOWING WHEN ITS LEAKING/DAILY MAINTENANCE) AS IT ALLOWS FOR THE USER TO RECEIVE PUSH NOTIFICATIONS AS TO ANY ALERTS WITH THEIR WATER HEATER. A FEW DESIGN PRINCIPLES WERE USED TO ENHANCE THE FUNCTIONALITY OF MY DESIGN. **VISIBILITY** REFERS TO HAVING A CLEARLY VISIBLE STATUS AND METHODS OF USE. IN MY PROTOTYPE THE GENERAL DISPLAY CLEARLY DISPLAYS THE STATUS AND THE LABELS ON THE BUTTONS INDICATE THE METHODS OF USE.

**PROGRESSIVE DISCLOSURE** MANAGES COMPLEXITY SO THAT ONLY REQUESTED OR NECESSARY INFORMATION IS DISPLAYED AT ANY GIVEN TIME. IT WAS IMPLEMENTED IN THE HOME SCREEN AS THE TEMPERATURE IS THE MAIN PIECE OF INFORMATION DISPLAYED, ALONG WITH THE BASIC SYSTEM SETTINGS (MODE AND STATUS). AND THE TOP ROW OF CIRCULAR BUTTONS CHANGES THE SCREEN AND THE INFORMATION THAT IS DISPLAYED (AS IT WAS INDICATED BY THE USER).

**ICONIC REPRESENTATION**, WHICH IS THE USE OF PICTORIAL IMAGES TO IMPROVE RECOGNITION AND RECALL, WAS USED IN MY DESIGN IN THE SYMBOLS ON THE BUTTONS. AS HOME, POWER, AND MAINTENANCE ARE LIKELY TO BE MORE QUICKLY RECOGNIZED THAN IF THE USER WERE TO TAKE THE TIME TO READ A WORD LABEL.

**PERFORMANCE LOAD** MEANS THE MORE EFFORT A TASK REQUIRES THE LESS LIKELY THE USER WILL COMPLETE IT. THUS, I INTENTIONALLY MADE MY DESIGN SIMPLE. NO TASK AFFORDED BY THE INTERFACE DESIGN REQUIRES EXCESSIVE PHYSICAL OR COGNITIVE EFFORT. EVERYTHING DESIGNED WITHIN THE INTERFACE HAS A CLEAR PURPOSE, MEANWHILE STILL PRESENTING AS SIMPLISTIC TO THE USER.

### PROTOTYPE DESIGN:



### APP DESIGN/VIEW:

