

Inspiring consistent sleep patterns through tracking, machine learning, and optimization.

Overview

Sleep is something that many people across all ages and various walks of life struggle with. There are several products on the market to help aid sleep, from physical products such as eye masks to meditation apps such as Calm. However, we still see a daily struggle for many individuals that affects their physical and mental health. Using human-centered design methods, we set out to find a solution to help night shift workers in the healthcare industry regain control of their lives through more consistent sleep.

Phase 1: Identify

Opportunity Space: Improving Sleep Patterns

Social, Economic, and Technological (SET) Factors

Social	Economic	Technological
<ul style="list-style-type: none">Revenge Bedtime ProcrastinationPoor Time ManagementSubstance AbuseLack of Education & Knowledge	<ul style="list-style-type: none">Insufficient Sleep leads to<ul style="list-style-type: none">Lower ProductivityHealthcare Utilization Costs	<ul style="list-style-type: none">Excess Screen TimeBright/Blue LightVirtual Environment & Remote Work

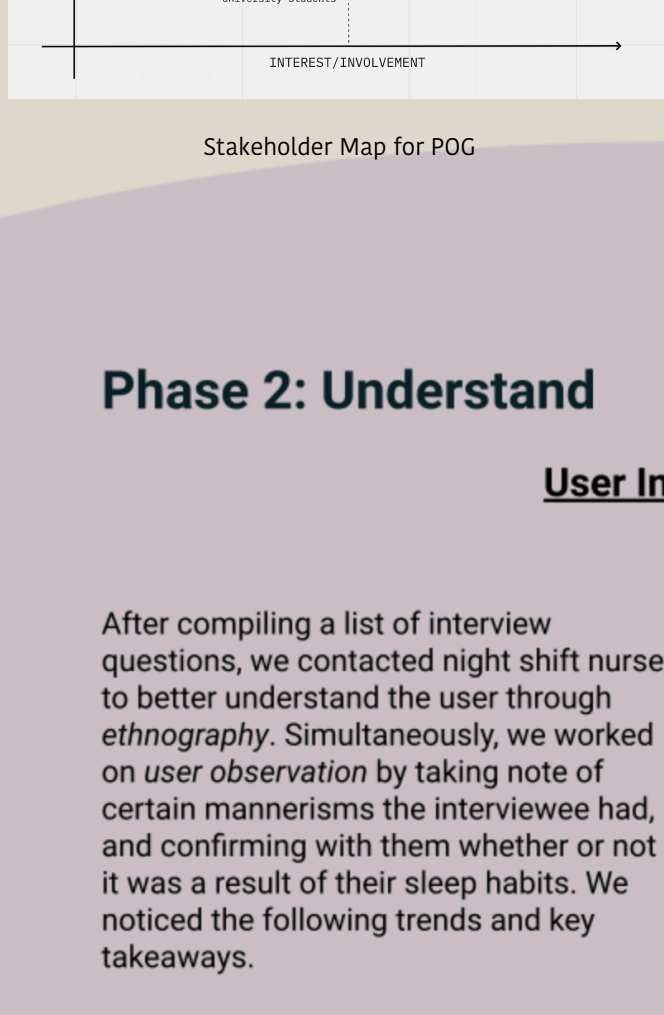
Product Opportunity Gap (POG) Generation

To narrow in on a specific opportunity statement, our team generated 25 POGs and used *Affinity Diagramming* to understand the space of our opportunity better and combine ideas where applicable.

To further help decide on a final POG, our team created a *Weighted Selection Matrix* ranked by criteria we found important to the long term success of the project. Using the insights from this matrix, we were able to decide on a final POG.

Final POG: How might we enable night shift workers in the healthcare industry create and keep consistent sleep schedules?

Key Stakeholders

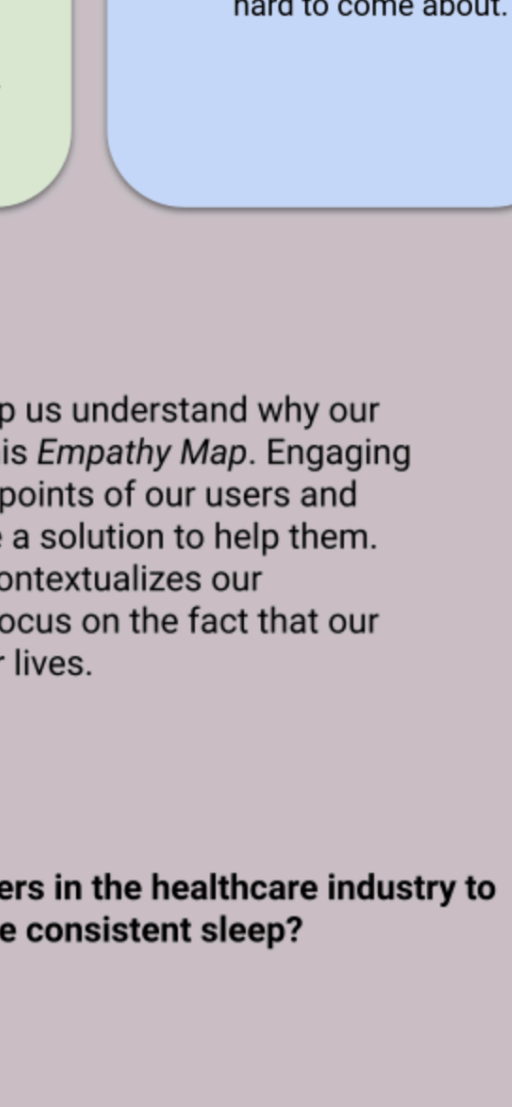


This *Stakeholder Map* helped us identify both our key stakeholders and other stakeholders that may be involved throughout the design process. Going forward, we focused our user research around night shift workers in the healthcare industry.

Phase 2: Understand

User Interviews

After compiling a list of interview questions, we contacted night shift nurses to better understand the user through *ethnography*. Simultaneously, we worked on *user observation* by taking note of certain mannerisms the interviewee had, and confirming with them whether or not it was a result of their sleep habits. We noticed the following trends and key takeaways.



Medicine/Drugs

- Medicine such as Benadryl and Melatonin were commonly used.
- Users developed a dependency on these products which they disliked.
- Caffeine and Coffee were also commonly used.
- This increased their attentiveness which was otherwise lacking.

Environment

- Products such as black out curtains, eye masks, and earplugs were common.
- Users also used white noise to help them sleep.
- Overall, users had done a great job replicating their sleep environment and were comfortable with it.

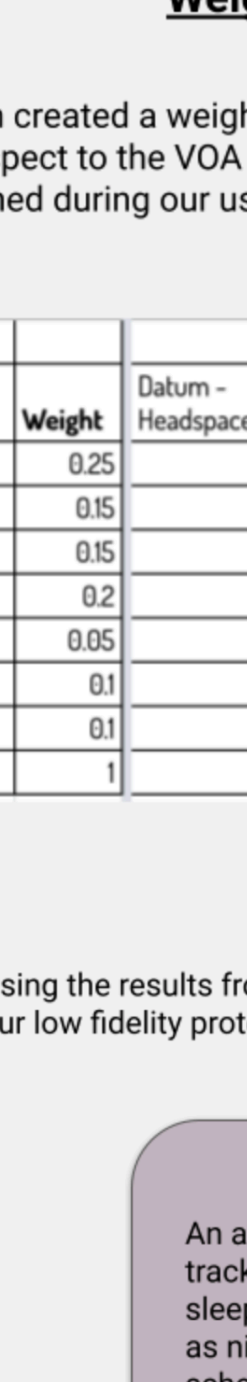
Priorities/Mentality

- Users would sacrifice sleep to spend time with loved ones.
- There was a fear of missing out and a desire to feel "normal."
- A night shift took away control of their life and sleep was hard to come about.

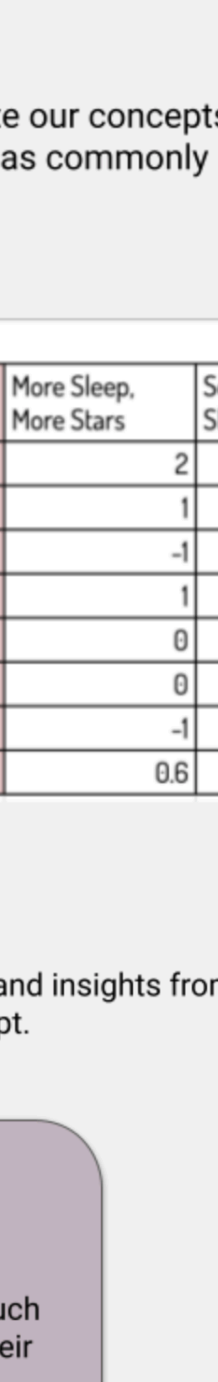
As a synthesis method for our findings and to help us understand why our users were making certain choices, we created this *Empathy Map*. Engaging in this process really helped us organize the pain points of our users and empathize with their plights as we strive to ideate a solution to help them. Additionally, the following two personas further contextualizes our opportunity and allowed us to revise our POG to focus on the fact that our stakeholders felt they did not have control of their lives.

Revised POG: How might we enable night shift workers in the healthcare industry to regain control of their lives through more consistent sleep?

User Personas



The "Mother"
Situation: Night shift medical worker who works 11pm - 7am shifts and constantly needs to take her kids to school, sports practice, etc.
Pain points: Is always pressed for time during weekdays because of her children's schoolwork and extracurricular activities.
Goal: Balance time between taking care of the kids/pets and getting adequate sleep.



The "Controller"
Situation: Medical worker working both day and night shifts who has been a nurse for several years.
Pain points: Is afraid of being dependent on drugs or other mechanisms so refuses to use sleep devices to get consistent sleep (~4 hrs).
Goal: Get adequate sleep using a crutch that enables them to retain control and sleeping.

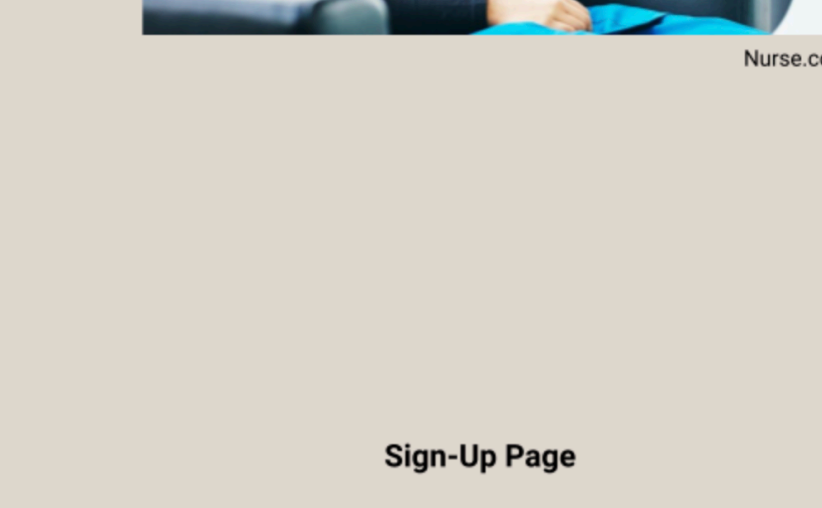
Value Opportunity Attributes (VOA) & Product Requirements

	COM	WEL	WIS
EMOTION			
ERGONOMICS			
AESTHETICS			
IDENTITY			
IMPACT			
CORE TECH			
QUALITY			

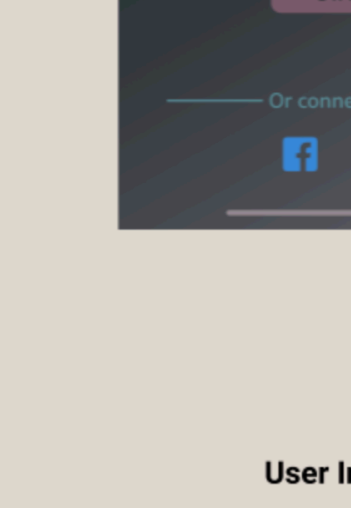
- Must not be an addictive substance or affect the user's neurotransmitters.
- Must be consistent in encouraging and providing healthy sleep schedules.
- Should be comfortable to look at at night through muted colors or by implementing dark mode.

Phase 3: Conceptualize

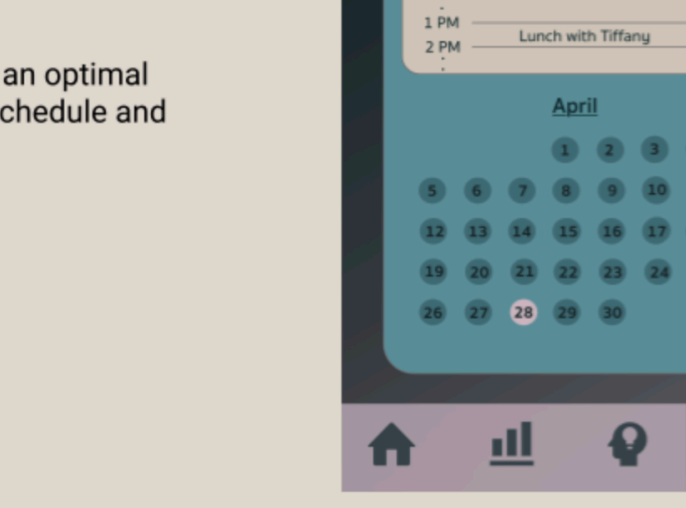
To begin our concept generation activities, we each ideated 10 concepts using *design heuristics* for a total of 40. Then, we engaged in a *Brainwriting* activity to generate off of each others' ideas and end up with a total of 76 concepts. After clustering and eliminating redundant ideas, we used *Dot Voting* to narrow down even further.



Low Fidelity Prototyping of Final Four



After narrowing down to 4 concepts using *Borda Count Voting* we prototyped each one very roughly to gain additional insights through testing and fabrication. This included physical prototyping, wizard of oz mock-ups, and experience prototyping with friends and family.



Weighted Selection Matrix

We then created a weighted selection matrix to evaluate our concepts with respect to the VOA criteria against a datum that was commonly mentioned during our user research.

VOA Criteria	Weight	Datum - Headspace	Snooze + Optimizer	Countdown Lamp	More Sleep, More Stars	Social Media Sleep Profile
Emotion	0.25	0	-1	-2	2	-1
Ergonomics	0.15	0	0	2	1	1
Aesthetics	0.15	0	0	-1	-1	-1
Identity	0.2	0	2	-1	1	2
Impact	0.05	0	0	-1	0	1
Core Technology	0.1	0	2	1	0	0
Quality	0.1	0	0	1	-1	1
Total	1	0	0.5	-0.4	0.6	0.5

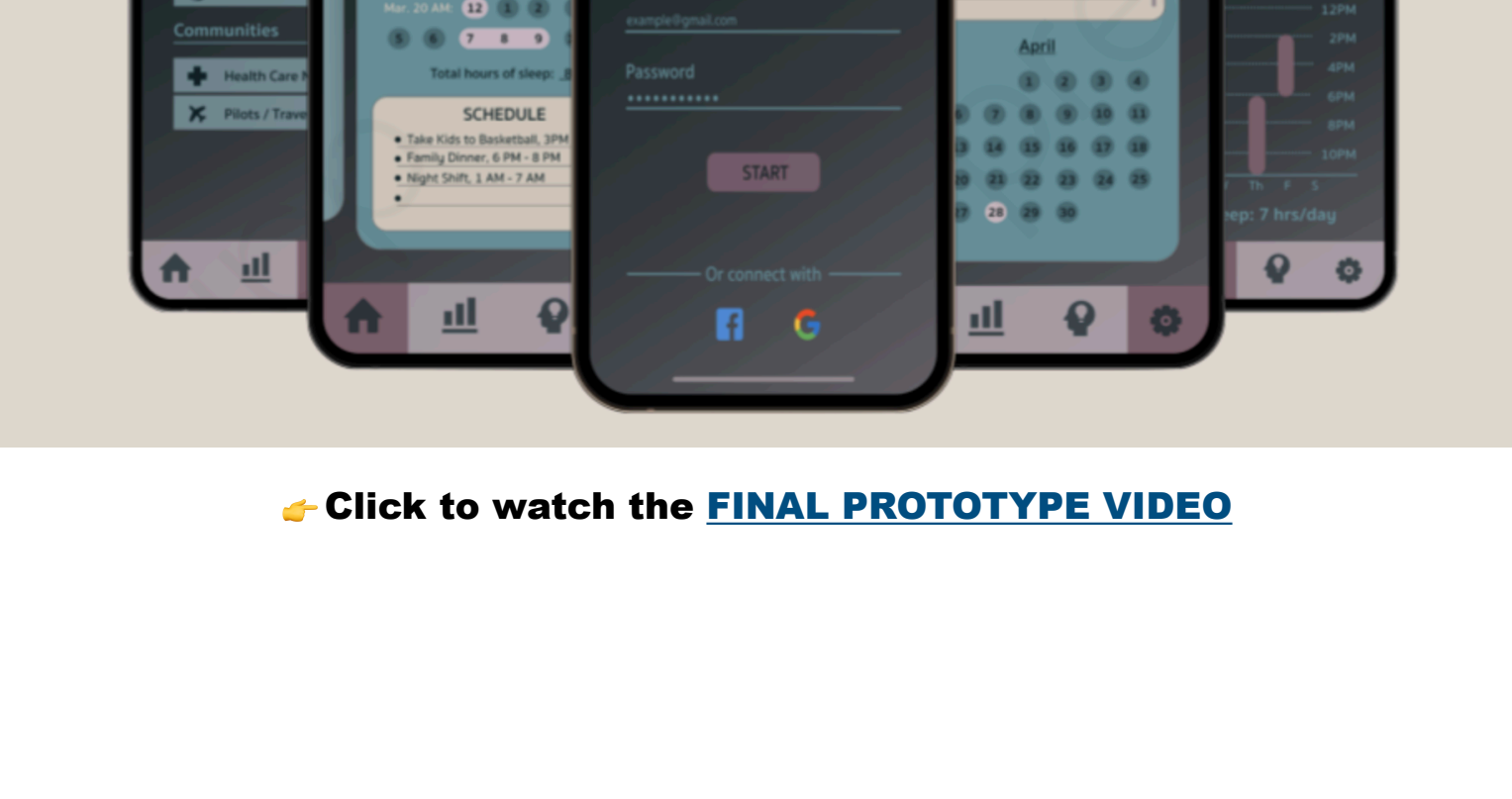
Using the results from the weighted selection matrix and insights from our low fidelity prototypes, we arrived at a final concept.

Final Concept: Snooze

An app that uses machine learning, tracking, optimization to provide ideal sleep schedules for busy individuals such as night shift workers. A user inputs their schedule while the app monitors their sleeping patterns and outputs an ideal sleep schedule for the day.

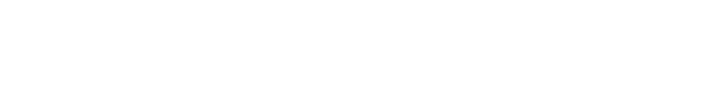
Phase 4: Realize

Since our final concept was relatively high-tech, we decided to primarily focus on *Wizard of Oz* prototyping where we would create the interfaces that users would interact with and create an imaginary output that would replicate what one might expect to see after inputting the necessary information. By doing this, we would be able to still test the response to the final output and evaluate the effectiveness of the prototype with respect to our product requirements and POG.



Final Prototype + Scenario

Elizabeth has been a night nurse for the past year. She has noticed a decrease in her quality of life because she is always tired. She only gets around 4-5 hours of sleep most days because she has a tough time balancing sleep with the rest of her life. She wants to be able to find a sleep schedule that can regulate her irregular sleep and allow her to get the proper amount of sleep while still allowing her to maintain her work and personal commitments.



Nurse.com

Sign-Up Page

To start, Elizabeth can download Snooze and sign up with her email, Facebook, or Google.

Snooze can also quickly import data from her Google Calendar or Facebook events to make logging in her schedule easier.

User Inputs Schedule

Next, Elizabeth will be prompted to either manually input her schedule or sync her calendar to train Snooze.

Snooze will use this information to find an optimal sleep schedule that works around her schedule and commitments.

User Inputs Goals

Snooze encourages Elizabeth to input at least 1 goal per day. It will also take these goals into account when planning a sleep schedule. The app can also remind her of unfinished goals.

Elizabeth sets reminders for herself three times a day, so when she checks her phone after a busy shift, she's always reminded of what she can do to help her health and sleep schedule.

Dashboard

The dashboard shows Elizabeth her schedule.

Based on her schedule, Snooze will show her the range of optimal sleep times on certain days.

Even if her schedule isn't fully filled in for a day, Snooze is able to use sleep data from previous days and weeks to project the best sleep times for her.

Sleep History/Statistics

Elizabeth can see her sleep history with the sleep statistics feature.

Snooze keeps track of how long she's slept throughout the week and when she's asleep based on phone data. Snooze then analyzes these patterns to plan out the most optimal times to sleep, so she has some consistency in an otherwise busy routine.

Education

Elizabeth can also access Snooze's library of courses about everything sleep related - from the best time management tips to the biology behind sleep cycles.

As a night shift nurse, she can join the appropriate community to connect with others, share her sleep experiences, and make new friends with its built in forums and messaging system.

Click to watch the FINAL PROTOTYPE VIDEO