

SMART SOLES

LITTLE STEPS ADD UP TO BIG RESULTS

INFO 360



Specification Document

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PROBLEM STATEMENT

Many people are trying to make the transition from a sedentary to an active lifestyle in order to improve their general health.

Smart Soles helps users through this transition by providing a unique technology solution that works to **empower the individual** through providing easy access to personalized information. This product is a more **accessible and data-driven solution** to meet current health goals. Smart Soles is a shoe insert that tracks key health data, as well as an accompanying mobile application to view and track your personal progress. Smart Soles is a needed addition to the current health marketplace because it helps beginners learn more about their exercise (as well as corrects their form through haptic feedback), is more accessible than other products on the market, and is modular enough to be put into any pair of shoes. Our design will exist in the context of the individual transitioning into a healthier lifestyle.



The Smart Soles **MISSION**



At Smart Soles, we care about helping you make a transition to a healthier lifestyle. We have all struggled with making fitness goals we haven't kept, keeping track of the activity we are completing, and understanding what progress is being made. Smart Soles helps you see the steps you are taking to a healthier lifestyle so you can see what's possible. **Little steps add up to big results** -- and we are excited to show you how easy it is to have a more active lifestyle. The bottom of the foot has untapped potential for understanding your movements and how to exercise effectively. Smart Soles harnesses products that are already a part of your life with technology to tap into this resource.

PROBLEM STATEMENT

Designing for Transition

Smart Soles is designed for those who are interested in pursuing a healthier, active lifestyle. By harnessing products that are already a part of your daily life, such as shoes and your smartphone, we can add a layer of technology to help you form healthy habits. We are here to support your transition (and your arches) as you make exercise a part of your daily routine. Health is personal -- by seeing your progress and understanding how your body moves, you are empowered to continue working to meet your personal health goals.

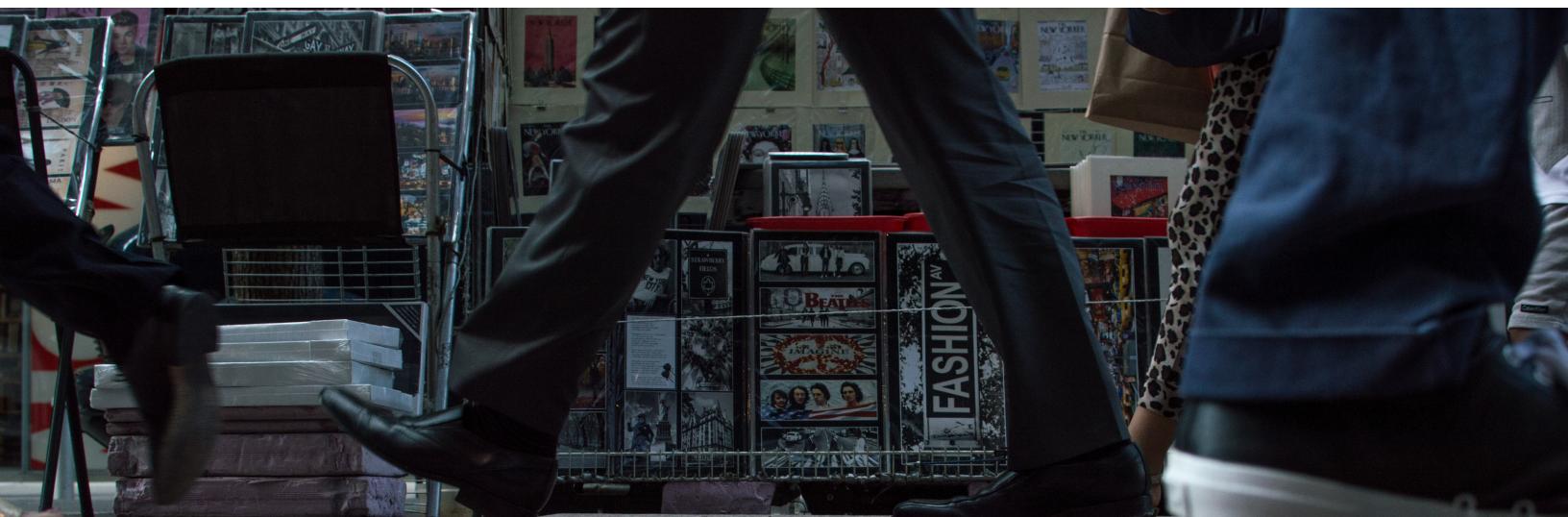
Physical and Digital Combination

Smart Soles is comprised of two main components, the physical shoe inserts that can be placed in any shoes and an accompanying mobile application. The physical shoe inserts contain components that utilize the bottom of the foot to collect unique health data such as pace and pressure which help us correct your running style through haptic feedback, calculate calories burned, and measure your weight upon request.

You have the ability to view and interact with this information through our smartphone application.

Data-Driven Health

Smart Soles allows you to be aware of your personal activity, which helps build personal motivation to increase physical activity. By providing haptic feedback while running, we can put you on the right track for how to exercise properly in order to prevent injury. Along with the data we collect, you also have the ability to sync other health applications into our mobile application for a full view of all your activity.





Creating Our Product

ROADMAP

PROFILES



Meet Mike.

21 years old
Single, Male
College Student

Mike is a current college student in Seattle, Washington. In high school, he exercised frequently and was an active member of his school's track and lacrosse teams. Since getting to college, Mike has been overwhelmed trying to manage school, work, and a social life. With all of these responsibilities, he has let his active lifestyle diminish and doesn't make time for exercise. He has started noticing that he has been putting on some weight and wants to get back into a healthy, active lifestyle to improve his mood and feel more energized. While he may not be able to go to the gym daily, he wants to know what kind of activity he is getting on a daily basis and how much he should be adding into his free time. Mike enjoys using new technologies -- he frequently uses his smartphone, computer, and new applications. He doesn't currently own a health tracking device, but is open to the idea that technology could help him on his journey of getting back into the active lifestyle he once experienced.

PROFILES



Meet Jane.

35 years old
Married, Female
Cardiologist

Jane is currently both a mother of two young children and works full-time as a Cardiologist. She leads a relatively healthy lifestyle and has started trying to go on a morning run a few times a week. Jane has never played sports before and is just starting to get involved with running. As a Cardiologist, she understands the importance of being active since exercise can combat many heart-related diseases. After seeing many of her patients struggle, she is motivated to increase her amount of activity and try out new devices she can recommend to her patients. As a new runner, Jane is most interested in the haptic feedback feature of Smart Soles, which can help alert her when she is running improperly. She has never owned a health wearable device, but due to her profession has always been interested in personal health tracking. Jane is motivated to improve her running abilities and is looking for a device to help her through the process until she is able to develop the correct habits.

PROFILES



Meet Valerie.

68 years old
Married, Female
Retired

Valerie is a recently retired teacher who finds herself living a much more sedentary lifestyle now that she is spending more time at home. She just recently went through a knee surgery and is starting the process of recovery by taking short walks with light exercise. She understands that physical activity is critical to her recovery process and will help change her sedentary lifestyle for the better. Valerie isn't very technology-friendly, but does own a basic smartphone. She is open to purchasing a device that will help her through this health transition, but for her to use it frequently it needs to be unobtrusive and comfortable. She already currently wears inserts in her shoes for comfort when walking. Her family is supportive in assisting her through the recovery process and along with her doctors, wants to see the kind of progress she is making with increased activity. She is looking for a simple device to help her through the transition of her recovery and to help her keep track of the activity she is completing on a daily basis.

SCENARIOS

Smart Soles fits into your everyday life.



Work



Home



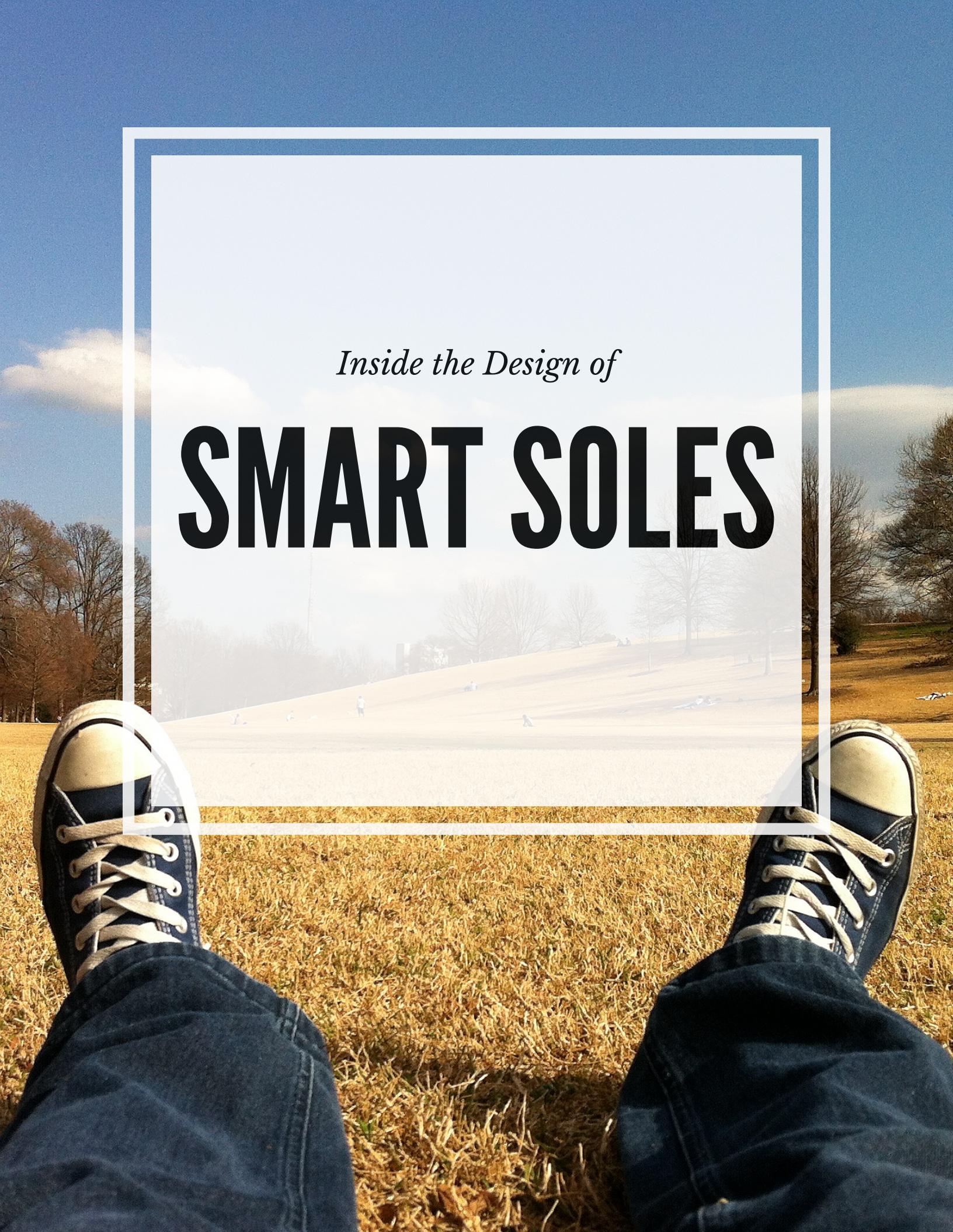
Outdoors

We wanted to create a product that fits into your everyday life, so we went straight to the *sole* of the challenge. The shoe insert is the perfect addition - it's a device that can't be lost easily and fits into whichever shoes you are wearing today. While other wearable devices can be uncomfortable and obtrusive, we wanted to create a fitness tracker that blends seamlessly into what you wear everyday.

By enabling a shoe insert to be a smart device, we give comfort and support for your feet while providing you with more information about how your body moves. The shoe insert is always hidden, so it matches every outfit and you can forget your data is even being tracked. Whether you are at work, in your home, or exploring the outdoors, Smart Soles moves where you do. Let Smart Soles show you how little steps can add up to big results, no matter which setting you're in.



**SMART SOLES
FIT INTO YOUR LIFE**

A photograph of a person's legs and feet wearing dark blue jeans and dark blue Converse-style sneakers with white laces. They are sitting on a grassy hill, looking out over a park area. In the background, there are trees, a road, and a few people in the distance under a clear blue sky.

Inside the Design of

SMART SOLES

RESEARCH



Research suggests that pedometers can help people improve their step counts. A review published in the Journal of the American Medical Association examined 26 studies involving more than 2,700 participants and found that "overall, pedometer users increased their physical activity by 26.9 percent over baseline." The study also concluded that pedometer users significantly reduced their body mass index as well as their blood pressure. (1)

"It's tremendously helpful for motivation to have a realistic understanding of where you actually are and then track your own improvement," Geier said. "Tracking on its own won't make you lose weight or get healthier, but it can certainly help you get closer to at least the recommended 10,000 steps a day which very few people currently achieve." (2)

RESEARCH



We found the transition into a healthy lifestyle the most interesting due to it's growing importance, especially in the United States. According to the President's Council on Fitness, Sports & Nutrition:

Less than 5% of adults participate in 30 minutes of physical activity each day; only one in three adults receive the recommended amount of physical activity each week.

Recent reports project that by 2030, half of all adults (115 million adults) in the United States will be obese.

More than 80% of adults do not meet the guidelines for both aerobic and muscle-strengthening activities, and more than 80% of adolescents do not do enough aerobic physical activity to meet the guidelines for youth. (3)

PROTOTYPING

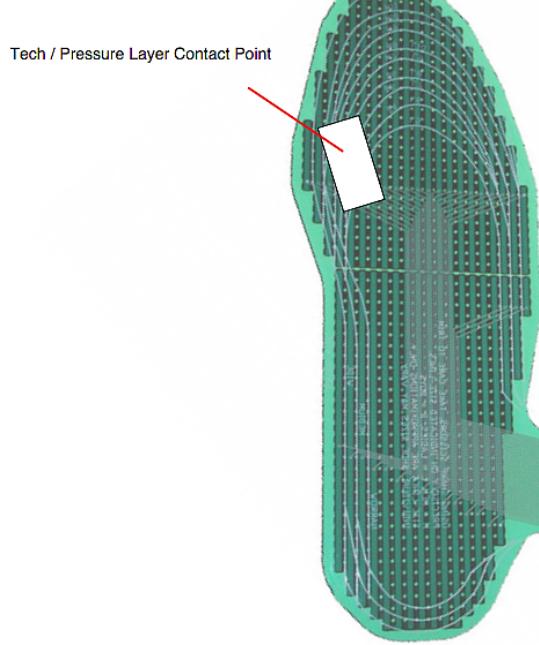


Research regarding the growing health crisis in America, coupled with the knowledge of health tracking making an impact, presented an opportunity for us to use new technologies as solutions to current problems. We've all made the New Year's Resolution to exercise frequently or attempted to try fad-diets, but the motivation to reach these goals never lasts long enough to make the full transition into an active lifestyle and establish healthy habits. We created Smart Soles as a response to the research that gives us a call to action and to the transition failure we've experienced personally. In order to help users complete the transition into a healthy lifestyle, we began an iterative process of prototyping both a physical insert and digital application. After creating versions of these products, user testing, and prototyping again, we've created a product we think users will love. The physical insert contains three layers -- the pressure layer, digital layer, and comfort layer. As the physical insert picks up your personal health data, the digital application allows you to view it all seamlessly. Our smartphone application provides information on factors such as weight, pace, and pressure, as well as allows the user to input personal goals which adds tangible steps to making progress towards your transition. We're excited to be using technology to solve such a growing problem and to empower our users with the tools to make it through their personal transition.

SMART SOLES MAKE TRACKING EASY



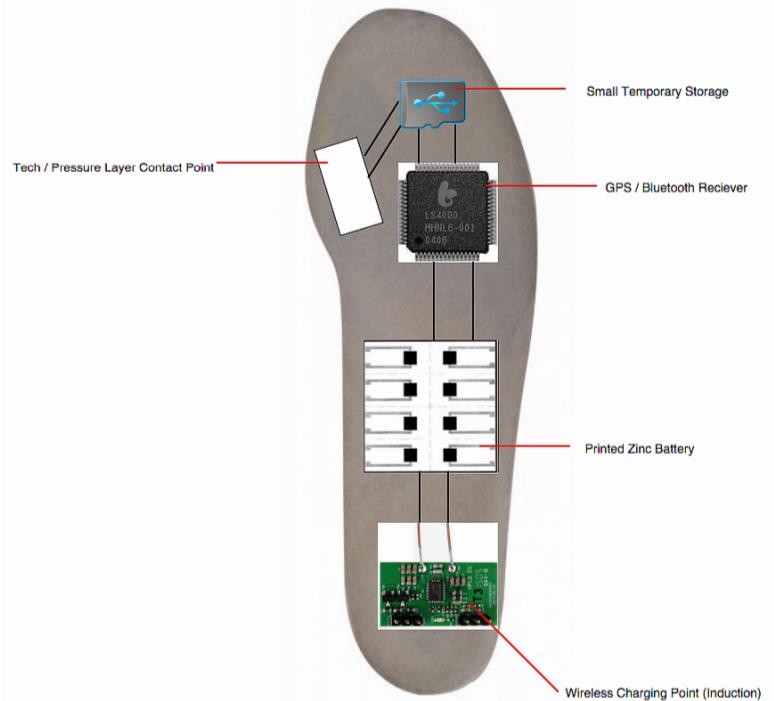
PROTOTYPING



PRESSURE LAYER

The pressure layer of our design is where our product collects the pressure information from our users as they are active with Smart Soles.

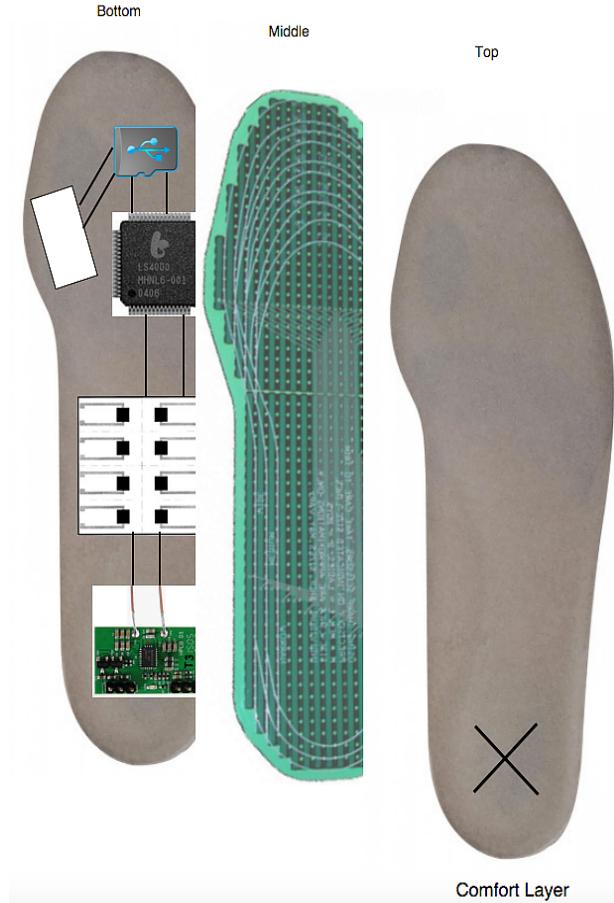
At first, we planned on having only three different sensors to determine which part of the foot struck the ground first, but after interviewing perspective users and hearing how interested they were in complete pressure mapping, we chose to implement a full-foot pressure mapping sensor with many more sensors that could more accurately map the whole foot (4). Once the user steps on the insole, the pressure layer determines which part of the foot hit the ground first, and relays this information to the tech layer through the tech/pressure layer contact point.



TECHNOLOGY LAYER

The technology layer of the insole lies just under the pressure layer, and is where aspects of the product such as GPS/Bluetooth tracking, the charging apparatus, and temporary data storage are located. We experimented with many layouts that put the more fragile components near the heel or mid-foot, but decided against it as we decided that it would take more of a pounding as most humans run with heel-toe or mid-toe form (putting a great deal of stress on the fragile tech)(5). We also decided on a printed zinc battery for our battery supply as it would be flat and rechargeable (6). The induction charging point was added so the user wouldn't need to remove the insole from their shoes to charge it.

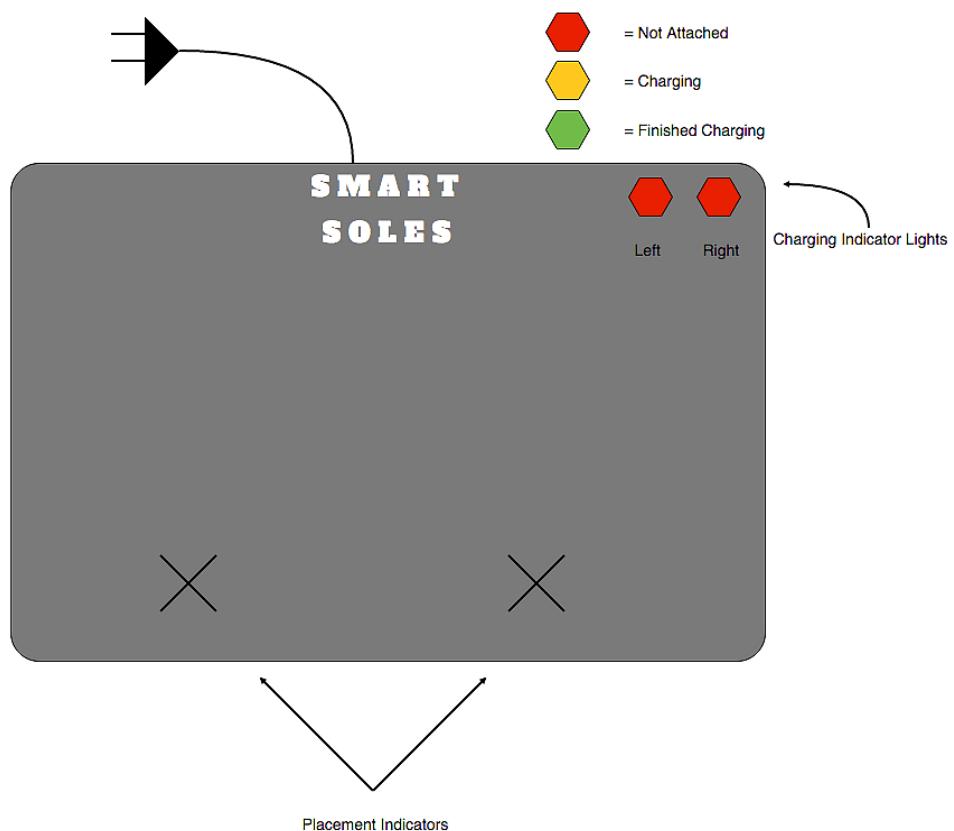
PROTOTYPING



The top layer of our design, the comfort layer, serves as a buffer between the user and the electrical components as well as the comfortable, gel-like layer that will eliminate foot pains while moving. We want to make sure that the comfort layer is waterproof and firm enough to keep out moisture while additionally allowing the pressure sensors to be able to accurately read foot pressures. There is also a small "x" marked on the heel of the comfort layer (over the charging tech) to give the user feedback on where to place the insoles on the charging mat to allow for wireless charging.

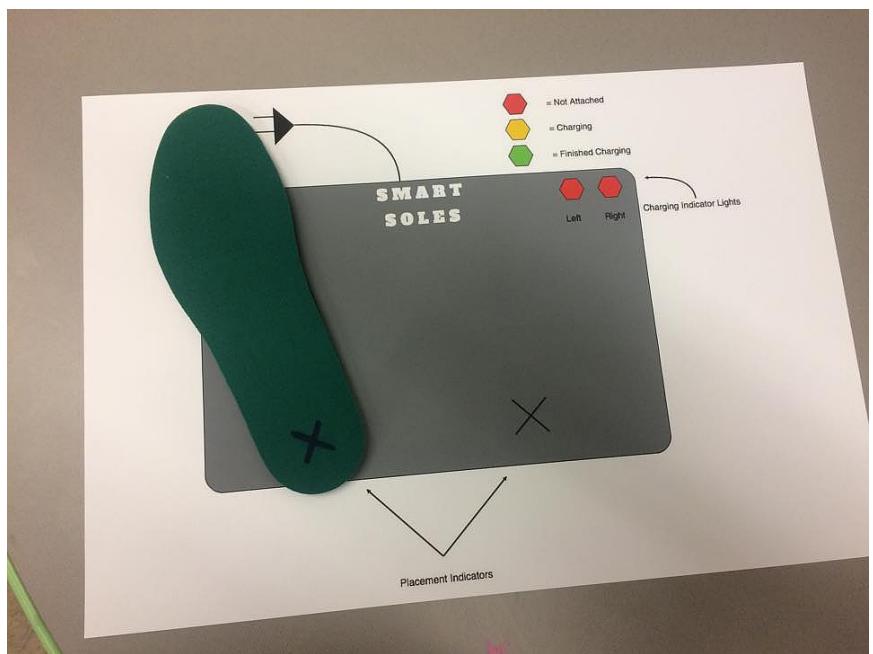
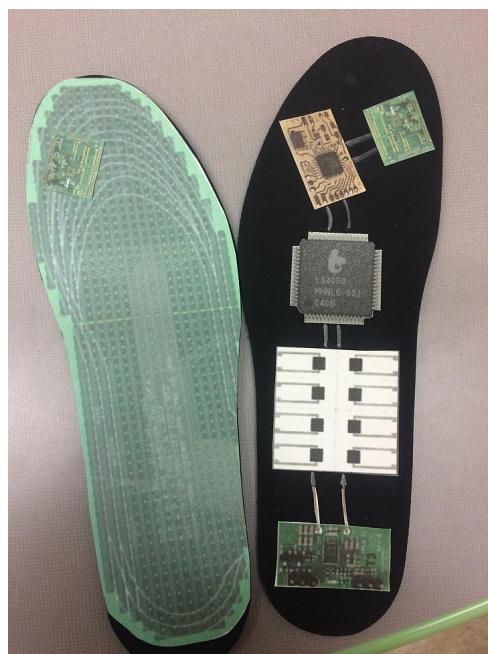
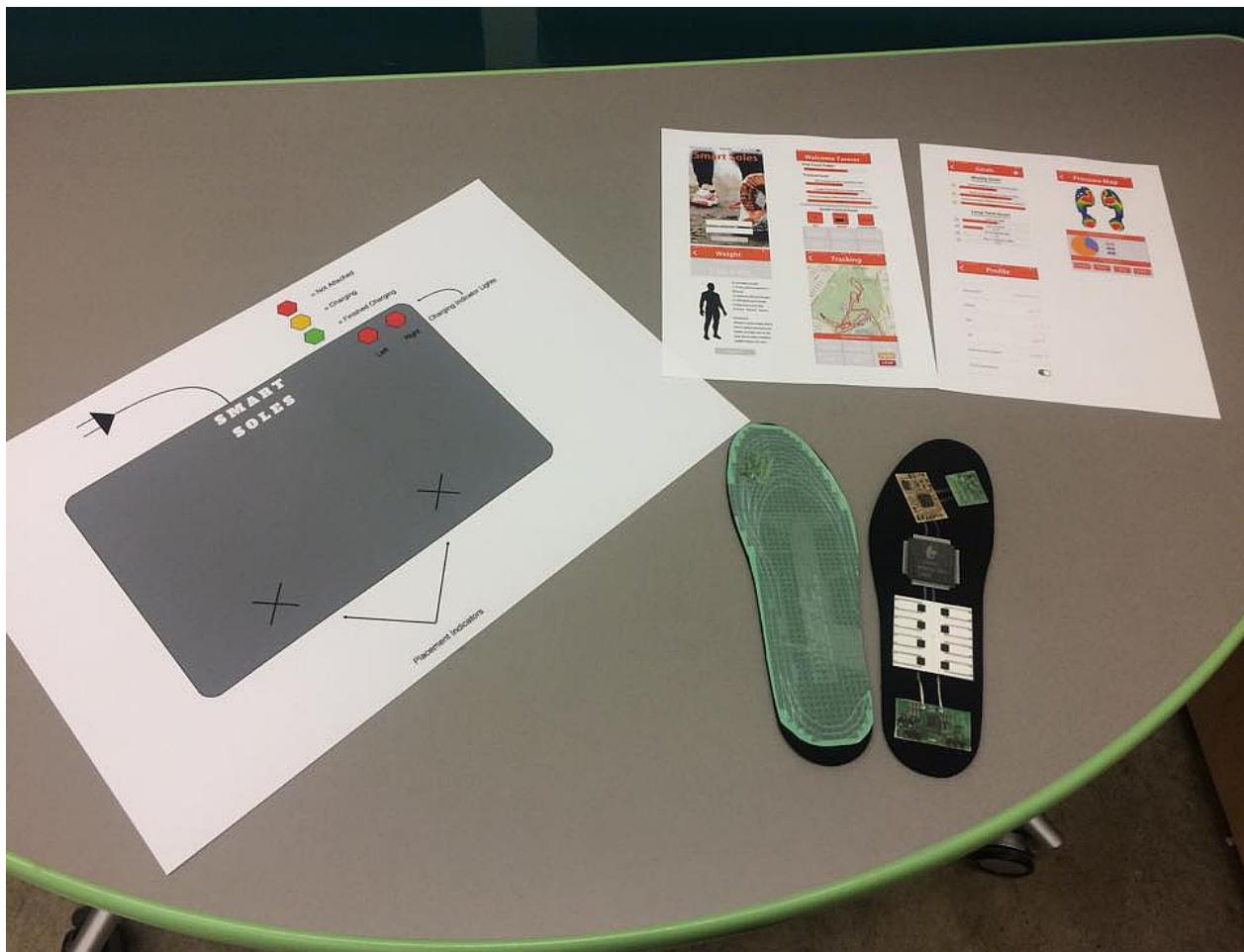
When all three of these layers are put together, the result is a strong, flexible, and durable insole that protects the tech involved, provides comfort to the user, and is able to transfer data easily to the digital application.

PROTOTYPING

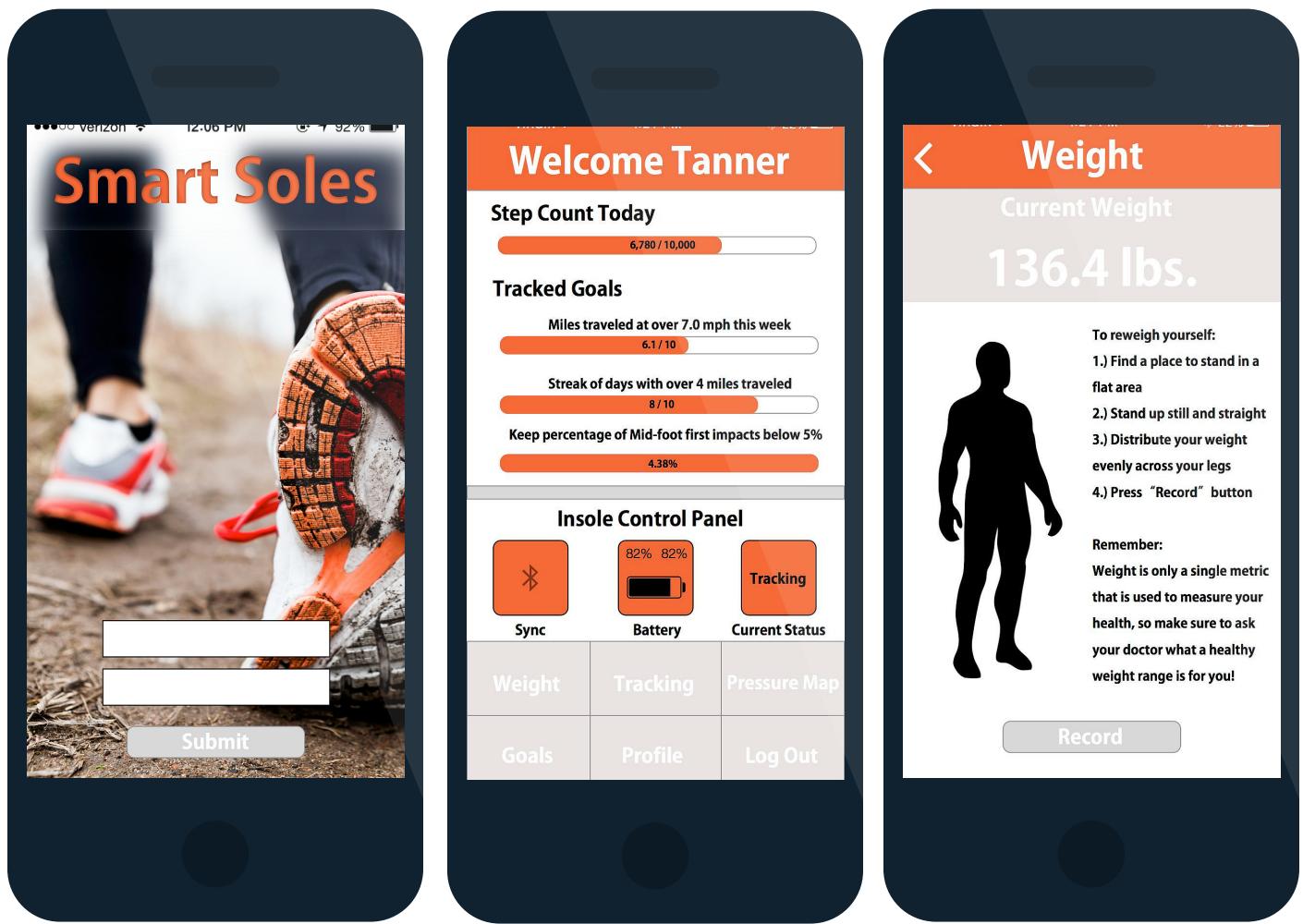


In order to charge our insole design, we decided to create a prototype of a wireless charging mat that plugged into a normal wall socket. We imagine this could be plugged in near the door or wherever shoes are usually kept by the user. All that the user would have to do to charge their smart soles would be to place their shoes on the mat so that the "x" on the insoles rest above the corresponding "x" on the mat. We made the design responsive as it gives feedback to the user via color-changing LED lights when the insoles are charging correctly. There are two LED lights, one for each shoe, that change color depending on what state the insoles are in. The LEDs will display red when there's no insole currently charging, yellow when the insole is currently charging, and green when the corresponding insole is completely charged. We chose to implement the design in this way to minimize the amount of time the user has to devote to upkeep of the smart soles, allowing for the transition to using the insoles as seamless as possible.

PROTOTYPING



PROTOTYPING



With our application, we chose to focus on a layout that would be beginner-friendly and simple. With this in mind, we created a unified color scheme of orange/grey/black so that important text and features would be easy to spot.

For our main menu, we played around with some busier screen types, but ultimately users enjoyed the simpler, minimalist layout. This simpler layout not only allows for beginners to easily see how to navigate, but it also is less intimidating and won't be a frustration that might keep a user from continued use.

Originally, our weight screen showed only the user's current weight and instructions on how to use the weight feature. However, after thinking about our goals going into the project of promoting better health to people new to being active, we felt it was our responsibility to convey to the user the weight isn't the only important metric.

PROTOTYPING



The tracking / GPS portion of our application was constructed with a beginner runner in mind. We have the very basic metrics such as speed, distance, time, and information about current pace. As the user runs, the physical insoles sync with the digital app via Bluetooth and displays the GPS location of the user. The user is also able to start, stop, and pause a workout.

Our pressure map function allows the user to see the current map of pressure in their feet in real-time. This information can help them see if their feet are hitting the ground in their desired way (i.e. toe-first, heel-first). It also allows the user to view the average pressure over time.

The goal portion page is a part of the app that attempts to provide a user with a tangible view of their improvement, as well as incentive to continue staying active. They have the ability to create new goals as well as "favorite" goals that can be seen directly on the home screen. Goal-setting is a major part of leading a healthier life, and we want to incorporate that into our application.

SMART SOLES ANALYZE YOUR HEALTH



USER TESTING



To learn more about what our users are looking for, we went straight to the source to talk with them about prototypes of our project. We gathered information through three primary user testing methods -- **interviews** so we could have in depth conversations about our users exercise experiences, **A/B testing** our application to figure out which interface decisions created a more intuitive experience, and a **survey** to distinguish between feature addition. We want to make sure that people love our product and it helps them effectively reach their goals. How are people using our technology? What purpose are customers using our product for? We set out to find the answers to these questions by speaking with a randomly sampled group of potential users. Smart Soles strives to be customer-centric in all that we do so that we can most effectively help you transition into living an active lifestyle.

USER TESTING

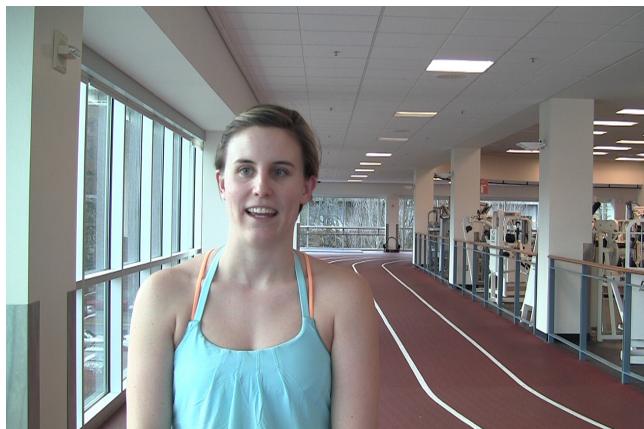


CONTEXTUAL INTERVIEWS

We chose to conduct contextual interviews to reach some of target users in their natural environment for the most accurate results. By combining observations with our interview questions below, we were able to learn that most of users haven't owned a wearable technology device before but are open to the idea of purchasing one in order to help them with their exercise efforts. Most users were interested in gaining information about their pace, correcting their running, and wearing a device that was sleek yet moderately priced. They were also optimistic that a technology device could be used to improve their health.

INTERVIEW QUESTIONS

- Have you ever used a wearable tech?
- How much are you willing to spend on a product like this?
- Have you ever worn or do you currently wear shoe inserts?
- What are your fitness goals?
- What type of data do you want to get from this app?
- What data will you like to see for you to reach your fitness goals?
- What has prevented you before to get into exercising?
- If you exercised before and stopped, why?
- What would help differentiate us from other similar products?



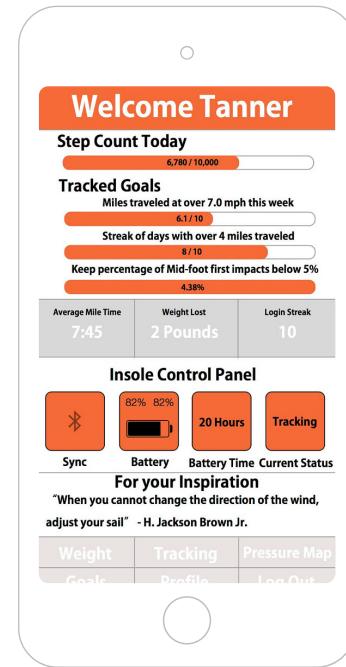
USER TESTING



OPTION A

A/B TESTING

The A/B testing process is a randomized experiment with two variants (A and B) with slightly different qualities that can affect user behaviors. By running these tests, we are able to identify which changes in the interface can maximize the user experience. We chose to test the home screen of our application because we felt this was a very critical piece in creating an intuitive process. We randomly tested with 18 students on the University of Washington campus and observed their behavior navigating through our wireframes. In this experiment, we asked them to navigate to the tracking page, see what percentage the battery was currently at, and take their weight. This helped show us that Option A provided an easier navigation experience.



OPTION B

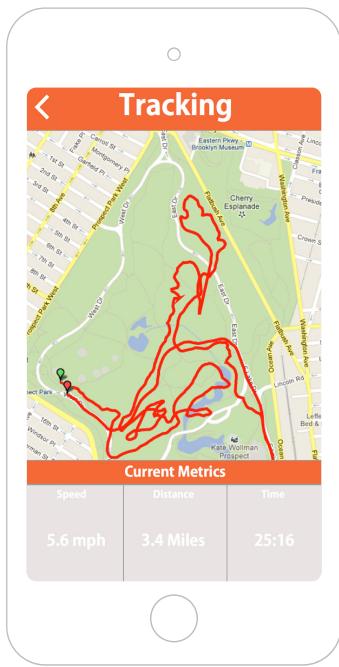
OPTION A FEEDBACK

The group who tested option A tended to find their weight and have very little difficulty changing it without getting lost or distracted.

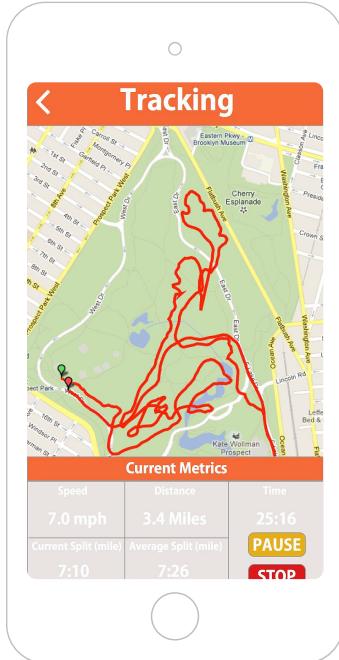
OPTION B FEEDBACK

In the group that tested option B, there were many more people who got lost / confused while they were trying to navigate the main menu. Many said they were a bit overwhelmed by the amount of icons and bars that were on the main screen. Additionally, once the "weight" button was found, a few individuals had trouble pressing the button as it was so small.

USER TESTING

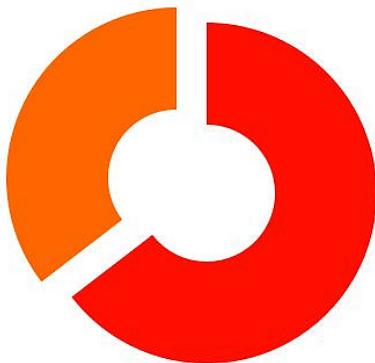


OPTION A



OPTION B

OPTION A
17 PEOPLE
35.42%



OPTION B
31 PEOPLE
64.58%

SURVEY

For our tracking interactions, we decided to survey 48 students at the University of Washington to see which of our two options they preferred. Option A has continuous tracking, with no start/stop buttons, that displays speed, distance, and time. Option B is a more complex, data-rich screen that allows the user to choose when they want to track their metrics with start/stop/pause buttons. The screen also displays information such as speed, distance, time, average split, and current split.

INTERFACE DECISIONS

Based on our survey results, we chose to proceed with the Option B screen because our users preferred to see more information and felt more control with having the ability to stop tracking upon request. Based on the feedback that we received, in future iterations we will also add a question symbol to the top in order to explain fitness terms such as "split".

EVALUATION



To continue evaluating our product, we'll complete longitudinal user testing to see if our device helps users make their full transition into a healthier lifestyle. We'll track how often users use their inserts and see if increased use of Smart Soles correlates to health improvements and a greater amount of completed personal goals. While we have already completed user testing to make interface decisions, moving forward we will incorporate analytics into our application to see which buttons and features are most frequently used. We can also continue using A/B testing as a method for determining which new features we'll add in our "n+1" iterations of Smart Soles -- such as sharing on social media, providing motivational quotes, or showing personalized health tutorials. We would also like to survey frequent users about their experience with Smart Soles to see how our product has helped them in their transition to a healthier lifestyle, feedback on what features or additions they would like to see, and testimonials on the user experience. By constantly evaluating and iterating on our product, we know we'll be able to pinpoint exactly how technology can provide a solution for the journey to an active lifestyle.



**SMART SOLES
CHANGE HOW YOU MOVE**

SOURCES

1. https://www.washingtonpost.com/national/health-science/high-tech-or-low-fitness-trackers-make-you-more-aware-of-your-steps-daily-activity/2014/10/20/db27eb10-4ef9-11e4-aa5e-7153e466a02d_story.html
2. <http://www.reuters.com/article/2015/02/10/us-step-trackers-accuracy-idUSKBN0LE25L20150210#RyErQbDsuBRoRdkq.97>
3. <http://www.fitness.gov/resource-center/facts-and-statistics/>
4. <https://www.tekscan.com/products-solutions/pressure-mapping-sensors/3001ESport>
5. <http://www.barefootrunning.fas.harvard.edu/4BiomechanicsofFootStrike.html>
6. <http://www.extremetech.com/extreme/145083-printable-flexible-rechargeable-non-toxic-zinc-batteries-could-challenge-lithium>

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