Sitless

Members:

- **Geoffrey Liu:** Project Manager
- **Adrian Sham:** Designer
- **Keting Cen:** User Researcher
- **Artem Minyaylov:** Developer

Problem and Solution Overview:

According to JustStand.org, people on average sit for about 7.7 hours a day[1]. Furthermore, the American Medical Association (AMA) says that sitting for extended periods of time is unhealthy behavior. While we might think that regular exercise can offset this, studies have found that the amount of time a person sits during the day is associated with a higher risk of heart disease, diabetes, cancer, and death, regardless of regular exercise[2]. Standing more may also have benefits such as improving energy levels and cognition[3].

Our solution is a smart leg band that we call the Sitless band. It is a device that wraps around your thigh and is worn underneath the pants all day long. It features sensors to detect the orientation of your legs and the tension in your leg muscles. Additionally, this device features a haptic feedback component to notify the user. We chose this design because it can help to track the sitting duration and posture.
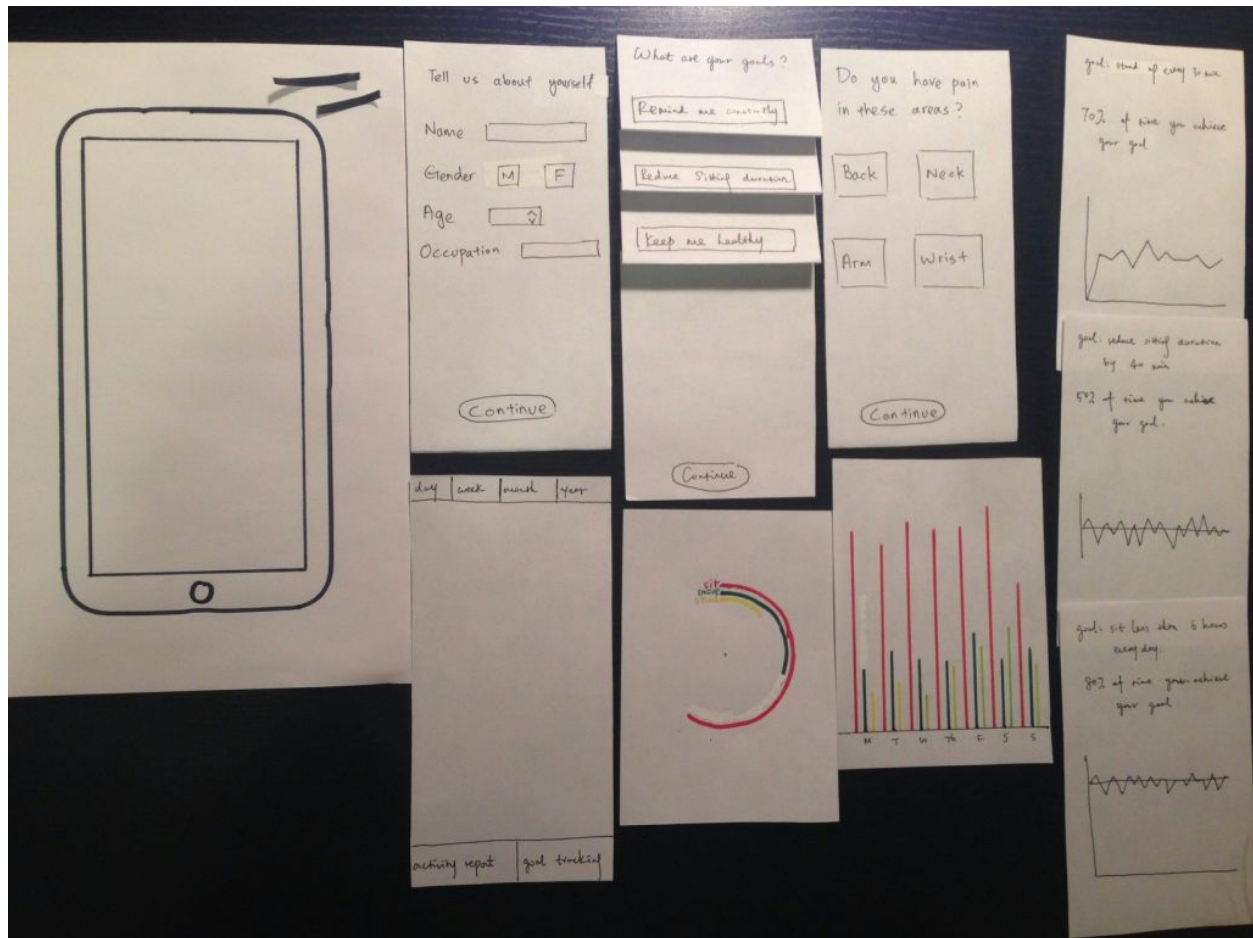
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[1] http://www.juststand.org/tabid/816/default.aspx
[2] http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3404815/
[3] http://blogs.cdc.gov/niosh-science-blog/2012/12/05/sit-stand/

Initial Paper Prototype

Original paper prototype

Our paper prototype is mainly focused on the interactions the user will have with the mobile app of the system.

The first task of the design is to "set up smart reminders". The goal of this task is to let the user help the app gain a better understanding of the user when the system is first used and to let the user set goals using the app. A key aspect of this design is the ability to let the user choose goals, while also specifying whether the user experiences certain types of body pains (back, neck, arm, wrist).

The second task is to "track progress towards goals". The goal of this task is for the user to be able to see the progress that is being made towards their goals. A key aspect of this design is the use of different views (daily, weekly and monthly) to let the user see the amount of time spent sitting, standing and moving. The app also allows the user to view their current progress

towards goals that were chosen during the setup process, using a percent scale as a measure of how close the user is to a goal.

Testing Process

For our usability testing, we tried to have the participant achieve two tasks using our design. The two overall tasks are setting up the app and letting the participant track their progress. We have added the script we used when testing our design, including what we will tell the participant and what tasks we will ask the participant to accomplish (see appendix at the end of the paper).

Our first usability test was with a UW student, and it took place at Odegaard Library. We chose our participant because of two reasons. First, he is a student, and fits our target audience demographic. Second, he is motivated to sit less during lecture and studying. The test protocol was a cognitive walkthrough in which the participant was to accomplish three tasks with Artem acting as the facilitator and computer, and Adrian was the observer. For the first task, the participant was asked to get through the setup process using his legitimate information and setting his desired goals. For the second task, he was asked to find and navigate to the weekly report of his sitting history. For his third task, he was to find and navigate to a specific progress report for a goal he set earlier in the usability test.

Our second usability test was a female UW student, and it took place at her apartment. We chose our participant because she is someone who is motivated to sit less and she fits the target audience for our app. For this test, Adrian was the administrator, Artem was the computer, and Geoffrey took notes. For this usability test, we used the testing script we wrote before to help keep the testing consistent.

Our third usability test was a male front-desk receptionist, and it took place at their office building. We chose our participant for two reasons. First, he was a different part of our target audience than our first two participants. Second, the location where he works fits our target environments because we anticipate our app will be used in an office setting. For this test, Keting was the administrator, Adrian was the computer, and Artem took notes. We also used the testing script we wrote for this test.

Using feedback gathered from usability testing, we made modifications to the design of a few components and slightly modified part of the tasks. For example, following feedback from a participant, we added a calendar synchronization feature to help better understand the user's day. Another change we made was to modify the daily report view to show more relevant information, with comparisons to previous days and weeks. We also fixed a confusing aspect of our design, which is the specification of goals during the setup process.

Testing Results

One of the major modifications that we made to our paper prototype is the change from a goal-oriented app to an achievement-oriented app. The initial reason that we allowed the user to define goals during the first task is to help the user stay motivated by working towards quantifiable, measurable sitting goals. However, during our initial usability testing and heuristic evaluations, we found that allowing the user to set goals was confusing to the user, especially as the user was just starting to make use of the app and may not have clear goals in mind.

In order to solve this issue, we decided to switch to achievement-based motivation, which will reduce confusion and allow the user to have preset goals they can try to accomplish. We think that this was an important design issue to fix early on since we do not want to lose users while they are getting started with the app.
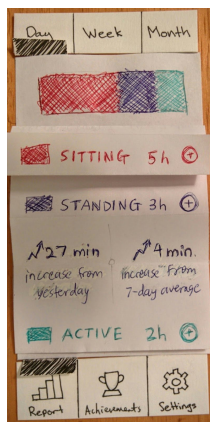

The next major modification we did following user testing is the redesign of the daily view screen. For the previous redesign, we changed from circular lines to a pie chart. But testing showed that users would like to be able to see more information regarding their day, such as the hours spent sitting, standing and being active. As shown in the figure to the left, we redesigned the page and converted it to a horizontal stacked bar graph to save on vertical space, while giving the user a quick view of the relative time spent sitting, standing or active. For more detailed information, the user could click on the "+" symbol and get more information about the trends of the user's sitting behavior.

Another revision we decided to make is to add optional calendar syncing during the setup process. During one of the tests, the user asked whether our application would consider situational context, e.g. if the user was in a meeting and could not stand up. We thought that it would be interesting for the app to use personal calendar data to give a more detailed breakdown of the user's sitting behavior. This data can also be used to prevent nuisance reminders, skipping reminders when the app knows that the user is in a meeting based on a calendar entry. Of course, this assumes that the user keeps track of their activities on a calendar, bet we think that this will most likely be the case for office workers with detailed schedules on their business calendars.
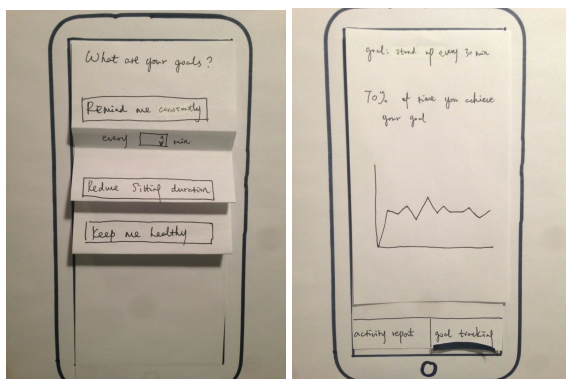
During the first usability test, we received feedback that the *Goals* page (left) of the app was confusing, with the user being unsure what each goal meant, at that point we decided to remove it from the paper prototype. Since we were going to be removing goals, we also decided to remove the pages related to progress towards goals (right).

In the second usability test, we received questions regarding the relevance of asking for the user's occupation during the setup process. Since we felt that it was confusing to the user and did not add much value to the app, we decided to remove it before the third test.
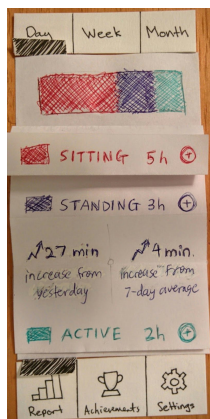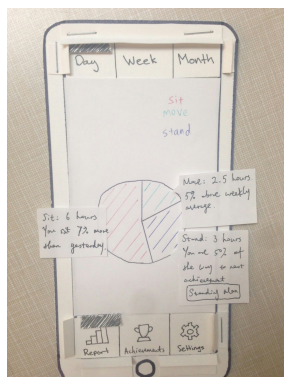
Before we settled on the final version of the *daily report* page, we also tried using a pie chart to represent the relative amount of sitting, standing and moving. In our second usability test, our user said that the use of percentages to specify changes for activity times was confusing, so we changed it to display actual minutes.

We switched away from a pie chart (left) it takes up too much vertical space, which we needed for displaying additional information.

Final Paper Prototype

The first task for our design is still getting the user to "Set up smart reminders". A few things changed from the first prototype, even though the goal of the task remains the same. The first is the addition of the smart band, and a few pages to help the user connect the smart band with the app via bluetooth. Next, instead of asking for information such as body pains and occupation, we decided that asking for permission to see the user's calendar data would be more helpful. We also ask for the user to sign in to an existing Google or Facebook account, or create a new account, so that the user can be tracked across multiple devices.

The second task, which was originally "Track progress towards goals" is now "Tracking progress toward healthy sitting habits" instead. This modification of the task reflects our decision to move away from a goal based app to one based on achievements. The main reason for this change is to reduce the confusion experienced by users during the setup process, where the app asks the user to define goals. With this change and the feedback from usability testing, the

app now displays the user's sitting, moving and standing information in a more user friendly way, such as by using minutes instead of percent to display daily duration changes.

We also added an achievements page, which shows the user what achievements have been achieved, and what achievements can still be earned or are in progress. To help the user better understand what an achievement means, we added short explanations that appear when an achievement is tapped.
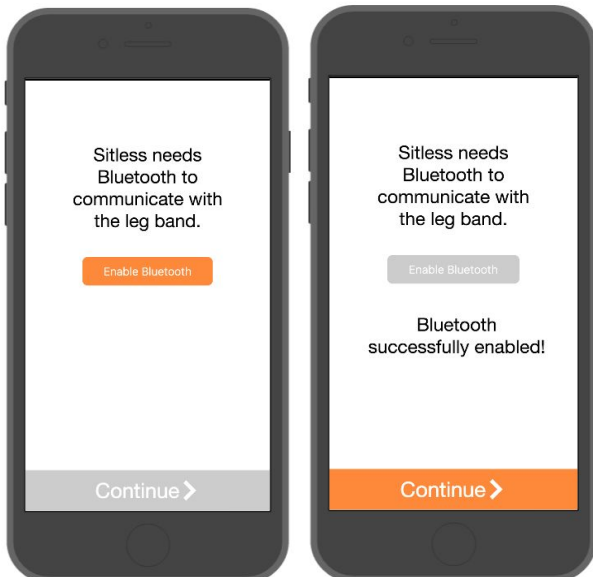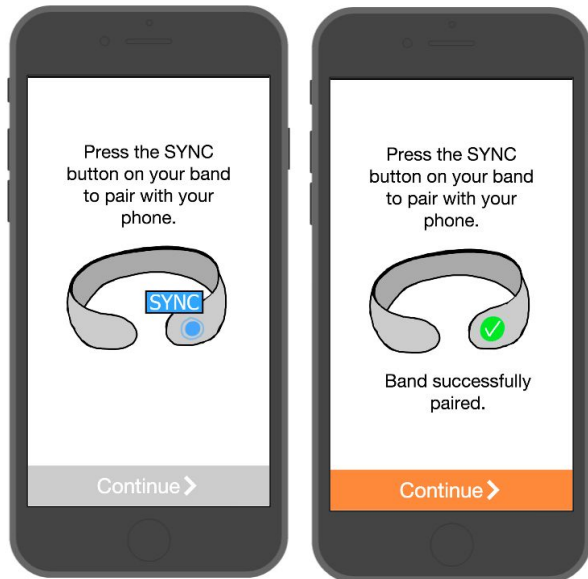
Digital Mockup

Task 0: Connect band

Figure 0.1: This screen shows the welcome page for the Sitless app, the user would click begin to start setup.

Figure 0.2-0.3: If the user does not have bluetooth turned on, this screen will appear. Otherwise skip to 1.3.

**Figure 0.4-0.5:** This shows the user how to pair up the band.

Decisions/Changes:
In our previous tests, all participants were able to connect the leg band and phone app successfully without any guidance. We kept most of our design from paper prototype. We made a minor change that we disable the "continue" button if bluetooth is not available (refer to Figure 0.2) or if the band is not synced with the phone (refer to Figure 0.4). We were not able to show distinctions between different buttons in the paper prototype. In our digital mockup, we differentiate buttons to guide users to complete the current task before moving on to the next screen.

Task 1: Set up smart reminders

Figure 1.1: Let the user sign in using a Google/Facebook/LinkedIn/Twitter account so that we can quickly get the user's information and possibly allow the app to track the user across multiple devices, with a desktop app.
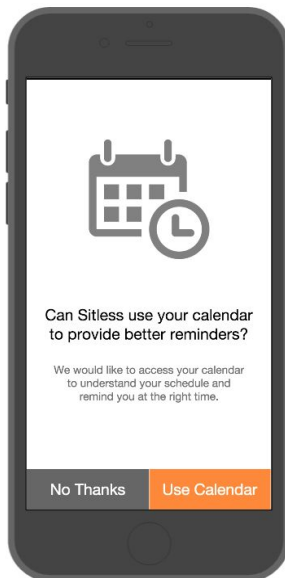
Figure 1.2: This is what the user initially sees when starting the app for the first time. The user needs to fill out the information and hit "Next".
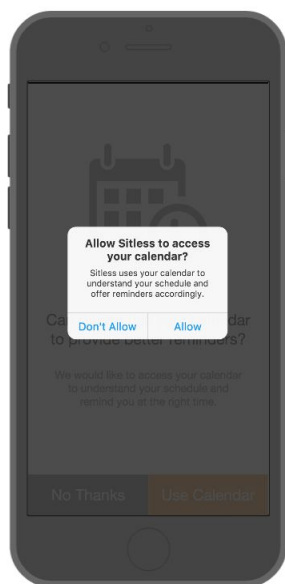
Figure 1.3: We give user option to sync their calendars so our system can offer better reminders and reduce nuisant reminders.


**Figure 1.4:** We inform the user that they need to install the desktop application as well.

Decisions/Changes:
We allow users to sign in with Linkedin or Twitter accounts in addition to Facebook or Google because we hope to better support part of our target audience, office workers. Another change is that we combined the page asking for name/email/password and name/age. For those users choose to log in with Facebook/Google/LinkedIn/Twitter account, we are able to get their age information from external accounts. Originally, we had a second page asking for age only (with name auto filled), but we decided to keep it simple and move the age information to the first page. Originally we had figure 1.4 as a notification that setting up is complete. But we learned from the critique session that we should inform users that they need to install desktop applications as well. So we created this new screen to remind users that this desktop app is available.

Task 2: Tracking progress toward healthy sitting habits
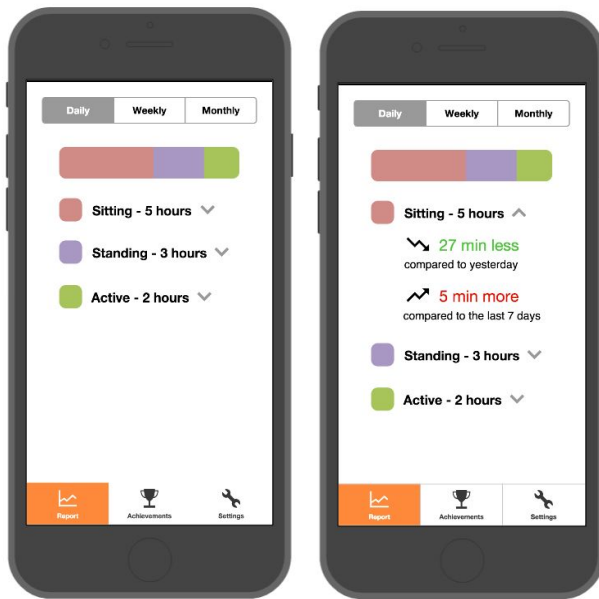
Figure 2.1-2.2: This is the daily report, which shows the user's statistics for the current day. Clicking on a dropdown arrow displays more information regarding today's comparison to yesterday and to the past seven days.
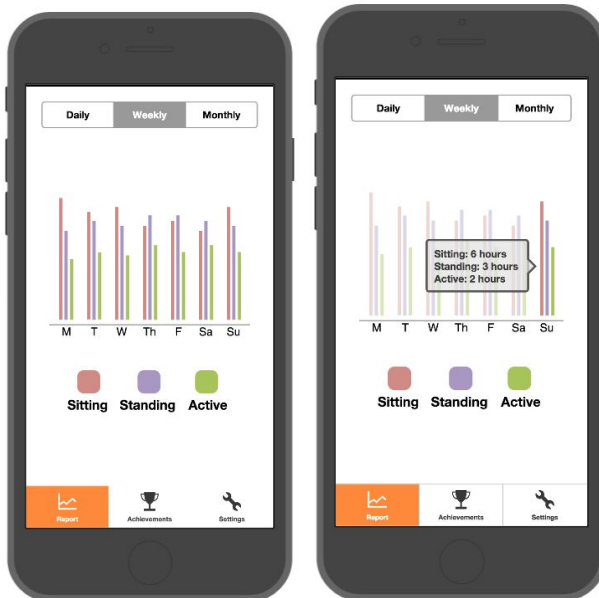
Figure 2.3-2.4: This is the weekly report, which displays the user's statistics for the last seven days. Clicking on a portion of the graph displays that day's data.
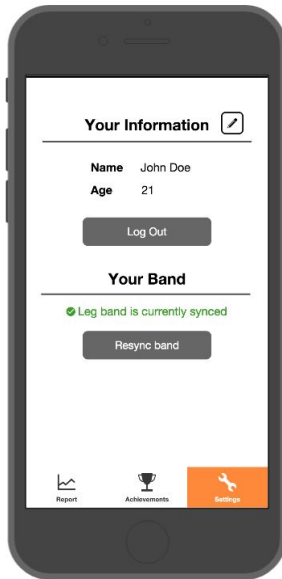
Figure 2.5-2.6: This is the monthly report, which displays the user's statistics for the previous month. Clicking on a portion of the graph displays that day's data.

Figure 2.7-2.8: This is the achievements page, which shows acquired and in-progress achievements. Clicking on an achievement brings up a description for that achievement.

Figure 2.9: This is the settings page. From here, you can change your name and age, log out and sign in using a different account, or re-sync your band.

Decisions/Changes:

For weekly and monthly reports, we moved the legend to the bottom to make better use of the available space. This also has an added benefit of placing the weight of the image at the bottom, which is more appealing to the eye. The achievements page remains essentially identical to our prototype. Finally, the settings page now allows the user to logout and sign in using a different account, as well as resync their band. Clicking the logout button returns the user to the account sign in screen during the initial setup (refer to Figure 1.1).

We also made a few improvements with feedbacks from the critique session. For example, we added "27 min more"/"5 min less" to make the language clear in Figure 2.2, we faded out unselected dates in Figure 2.4 to help users to be more focused on the selected date, and we added a line to specify the date in Figure 2.6.

Discussion

What did you learn from the process of iterative design?

During this process, we learned that it is important to be able to quickly interpret feedback from various sources and decide what changes need to be done in order to improve our design. Throughout the class, we received a lot of feedback from other students, TAs and various tests, so it is important that we were able to make quick decisions are a group to identify issues that need to be fixed. We also found that feedback was really helpful in identifying issues in our design we were not aware of, such as the design being confusing to users.

We also learned very quickly that we cannot get too attached to a particular design, as we would need to change it in response to feedback, knowing when to support or give up on a design is important during this process. We learned that during the process, it is important to be open to different ideas, even if something may not sound good initially.

How did the process shape your final design?

We think that the main way the process shaped our final design is to make our design more focused on specific tasks for the user. During the iteration process, we were able to get a better understanding of our audience, and make changes to better reflect the needs of our audience. Throughout the iteration process, we were able to see that there were issues with our design and work on fixing those issues using the feedback provided to us. Overall, the process has helped us produce a design that is much more suitable for our target audience.

How have your tasks changed as a result of your usability tests?

The first task "Setup smart reminders", did not change. However, the original task of "Tracking progress towards goals" was changed to "Tracking progress toward healthy sitting habits" to reflect our switch to an achievements based app.

Do you think you could have used more, or fewer, iterations upon your design?

Since we only had a short amount of time to work on this project, we think having a few more iterations would be beneficial to our design, especially during the paper prototyping phase as making changes after that is more difficult. Being able to get feedback from a few more potential users might help us improve our design further, since we only talked to about 3 people outside the class for feedback on the design.

Appendix

Sitless usability testing script

Begin:

Thank the participant for participating in the usability testing study.

Hello! We are a group of students from the University of Washington. We are working on a class project to encourage people to sit less. On behalf of the Sitless team, I would like to thank you for participating in a test for our product prototype. Your participation will be valuable to the design of our project.

Tell them about the project, if they do not know already

In short, our product strives to help people sit less, as the name suggests. We track users' sitting behavior through a special leg band, the Sitless band. This band sits on your leg, underneath your leg wear, and passively tracks your behavior. When it is time to un-sit, as we say, the band buzzes gently, in order to encourage you to stand up. The Sitless band also integrates with a mobile application, so that you can track the progress of your healthy sitting habits.

Do you have any questions about our product?

Let them know what the test entails.

During the course of this usability study, we will ask you to complete 2 tasks relevant to our product. We may choose to record video, record audio, take photos, and write descriptions of certain portions or all of the test for later analysis. At any time, you may choose to pause, or end a task completely, for any reason.

and who will be in the room

A few members of our team will be in the room in order to observe and take notes. A facilitator will sit next to you and explain to you the tasks that you will attempt.

Let them know we are testing the design, not the participant

Please note that we are testing our product prototype, and not testing you! Do not feel bad if you are unable to complete certain tasks.

At this point, do you have any questions?

After answering their questions, state the confidentiality of this study

All information that we collect in this usability study will be used solely for the purpose of informing the development of this product. The information from this session will be kept anonymous and confidential, and will only be seen by our team.

Do you have any questions?

Ask for their permission to continue the test

Do you give us your verbal consent to take this test?

Task 1 - Initial setup

Imagine that you have just bought the Sitless band, and are using it for the first time. You snap the band on your leg and open up the mobile application to set up the band.

[give them the band]

[show them the first screen of the task]

Your task is to set up the Sitless band to integrate with the mobile application. Please let us know if you have any questions during the process. Please explain your thinking process when you are using this system.

Task 2 - Tracking your progress

It has now been a couple of weeks. You have been wearing the Sitless band every day, and the application now has a wealth of data.

The following task will show you

2.1 - Sitting behavior for today

Point out where you would find the amount of time you have been sitting today
Point out where you would find the amount of time you have been standing today
Point out where you would find the amount of time you have been active today

How would you find out the exact number of hours and minutes you have been standing?

2.2 - Sitting behavior for this week

How would you find out the exact duration that you sat this past Thursday? This past Tuesday? Did you sit more on Saturday or Monday?

2.3 - Sitting behavior for this month

What is your overall trend of sitting/standing/moving?

2.4 - Achievements

What information can you tell from the achievements page?

Debrief

On behalf of the entire Sitless team, I would like to thank you once again for participating in our usability research test. We will now use the information gathered from this test to inform our decisions for the product going forward. Do you have any questions?

Thank you for your time!