







Usability Test 1


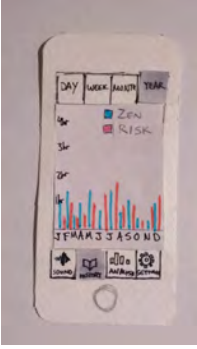
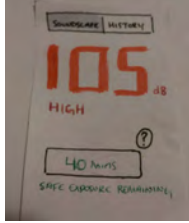
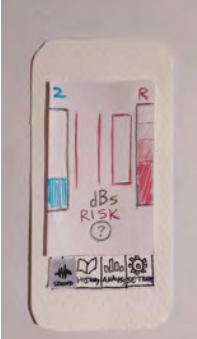

Our first usability test was done with Glenn, a UW student, and took place in the HUB cafeteria. We chose Glenn as a participant because we wanted a student who frequents loud environments on a daily basis. The HUB cafeteria was chosen as the location because it is a loud environment visited daily by Glenn and many other students. The test protocol was a cognitive walkthrough in which the test subject was told to accomplish several tasks while Garrick acted as a facilitator and Luyi as the prototype “computer”. For the first task the subject was told to analyze the soundscape of the current environment and make a decision based on the presented information. For the second task the subject was told to review past data recorded by the app and view the detailed analysis. The biggest complaint was that the user wanted more detailed information when they pressed the “more info” question mark icon on the Soundscape page. We added a more detailed text page here. We also added an overall Tutorial slide that loads the very first time users open the app and is also accessible via the Settings page.

Prototype Image	Incident Description	Issue Severity	Revised Image	Revised Explanation
	User tried to click on the bars in the graphs	N/A	N/A	N/A
	User wanted more (different?) information in Info screen.	S:0		In addition to the sound chart, more detailed text is provided and we have also included a tutorial page on initial startup.

Usability Test 2




Our second usability test was done with Allen (name changed), an older gentleman who self-describes as “technologically semi-literate”, and took place at his office. We chose him as a participant because we wanted to ensure our design made sense to people of various age ranges and experience levels with smartphones. Interviewing at his office was chosen for convenience. The test protocol was a cognitive walkthrough in which Allen was told to accomplish the two tasks of 1. Gather information regarding your current soundscape, and 2. View an analysis of past data. Grant acted as the facilitator and Chris as the prototype “computer”. Allen had numerous criticisms of our soundscape page, primarily the location of the More Info question mark icon and the purpose of the timer with respect to the higher risk environment Soundscape screens. His comments (and general bewilderment at the interface and timer layouts) encouraged us to completely redesign our soundscape page, which is discussed in more detail in the table below and in the final recap paragraph. He also voiced a concern relating to the word choice of “Damage” as the counter to our “Zen” terminology.


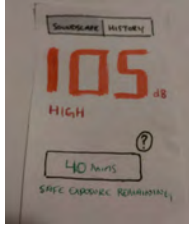





Prototype Image	Incident Description	Issue Severity	Revised Image	Revised Explanation
	User did not like the location for the question mark “more info” icon	S:1		We moved the question mark to the middle of the screen so that it is now more obvious to users. And it also better fits our new symmetric interface.
	User was initially confused with swiping mechanism on Analysis page	S:0	N/A	User was only momentarily slowed by this layout. The mechanism will be much clearer in the digital form. A minor issue.

	<p>User did not like the word “Damage” for graph. He pointed out “no guarantee the sound will ‘damage’ hearing”</p>	<p>S:5 also mentioned in usability test 3</p>		<p>We agree that “Damage” is not the best wording. We changed the word “Damage” to “Risk”.</p>
	<p>User found the timer in loud environment very confusing</p>	<p>S:5 also mentioned in usability test 3</p>		<p>We also had a hard time figure out the best way to display the timer. After the usability test, we found there is no need to keep the timer because of its erratic and confusing behavior (e.g. user frequently stepping in and out environments with different noise levels will have trouble interpreting the timer). We replace the timer with a goal-setting and live-review feature.</p>
	<p>User found “Zen” timer made much more conceptual sense.</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>

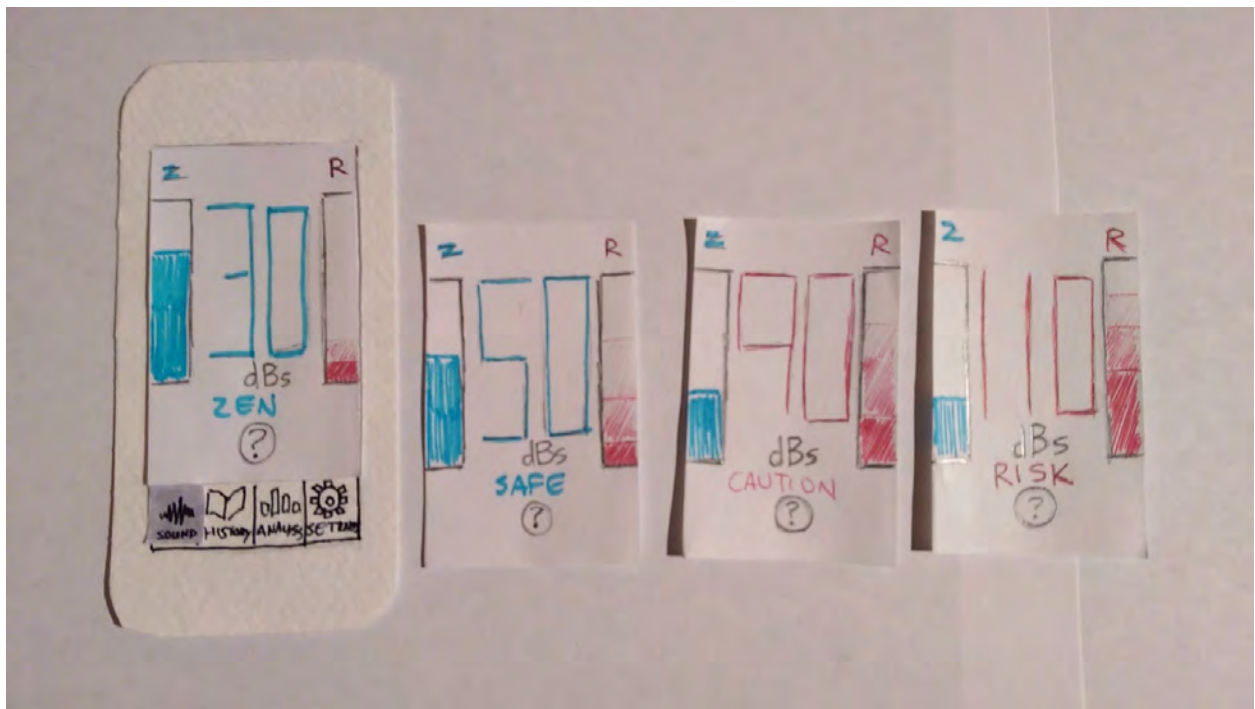
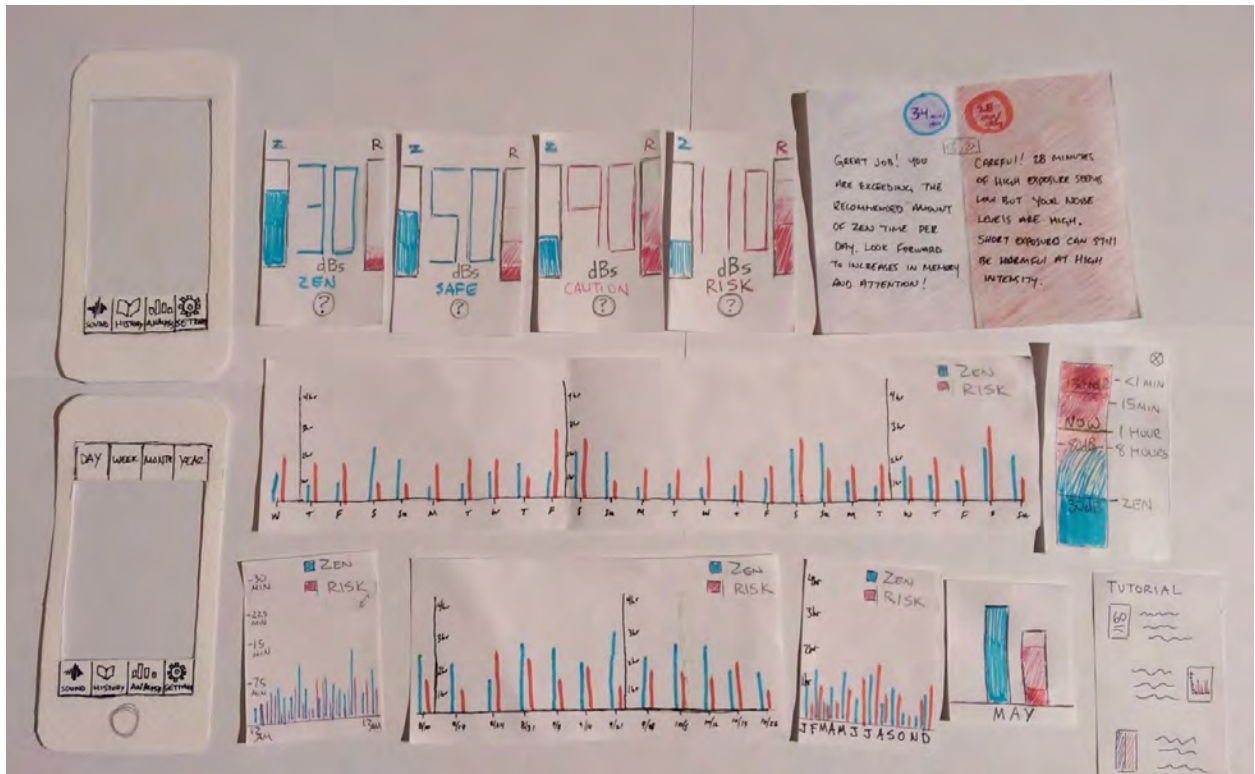
Usability Test 3

Our third and final usability test was done with Dr. Jane (name changed), a professional Radiologist, and took place at her home. We wanted a physician for a usability test in the hope that they could provide us with some feedback regarding how our medical information is presented in the interface. Interviewing at her home was done for her convenience. The test protocol was a cognitive walkthrough in which Dr. Jane was told to accomplish several tasks while Grant facilitated and Garrick acted as the “computer”. The tasks were to gather information regarding her current soundscape, and view her past data in various timescales. Dr. Jane’s main comments and concerns dealt with the layouts of the graphs in the History tab. She strongly disliked the “Damage” terminology, and remarked that “medically, there is no guarantee loud sounds will ‘damage’ hearing”. She also voiced a desire for more information in the bars themselves, so we added a detail page when users click the individual bars. Her other unique comment was related to the information provided in the Analysis page, but this confusion was eased when we told her the analysis was provided for *all* of the data, not just the past day. Dr. Jane shared a concern of the timer screen on the soundscape page, which is discussed in more detail in the final section.

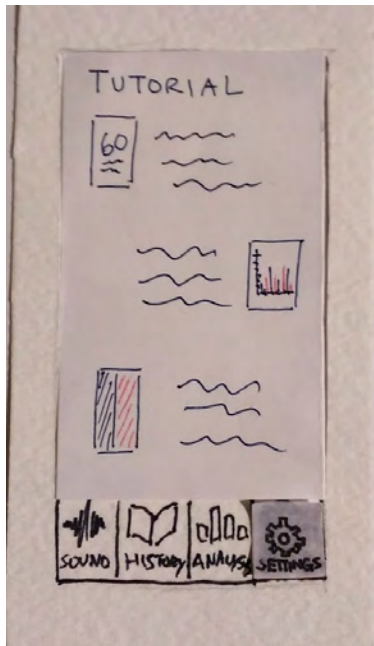
Prototype Image	Incident Description	Issue Severity	Revised Image	Revised Explanation
	User did not figure out the graph is scrollable	N/A	N/A	Minor issue primarily related to drawing limitations. (will be clearer in digital mockup)
	User tried to click on the bars in the graphs	S.1		We now allow user to see detail of each bar when clicking on them. The pop-up will show detail information with different granularities of noise levels. This will also match our redesigned soundscape screen.

	<p>User liked our Day / Week / Month / Year layout. "I liked viewing the data over different times"</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>
	<p>User found the timer is highly confusing</p>	<p>S:5 (also mentioned in the second usability test)</p>		<p>Same as test 2</p>
	<p>User did not find analysis for past day as useful</p>	<p>S.1</p>		<p>We now change the analysis page to show average zen/risk time throughout the app's lifetime. This change would distinct analysis with history, where history represents the trend and analysis shows the summary of data.</p>
	<p>User did not like the word damage in the graphs</p>	<p>S:5 (also mentioned in the second usability test)</p>		<p>Same as test 2</p>

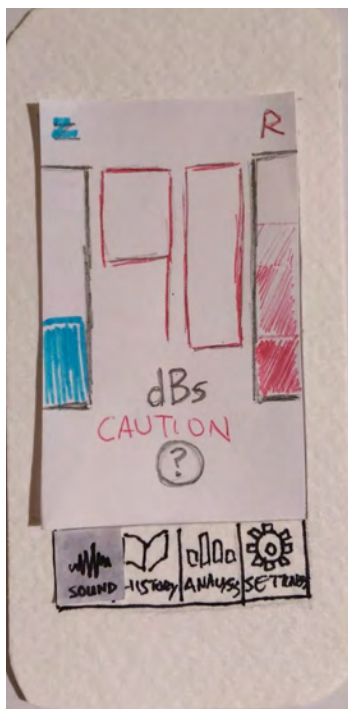
Paper Prototype Overview



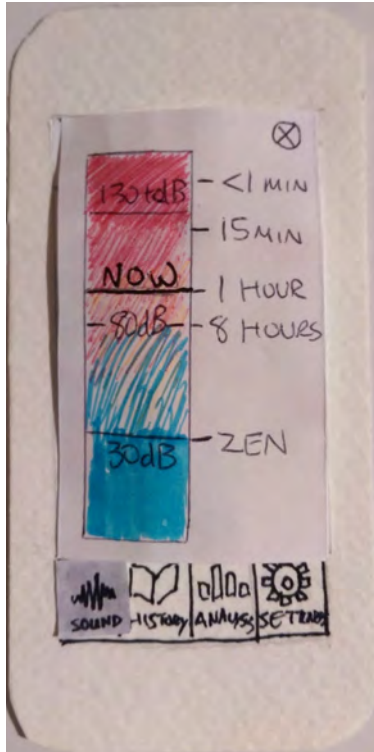
Task 1: Perform Soundscape analysis of the current environment



1.a. First time default screen users are presented with a mini-tutorial / instructions page.

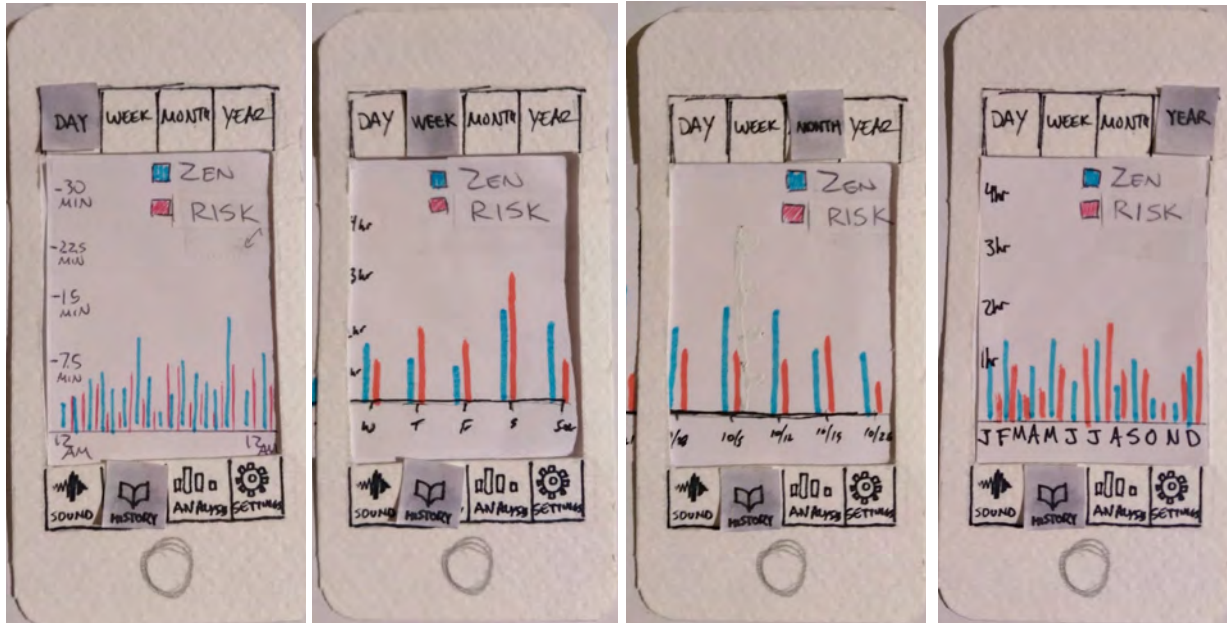


1.b. The blue bar provides information on Zen time for that day. The red bar shows noise data (which is shaded depending on past severity). The large middle numbers show current dB levels and the text below it offers worded feedback (in this case, 'Caution'). Users can click the question mark for more information on the text.



1.c. Clicking the question mark brings you this dialog, which provides more detailed feedback regarding recommended exposure times for various dB levels. In this case (90 dB), users are told that they should limit their time in the current environment to about an hour.

Task 2: View past noise exposure



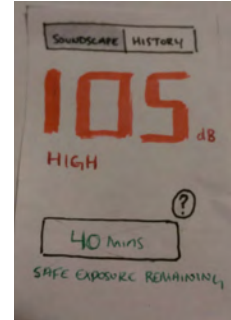
2.a. User clicks the history tab. The default view shows the data from the past day but users can easily move between different views using the tabs on top (from left to right: day, week, month, year). All of these screens are horizontally scrollable if past data is needed.



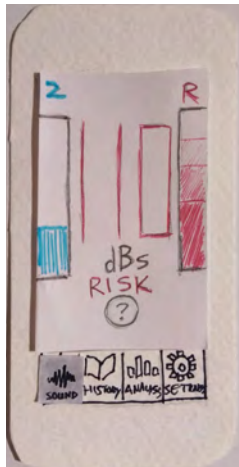
2.b. All of the bars are clickable, and doing so brings you to a detail screen. In this case, May has been selected from the Year view, and the information for the month is presented. Note the shaded bars of the Risk section that shows which percentage of the red bar is “high risk”, “medium risk”, and “low risk”. This page is currently limited by the paper prototype medium and future versions of this page will show more information.

Major Revisions

Following issues identified in inspection, usability testing, and critiques, we have made one major revision to our design, and this in turn has sparked numerous smaller revisions throughout our prototypes. Following our usability testing in particular, we have completely redesigned the way in which our design measures and emphasizes noise and zen tracking. The old “homepage” is shown to the right. The major pieces of information are the current dB level of the space, and the “Safe Exposure Remaining” timer that we based loosely off of OSHA noise standards. We posited that we could track the current noise level, make estimates regarding safe exposure, and then alert the user when they exceeded these limits. Nearly all of our usability



tests (and most of our critiques) raised concerns with this layout, ranging from confusion to what the timer represented to even doubting that “safe exposure” could be accurately tracked and monitored. With this in mind, we scrapped the idea of a live updating and algorithm-based timer, in favor of a more objective and data-oriented interface. The redesign is shown on the left. We kept the large and color-coordinated digits of the decibel meter and replaced the timer with a centralized information button (question mark). On the side we placed bars that show the data of the current day. Note how the Risk ('R') bar shows different shades of red depending on the severity of the exposure. If the environment is either a zen or risk environment, the corresponding bar will flash to show live updating. In this case, the Risk bar would be flashing. This is a much cleaner interface, and we believe it more strongly communicates need-to-know information to the user.



This redesign has prompted several other revisions, most notably in the History portion of the prototype. The first change you may notice is the use of the word “Risk” instead of “Damage”. Our usability testers (and several TAs) disliked the word Damage and its connotations. Risk better communicated the information--these are the noises that could put you at *risk*--and seemed to fit better with our Zen term. The more notable change is our addition of a detail page that is accessed when users click on the timescale bars. While our basic design still only shows solid blue and red bars for past data, we now give users an option to view this information in much more detail (see right) if they click the individual bars. Doing so provides them with a breakdown on the severity of their risk levels (shown) and more detailed metrics regarding average noise exposure, loudest days, etc. (not shown). This “zoomable” interface will bring more detailed information to the power users but will still maintain the clarity and simplicity of the original blue/red design for more “at-a-glance” feedback.

