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CSE 440 - Autumn 2014
2d: Contextual Inquiry Review

Themes: Inquiry Overview

For our contextual inquiries we wanted to choose people that are exposed to loud environments both socially and professionally. With this in mind, we selected and interviewed Landon, a pasta cook in the restaurant industry; Max, a professional drummer; and Nick, a student at Dartmouth College and fraternity member. All of these inquiries were done using an interview model, as a master/apprentice model was either impractical or unnecessary for these individuals.

Landon, the restaurant worker, is currently the pasta cook at Serafina, a fine dining restaurant in the Eastlake neighborhood. He has been in the industry for seven years (started as a dishwasher in high school), and worked for six different establishments in that time. At each place, he was exposed to different working environment, including a catering company, open-kitchen fine dining, and a closed-kitchen diner. In his experience, the loudest kitchens are highly dependent on the restaurant's clientele and ambiance (fine dining is the quietest), the style of the kitchen (closed kitchens are much louder), and the number of customers currently in the restaurant (loudest during the rush). The unique aspects of this inquiry included the fact that none of Landon's coworkers (in his experience) have ever talked about hearing loss. Also, when asked about using hearing protection while working, Landon was quick to say that it wasn't feasible: "You have to have all of your senses in the kitchen."

Max, the professional drummer, started playing drums when he was a toddler, joined a band in middle school, went to college for music performance, and is currently making a living as a professional drummer in Seattle. He plays an average of 4-5 nights a week, as well as numerous practices and rehearsals during the day. As of now, he has not had any symptoms of hearing loss after shows, and says that this is because he "can tell when things are too loud" and take steps to limit it. When asked to describe the sensation, he couldn't. When this happens, he says he puts in earplugs or other hearing protection. He says this isn't ideal, though. His interview was unique in that he knows numerous people in his industry that have hearing loss from their playing--mostly gospel drummers. He expressed a strong interest in a noise tracking application, and hopes it would include a real-time warning system for loud environments as well as a daily timeline of noise exposure.

Nick, a current student at Dartmouth College, reports being exposed to high levels of noise in social spaces at least three times per week. While he is aware of the potential risks that this type of exposure poses, he has not considered the long time implications, and rarely considers changing his behavior. Nick's noise exposure is unique compared to the other people we spoke with in that his exposure is due solely to his personal choices, not required by a job. Because of this, the user group that Nick represents is likely one that our group would like to target, as they have full control over their noise exposure. Additionally, targeting a young user group such as students will bring more significant meaning to any behavioral changes due to our

solution. Nick said that he would be interested in something that could track his noise exposure if it was convenient and would not get in the way. Furthermore, Nick is more interested in tracking the noise level in his current environment, and would like to know the health implications of that level of exposure. However, he is less interested in a long-term tracking solution because he feels that he would not want to make many major adjustments to his behavior.

Themes: Inquiry Analysis

While we interviewed three very different people for our inquiries, there are several commonalities and themes among them. First, all of our inquiry participants were aware of the noise exposure in their activities. Though at first glance this doesn't seem particularly profound, each of our participants claimed to know when things "seem too loud". Thus, they are all aware of it, but this awareness is subjective and completely dependent on their environment and current state. Second, they all expressed a strong aversion to wearing hearing protection during their respective activities. The restaurant worker needs to stay in constant communication and remain safe in the kitchen, the drummer (though he does use it occasionally) is strongly against it, and the fraternity member is in a social environment that necessitates interaction. Third, all of them were convinced that hearing loss is not something that will happen to them in the near future (likely true) and seem unwilling to make any big changes to their lifestyles--aside from taking occasional short breaks outside. Finally, all of them expressed a strong interest in a noise-tracking mobile application, especially if it did not require any extra hardware.

Fortunately, these major themes we've identified lend themselves directly to obvious design tasks. Because each of our participants was subjectively monitoring their daily noise, including an accurate decibel meter in our design is crucial. We need to ensure that our users are provided with objective measurements of their daily noise exposure. Without this consistency, accurate feedback is impossible. A problem posed by our participants was that wearing hearing protection was impractical or even impossible during their activities. This would indicate that an important design feature would be to monitor for excessive noise limits. While 95 dB is in a dangerous range, it takes hours for any hearing damage to occur. Our design needs to include a monitoring device for when environment spikes *above* this limit. When this happens, our users should be notified of their increase risk and exposure so they can take appropriate steps before it causes damage. Additionally, none of our participants were concerned about hearing loss in the near future. When something is 30 years away (or more), it's much harder to consider it in your day-to-day choices. Our app design needs to include a strong focus on noise education for these particular users. If we can clearly indicate exactly what kind of damage is being inflicted, we might be to make the abstract symptoms of the future much more tangible. Finally, all of our inquiry participants were interested in a noise tracking application, provided it was just an application. While an external peripheral could provide higher accuracy and improved battery life for our app, all of our features should be accessible with just a smartphone or other mobile device. Any peripheral needs to be optional, and only useful in cases where extreme accuracy is required or static environmental tracking desired.

Task Analysis Questions:

1. Who is going to use the design?
   People in dangerously loud environments that are either not wearing ear protection due to awareness or by choice. Additionally, anyone who is interested in personal informatics and monitoring sound levels with respect to time can be benefited with this design.

2. What tasks do they now perform?
   Some are cognizant of the dangers of hearing damage and subsequent hearing loss by using ear plugs and attempting to take breaks from long periods of exposure. However, a majority of these users find it inconvenient to address the problem with performing their work/task. Also, a majority of the general public judges “loudness” using subjective methods of perception and does not rely on using data to show differences in sound level.

3. What tasks are desired?
   The primary task of this design is to accurately track sound levels much like a sophisticated sound meter. Additional tasks that would separate our design from previous ones would include tracking levels of sound throughout the day in order to give a record and feedback to the user about the noise level patterns, alerting the user when safe hearing thresholds are breached, and overall education of safe versus dangerous sound levels. As the design tracks sound levels, it will also be dynamically displaying any changes that occur. Based on tracking, the design will also be able to show consequences of exposure to long periods of dangerous sound level based on patterns logged by the user as well as provide solutions to promote better methods of recovery from these periods. For portable music player users, a dB limiter can be applied to music which will cap the volume of sound based on the surrounding environment.

4. How are the tasks learned?
   Tasks should be learned intuitively and in a way that relays high-level technical information in an easily consumable fashion. With our subject matter, using one’s ears to gauge and learn safe hearing zones is an integral part of the process. Upon first interaction with the design, a walkthrough will be presented to the user that gives a rundown of the design’s features and shows the user how to complete the main tasks.

5. Where are the tasks performed?
   Tasks can be performed in all settings with greater emphasis in areas of high levels of dB. Tasks also need to not be intrusive or cumbersome for the user as it should passively operate without input or interference from the user or external factors.

6. What is the relationship between the person and data?
   The user will be given visual feedback about the amounts of noise exposed to for a given time period. The user and data will be linked using a personal device and data will be

stored in a cloud infrastructure that can be accessed at any given time. Since this data is personalized, each user will have personal access to their respective data. Therefore, access to data will only be restricted to the user and whomever the user decides to share it with.

7. What other tools does the person have?
   There are plenty of software and hardware options that can register decibel levels that a user can implement. They range from phone apps to high fidelity sound meters. These are not common for individuals who are not aware of such technology and those who are not interested in knowing sound levels of a given space or time. As such, our design will differ in the fact that not only will the design provide the same capabilities as current iterations of the concept, but also include personal informatics as well as prevention and awareness.

8. How do people communicate with each other?
   Users can communicate and compare their personal data. They can also use their data to pinpoint and map out areas or times of high exposure since the data collected will be geotagged. (Could be a crowdsourcing project)

9. How often are the tasks performed?
   Tasks will be performed on a daily basis or personally set by the user. Experienced users will have a schedule of recording that can be individually configured. Newer users will be walked through how the product/technology works and will provide simple ways to use the product/technology.

10. What are the time constraints on the tasks?
    Each time the user checks the data, it will provide the information as soon as possible. How much time elapses depends on what the user wants to do with the data. At the most basic level, users should be able to use the sound measuring functionality at first glance. The personalization aspect of the product would add additional time, as it will allow the user to customize timings, profiles, and other personalization features.

11. What happens when things go wrong?
    Possible errors that could occur with the new system is failure to record at any given time due to either mechanical issues with microphones or hardware, or software runtime issues and failure to retrieve data. Standard app-related and software troubleshooting conventions should be taken in consideration. The product would ideally be running even when the device is on standby so it is somewhat under the mercy of the battery. Data should indicate when the product stops working for whatever reason.