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Sleep Tracking for Better Health

When I signed up for this course, I had little to no knowledge about mobile app development. I had previously taken GUI II, where I learned the basics of user interface design. However, those basics would come to be useful in the development of my mobile app for this course. I learned a lot through the research and design / proposal phase of my project, and I am continuing to learn more through the development phase as well.

In the first assignment of the course I conducted a survey amongst my friends, in which I asked "What mobile app would you like to have and/or what problem do you have that you would like to have a mobile app help you solve?", and compiled the data through a Google Form. After receiving their form submissions, I read through each of them carefully and reached out to them individually if I was able to find an app that matched their desires, and asked them to test it for a few days and give me their feedback on it. The data consisted of 2 women and 4 men in their 20s, most of which were students. Out of the 7 responses that I received, two of them stood out the most to me because I could relate to the problem they proposed.

The first one was from a graduate student and stated that they had an inconsistent sleep schedule and always stayed up late at night scrolling on their phone while in bed. After some research, I found the app *SleepTown*, which encourages users to build regular and healthy sleeping habits. It achieves this by allowing users to set their own bedtime and wake-up time goals in the app, which the users will keep open throughout the night instead of opening other

apps. When users wake up, they will shake their phone and receive a reward in the form of various collectible buildings to build their "town". It is intended to motivate users to follow their sleep habit goals to collect more and more of these rewards. My friend said that they liked having an incentive for sleeping regularly on a schedule, but they had to pay for the app on iOS and did not particularly like the buildings and town theming of the app. Improvements they suggested were for the app to be free at the start with paid upgrades, different theming, and to consider users with varying schedules. I thought that this would be an interesting idea and a fun learning experience while implementing the suggested improvements.

The second one was from a freelance worker and stated that they get distracted often on their phone and that it takes time away from other important tasks such as school work and studying. After some research, I found the app *Forest*, which is from the same developers as *SleepTown*. This was understandable, since the apps were essentially trying to solve the same thing. *Forest* has the same concept in which it attempts to block the user from using their phone by asking them to keep the app open for some amount of time and collect a tree at the end as a reward. It is intended to lead to higher productivity by reducing the amount of time spent on the phone. My friend said that it was "too easy to not use the app at all", which meant that they were not motivated by the rewards that Forest provided. Instead, they said they would rather it locked the phone, but I believe that locking users out from their own phone could cause issues in the event of an emergency, and an unlock button would need to be implemented. However, this would lead to their complaint that it is "too easy to not use the app at all".

Both of these apps use gamification to enhance their service and increase motivation from the user. It is the application of game design principles in non-game contexts and problems. The app adopts the act of "playing" a video game into everyday use, which increase engagement

and entertainment levels, and motivates users to accomplish tasks that were normally seen as "boring". Although it has been associated with adolescents, I believe that gamification can be applicable to all ages who are motivated by receiving incentives, particularly those familiar with video games and game mechanics. A popular example would be *Pokémon GO*, which utilizes a more advanced form of gamification to encourage users to walk around more as physical exercise while catching pokémon and completing raids with friends. The source of motivation and success for the app would be that it is themed around a very large, successful, and well known franchise from Nintendo, and paired with the AR technology from Niantic. Another popular and well known example is *Duolingo*, in which users can compete with friends to learn new languages while earning experience points and badges.

In the end, I decided that I wanted to create an app that would also track sleeping habits, but I struggled a lot with deciding on the theme and design. My concerns revolved around the fact that my group partner and I have little to no artistic capabilities, and the incentives may require artistic skills and resources to be created. However, we considered using stock images to act as an incentive, which could be a possible solution once we decide on the theme. For the design, although we both have experience from taking GUI II, we have never designed a user interface for a mobile device. Despite new smartphones being released in larger sizes, the screen of a mobile device is significantly smaller than the screen of a computer monitor or laptop. Designing the user interface was a challenge for several reasons; I was used to either drawing user interface designs by hand, or by prototyping it through an online wireframe tool. In the end, I chose to draw it by hand because I was unfamiliar with using the wireframe tool for mobile devices.

In my design, I had several key components. One was a navigation bar at the bottom of the screen that allowed the user to move throughout the app. There was also a large adjustable timer that allowed users to set their bedtime goal and wake-up goal, a calendar that tracked users sleep quality, and a profile page that showed their sleep habit history on a graph as well as "badges" or incentives for sleeping regularly and achieving their goal. However, our professor made a good point about the design during our proposal presentation. He pointed out the colors used in the design and it led me to do some research on color schemes for user interfaces. Truthfully, when I was drawing the design, I had used a blue color because it was the default color on the drawing tool I was using, but since then I have researched a new color scheme for the app.

While I was learning to create my first Android app, I followed a Udacity guide linked by the professor and learned that although there are many different files, there are three main types of files. It consists of the java, XML, and values files. The java files control the UI, which is laid out in the XML layout file. The value files store simple values such as strings and integers. When my partner and I started working on our project, he created a Github repository for us to use. Previously, I had created the Android app on Android studio on my computer, so I was not familiar with opening it from a cloned repository. I had an issue that blocked me from working for about two weeks, and it took that long to solve it because we were both very new to working with Android studio. I had cloned his entire repository, which consisted of various other folders and files relevant to the course. I went directly to the app and opened it in Android studio, only to be met with countless error messages. Many of them stated that there was an "unresolved class" or "unresolved symbol" and all Google searches lead me to forums asking me to sync with Gradle. However, I was unable to find the button to "sync with Gradle", and struggled to solve

these issues while my partner was fine and not seeing any issues. Eventually, I was able to resolve this, and the cause of the issue was that Android Studio was opening it from the root folder of the cloned repository, and I had to change it so that it only opened from the app folder itself. I never would have thought that would be an issue and I regret wasting so much time being stuck on that simple problem. However, I consider it to be a valuable lesson since it will most likely be helpful in future Android projects I work on.

Our group has made some progress in the development of our app, but I admit I have not been able to spend as much time on this as I would have liked since I am also struggling to complete my engineering capstone project. For context, my group was originally a team of 4, and one person dropped out this semester unexpectedly. Among my two other members that remain, one of them only knows how to work on the hardware and electronics for our project, and the other has minimal experience with hardware or coding. It was expected that the third member would work with me on the code and programming needed for our capstone, but the work has been doubled for me. However, I have spent time refining the design aspects of our app and creating a very basic UI. Our milestone goals were to create a basic framework and research user interface design principles, add more complicated functionality such as user data storage and keeping track of the time and phone activity. My initial priority has been the design and cosmetics of the app, but they are proving to be less of a priority as time is running out.

It has been a little difficult developing our app since our group has very little experience in developing Android apps, and it has been a busy last semester for both of us. However, I feel that I have learned many useful skills throughout this course. Although I have learned the basics of Android app development and gained experience through researching Android tutorials and reading help forums online, I've also learned a lot about the considerations that go into

developing an app from scratch, designing user interfaces for smaller screens, as well as refreshing my presentation and public speaking skills through proposing my app idea.

Resources Used

- What is Gamification? Education, Business & Marketing (2021 Examples) (gamify.com)
- 13 basic mobile UI patterns to know about | by Shakuro | UX Collective (uxdesign.cc)
- Choosing colors for mobile app design (5 key principles) | Dribbble Design Blog
- https://classroom.udacity.com/courses/ud834/
- Guide to app architecture | Android Developers