Balance Me: Final Report

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INTRODUCTION

The digital world in which we now live has given us access to an exceedingly large amount of information at our fingertips. While beneficial, this vast amount of information and the constant connection to it may be distracting to teenagers, especially those with intellectual or developmental disabilities (IDD). There are approximately 6.5 million people with an intellectual or developmental disability in the United States [1], and they may have difficulty balancing their time between required tasks and recreational ones. While there are multiple solutions currently on the market for keeping on task, most of them are either too simple (i.e., countdown clocks) or too complex. The goal of this project is to develop an interactive and minimalist smartphone application and companion smartwatch application to help teenagers with and without IDD manage their required work while still making time to do things they want to do.

RELATED WORK

Currently, there are many different types of time management and task tracking applications on the market; some specialize in scheduling, habits, and routines while others emphasize focus and what the user is spending their time on. *Focus Keeper* is a mobile app that utilizes an onscreen timer to keep users focused and allows users to schedule breaks and set session lengths [2]. *Toggl* is another mobile application that allows users to track and monitor the time they spend on activities, while also setting goals and plans for completion [3]. Applications like *Stepping Stones* and *CanPlan* are geared towards users with disabilities, both creating routines for users to modify and stick to [4, 5]. Additionally, *Stepping Stones* consists of very detailed steps in which a user should complete each day [4].

What separates *Balance Me* from other existing technologies is the combination of individual and team task management, along with a wearable application to ensure that time management tasks are completed. Those using our application are able to view all tasks in one place in a format that is easy to use. Existing applications geared towards time management are often either too complicated for adolescents with intellectual disabilities, or too simple to be stimulating and useful long term. For instance, the application *Focus Keeper* [2] encourages users to focus via starting and stopping a timer, but fails to incorporate scheduling of future tasks or the creation of different types of tasks. Time management technologies geared towards those with developmental disabilities, such as *Task Timer* [6], are too simple to be used by those with and without intellectual disabilities. In comparison, *Monday.com* [7] provides a solution to group task management and allows for the managing, creation, and scheduling of tasks, but is too complicated for individuals looking for a simplified time management tool. *Balance Me* aims to provide a middle ground in the form of an easily navigable application that incorporates existing wearable technology to reinforce time management goals.

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CURRENT WORK

Our team has divided the work on the mobile application into front-end development and back-end development. This section talks about the work that has been done thus far on both fronts.

Front-End Development

With target users in mind, the focus of *Balance Me* is to deliver a user interface that is easy to use and motivating. The user should feel accomplished when they finish a task, but also, should not feel unmotivated when they fail to finish a task on time. The purpose of this application is to help the user enhance their time and task management skills. If a task is not completed on time, the user should learn from the failure rather than feel defeated.

Currently, the *Balance Me* team has established the groundwork to develop these functions. Our focus for the first half of the semester was to understand and develop the flow of the application, which supports the user's schedule rather than dictate it. For example, the user has an option to create a task, but not schedule it. This provides the user with certain flexibility while using the application. The current UI is designed to be minimal yet impactful. We do not want to overwhelm users with information.

Back-End Development

Our goal for the backend design was to create a RESTful API that had direct communication with our database. To do this, we used Express, Node.js, and Mongoose for our server communication. For our database, we are using MongoDB Atlas, as it provides us a database with lenient reading/writing and plenty of space to hold our data. Furthermore, we are using Heroku to host our backend repository, which lets us make calls to our API from any device.

The reason we chose to use Mongoose is its models. Mongoose models utilize schemas to let us easily layout what data we want each object type to encapsulate. For the *Balance Me* app, this is the creation of two main object types: User and Task. The user model holds information about each individual user's data, such as their first name and their email.

In contrast to the simple user model, we created a task model that would be capable of dynamic updates and easy repetition. Each task is referring to the user who created it and the user it is assigned to. This allows for the possibility of another "parent" account to create a task and assign it to a "child" account. In the case of a caregiver and a child who has a mental disability, this would allow for the caregiver to easily create and assign a task to the child from anywhere.

DISCUSSION

At the midway point in the semester, perhaps the most important thing we have learned so far is the ability to find the middle ground between our ideal goals and reality. As a group, none of us had much experience with React Native, the framework we are using to build our application. Therefore, it took about a week for everyone to get comfortable programming and creating components, screens, and other react native pieces required for this project. When writing our proposal, our timeline seemed easy enough to stick to, but with the learning curve required to do most of the work, we found ourselves about a week behind because we did not factor in the time it takes to get used to the framework. This meant that we had to revise our timeline and as a group decide which aspects of our application are most important, and focus on those first before getting into other additional features.

Despite seeming like a negative, this actually allowed for our team to have in-depth discussions about what elements of the application are most important to the user and do more research on our user's needs that we would not have done otherwise. This also caused us to investigate what components we can outsource to existing available components that we can then customize to fit our needs, instead of building everything ourselves. Through these discussions, we have also learned that our initial implementation of the project needed tweaking as our core user group has different needs than the everyday individual, so despite our initial excitement to add in a new feature or cool design to our application, our focus needs to stay on our user and their experience. This means that our design needs to stay simple and focused on the application goals instead of fun elements that, while we would enjoy creating, do not adhere to the project's core goals. These elements are still included in our timeline, but are now placed towards the end of the semester so that we can create them if we have extra time towards the end of the course.

FUTURE WORK

Work on this project will continue to progress according to the following updated timeline:

- **Week 4 (June 28–July 4): Mobile Improvements**
  - Continued development of backend/data storage
  - Finalize flow of screens in mobile app
  - As a user, I want to see graphs/charts to be able to monitor my progress
    - *Feature:* Page to see statistics of previous tasks
  - As a user, I want tips and how-to tutorials on how to do tasks
    - *Feature:* Tips and how-to's added to active task screen
- **Week 5 (July 5–11): Wearable Application Development and Gamification**
  - Adapt backend to wearable application
  - As a user, I want to start a task from a wearable
    - *Feature:* Wearable app creation of a task
  - As a user, I want to have default tasks available to choose from a quick start option on a wearable device
    - *Feature:* Predefined quick start list
  - As a user, I want a visual game component to motivate me to complete tasks on time
    - *Feature:* Creation of game component to be integrated into the application
    - *Feature:* Page dedicated to see the game component and total points/level
- **Week 6 (July 12–18): Mobile and Wearable Improvements**
  - Continue implementation of visual game component
  - As a user, I want to be notified for upcoming tasks from my wearable and phone
    - *Feature:* Vibrations on wearable and notification on phone to tell the user when a task needs to be completed soon or if timer is almost done
  - As a user, I want to share my progress with others in the form of game statistics
    - *Feature:* Sharing stats via social media
    - *Feature:* Seeing other user's progress as well as your own in the settings page
- **Week 7 (July 19–24): Extra Features & Bug Fixes *(Project due July 24)***
  - Fix existing bugs in the applications
  - As a user, I want to customize my game character
    - *Feature:* Customization page
  - As a user, I want to monitor my time spent on other applications
    - *Feature:* Add setting button to monitor and notify user of excessive app usage
  - As a user, I want the application to be visually appealing
    - *Improvement:* UI Improvements (if needed)
  - Project Deliverable

CONCLUSION

With the development of *Balance Me* we hope to create a product that can help teenagers with and without IDD balance their time between required tasks and leisure activities. We believe that the work that has been accomplished so far is promising and will lead to an innovative solution for this problem space. We believe that, by the end of the semester, we will have a functioning product that enables users to improve their lives by successfully managing their time.

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