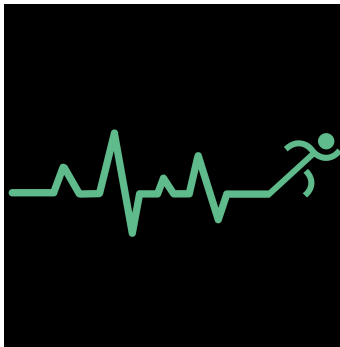


Team Agone

Requirements Specifications

November 30, 2021



Team Members:

Rylee Mitchell , Kaila Iglesias , Samantha Rodriguez ,
Jonathan White Velasco

Sponsor:

Adam Stepanovic

Mentor:

Vova Saruta

Accepted as baseline requirements for the project:

Client Signature: _____ Date: _____

Team Lead Signature: _____ Date: _____

Table of Contents

1 Introduction	2
2 Problem Statement	3
3 Solution Vision	5
4 Project Requirements	7
4.1 Domain-Level Requirements	7
4.2 Functional Requirements	8
4.3 Performance (non-functional) requirements	16
4.4 Environmental Requirements	18
5 Potential Risks	19
6 Project Plan	21
7 Conclusion	23

1 Introduction

A study from Yale found that 50% of regular runners get injured every year, primarily from overuse. That is one in every two people who run regularly that will suffer from an injury just this year. Insane! For an activity that is so common among people of every age around the world, it is quite a shame that this statistic is so high.

For almost any athlete or any individual that participates in sports, whether it be competitively or as a hobby, injuries are among the worst culprits for impeding progress. While some preventative measures can be taken, such as using proper form, stretching, and taking time off from activity, it is virtually impossible to prevent injury let alone predict when it will happen. As a result, injury is something that can only be responded to after the injury has already occurred.

However, PWR Labs has a better solution - to predict and prevent injury rather than treating injury after the fact. Reading through various statistics on athlete performance and seeking out the minor indicative details of change in an athlete's body is a process that can be time consuming, but incredibly revealing for coaches. These details can influence the development of dynamic training regimens for each athlete in an effort to protect their bodies, thereby reducing injuries. PWR Lab's vision to help facilitate this process, is to take the biometric data that can be tracked from wearable devices (such as Apple Watches and Fitbits) and make it easily accessible to be viewed and analyzed by coaches.

Being able to predict and prevent running injuries is extremely valuable. However, this can go far beyond only runners; this wellness portal could be used in several different professional fields. For example, physical therapists play an integral role in helping athletes and others recover from varying types and severities of injury. Consider a therapist that is trying to determine whether their suggested exercises and activities have been successful in treating an individual. Our wellness portal, used alongside devices that track the necessary biometric information related to that individual's injury, could provide the physical therapist with visual information that would allow them to more easily see whether progress is being made. They could even fine tune their treatment plan and make adjustments that could rapidly improve the healing process, allowing people to recover from injuries faster.

This is why our wellness platform is so vital to not only runners, but to anyone that could benefit from visualizing data relating to and produced by the human body. Now, we will establish the problem and suggest a general solution. This way, we can dive deeper into a careful analysis of the requirements for building such a platform. At this early stage of development, we are in the process of analyzing the key components of the functionality of our portal as well as the potential risks and plan for development.

2 Problem Statement

Our client works with coaches to streamline communication of athlete workout plans and wellness. Before our client offers their service to these different coaches, they would collect information from athletes themselves and manually record it in google sheets. This process, depicted in Fig. 1 below, takes around eight or nine hours on average. The coach starts off by creating a google spreadsheet with a roster containing each of the athletes by manually entering their personal information. The information is collected either through a phone call or email. After this initial spreadsheet is created, the coach reorders the data to appear to their liking. Every day the coach manually collects the data from each athlete they train. After a certain amount of time (i.e., a week or three days depending on the coach) the coach creates a workout plan for each specific athlete based on the data. Lastly, the coach verbally tells each athlete their workout plan and repeats the process. This process is very inefficient, and our client created a simpler process. Even though the client's process is simpler for the coach it can become more efficient.

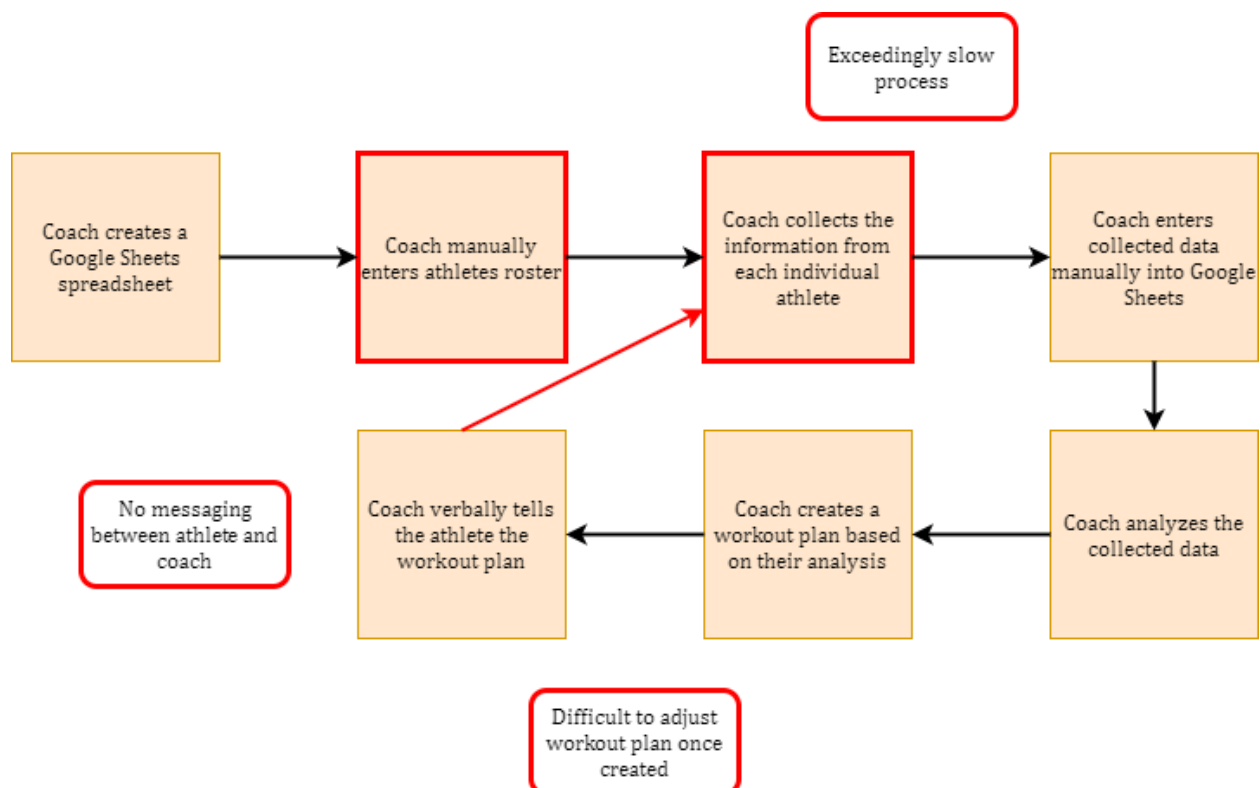


Figure 1. A diagram laying out the process before the coach went to our client for assistance. The block colors indicate which party is contributing. In this case, the orange block is designated for the coach who is the sole contributor to this system.

Although our client has reduced the time coaches previously took to build athlete training schedules, the process can still become more efficient. Based on the figure above (Figure 2) the main issues with the current system are:

- Iteratively long process to create the environment for the coach as the coach asks our client to create changes based on their needs for the dashboard. This can become very time consuming for both parties. Coaches all have different specifications for how they want their dashboard to look.
- Our client manually creates the environment, the athlete dashboard, the google form for the athlete questionnaire and data entry. This process becomes more time consuming the more coaches that our client has. With each coach having their own specifications our client cannot apply a general form to every coach dashboard.
- Difficult for both the coach and athlete to visualize data. In order for the coach to accurately understand the data presented in front of them, it should be shown in an interpretable way.
- There is no messaging system between the athlete and the coach. Without messaging, there cannot be a dialogue if the athlete wished to change the workout plan or update a coach about an injury.
- Currently not included in Figure 2, different dashboards for athletes who have an injury, mental health checks, separate athlete dashboards (i.e, men and women teams), and priority athletes who have events coming up.

Addressing these problems in our product will create an efficient tool our client can use for the different coaches they work with.

3 Solution Vision

In order to adhere to the issues listed above, we will begin by creating a web application. This web application will be flexible enough to meet different coaches' needs. As mentioned before each sports coach looks at different statistics to measure the success of their athletes. There are three main categories of permissions for the website: the coach, staff, and the athletes. There will be subcategories for the staff, such as physical therapists to help with injured athletes and therapists to help with athletes that are having mental health issues. For each of these different categories, they will have different dashboards. The dashboards are what the permissions will be tied to. For example, the physical therapist can only see the athletes on the injured dashboard. Next, we will be explaining the specifics of how our system will solve the issues previously addressed.

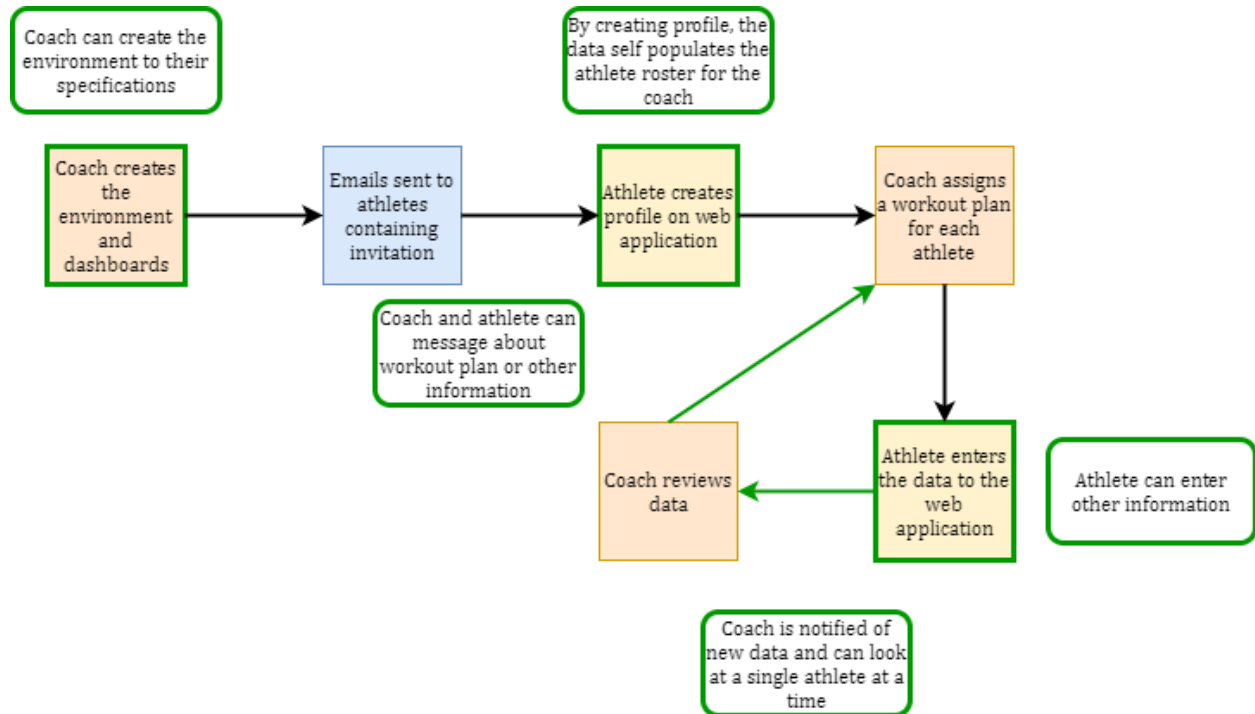


Figure 3. A diagram proposing the solutions to fix and improve our client's system. The block colors indicate which party is contributing. In this case, the orange block represents the coach, the blue block represents our client, and the yellow block represents the athletes.

The figure above (Figure 3) lays out the new system and the improvements being made. In order to improve the current system our client has we will:

- Have the coach create their own environment and dashboards in the beginning of the process. By giving the coach the immediate customization, it eliminates the iterative process between our client and the coach they are working with.
- Automatically populate the database as the athlete enters data through the web application. Whether manually or through our clients API, our client will no longer have to create a google form that is connected to the coaches google spreadsheets.
- Allow for new information to be added such as injuries and mental health. This will improve the coaches understanding of their athlete and how to best work with them. The coach will be able to combine training statistics with athlete health.
- Provide data visualization to not only make it visually appealing for the coach, but to also facilitate the analysis process. The coach will no longer have to reason about line after line of data, instead, they will be able to easily interpret it in graphical format.
- Include a messaging system so a coach and athlete may converse about workout plans. When necessary, an athlete can respond to a coach's plan and the workout can then be developed to best suit the health and performance of the athlete.

- Substantially lower the amount of work our client has to put into each environment for different coaches. This allows our client to take on more coaches and allow coaches to have a more customizable system that works for them.

Our web application will integrate with the client's API to collect the data from athletes' wearable devices or an athlete will have the option to manually enter exercise and health information into their dashboard. The collected data populates the database and is shown on the appropriate user's dashboard. A coach can select different ways to view the data, all of which will be presented in a simple to interpret format. The data can be transformed to provide an overall goal for the athlete to look forward to. This will help them work for something as well as want to enter their data at a consistent rate. A functioning web portal that refines these processes will also allow for the client to provide more coaches with these services. By providing a better environment for the coach to analyze data, rather than spend time collecting it, this solution will also ease the workload of the coach. The flexibility provided by this product could also be made useful to other professionals, such as personal trainers or medical professionals, who would benefit from data visualization and consistent information from clients about health.

4 Project Requirements

4.1 Domain-Level Requirements

For this section, we will detail the requirements for the system described from the previous section ([3 Solution Vision](#)). The requirements that pertain to the solution our group has envisioned for PWR Labs are the domain requirements listed below. We plan to meet our clients' needs by integrating each requirement as well as the functional, performative, and environmental requirements that follow.

Athletic Wellness Portal

1. Allows for communication between coaches and athletes.
2. Let's athletes submit weekly wellness surveys. Along with the analysis of the weekly wellness assessments by the coach further helping the creation of their workout plan.
3. Populates coach dashboards with athlete biometrics and wellness info.
4. A GUI that visualizes the populated data and allows for flexibility in how data is displayed.
5. Secures User information in separate coach and athlete accounts.

6. A database to fit the different information given by each party (i.e., athlete, coach, physical therapist, and therapist)

Serving as the baseline for our functional and performance requirements, we will be providing a more formal description of each of the items listed above, discussing their level of importance to the system, as well as what each item entails in terms of web portal function.

4.2 Functional Requirements

Function requirements describe the detailed functions that our system must provide. In order to solve the problems stated above we have listed six main functional requirements. They are listed in importance to accomplish our solution. The following requirements show the necessary components of the system, as discussed with our clients.

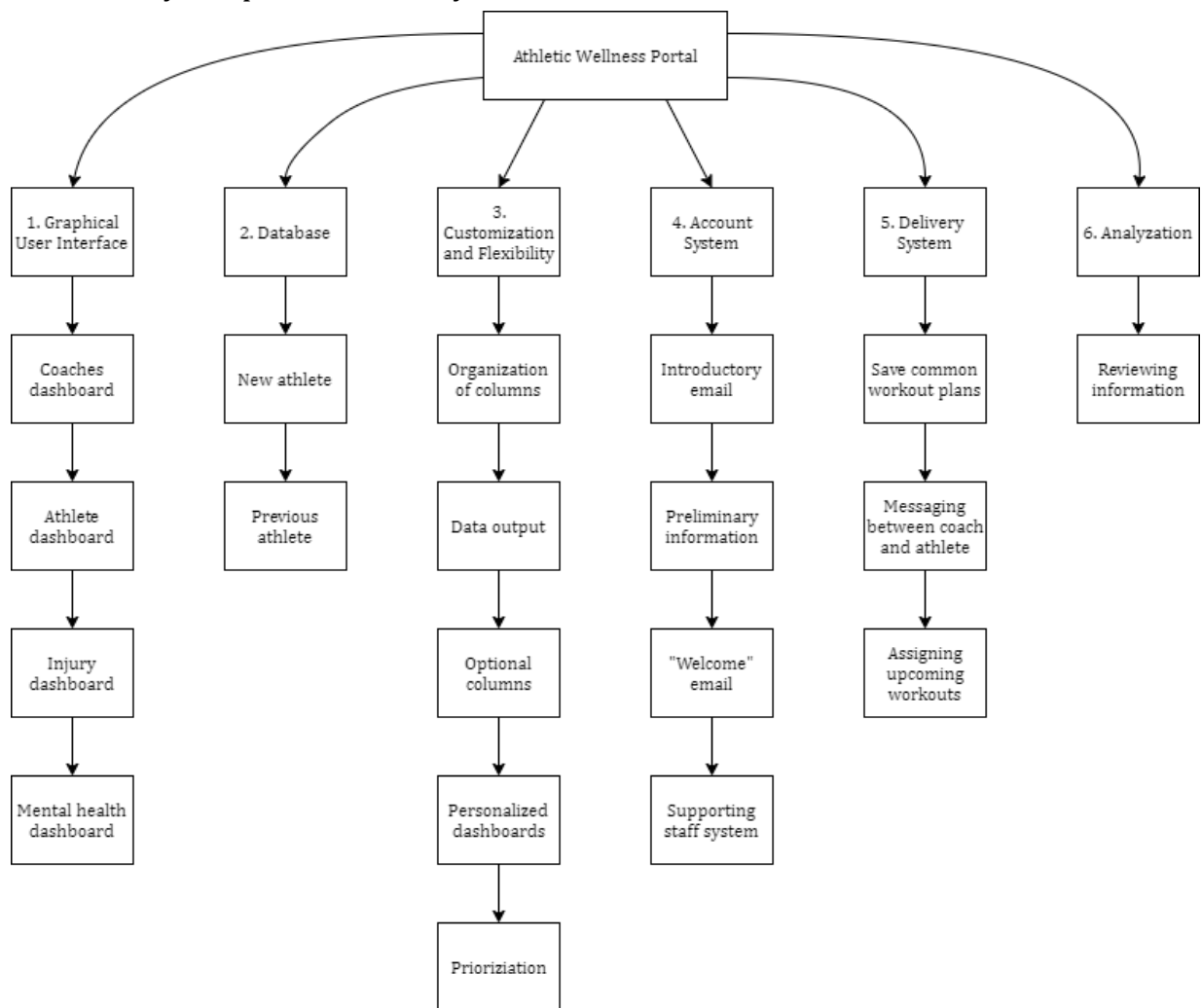


Figure 4. The following figure outlines the functional requirements. Along with the hierarchy of each as well as the importance of each of the subsections listed below them. Below will expand more on the separate connections and the single blocks from the diagram.

The six domain level requirements listed in the previous section have been further broken down into the following primary functional requirements. The breakdown of Figure 4 shows the importance of each requirement. The subsections in each description are listed in level of importance as it pertains to the athletic wellness portal.

1. Graphical User Interface (GUI)

The front-end application of what the user will see. Having a GUI will allow for the user to accomplish the functions listed below. Based on the figure above (Figure 4), the GUI works as the connection for the backend to the different users.

- 1.1. In total, 4 different dashboards will be used to accommodate the different types of users of the system. The coach will have a dashboard, including information such as an athlete roster, with a full list of athletes and related information uploaded by the athletes. The athlete will have their own dashboard to see their workout plan and upload workout or health information. The physical therapist will have an injury dashboard to list all the athletes that have an injury. Lastly, the therapist will have their own dashboard to list the athletes that are struggling with mental health.
- 1.2. After a coach assigns workouts to each athlete, the workouts will be uploaded in the athletes dashboard. Along with updating the athlete's portal, the athlete will receive an email notification regarding the update.
- 1.3. If the coach has a common workout they assign to athletes, they can save it. This allows for a coach to easily select a workout that they want to use to update an athlete's workout dashboard and results in the coach not having to repeatedly enter a workout that is commonly assigned.
- 1.4. The daily submission form/log/questions. The athletes enter their data (workout, injury status, and mental health) daily. The data will populate the athlete's and the coach's database, which will be discussed further below ([Database](#)).
- 1.5. While coaches may spend more time on a computer to view and analyze athlete data, the athletes will be using the portal far less extensively and typically only to upload information. For this reason, our system should work well on the website but also be cross compatible and viewable on a mobile device like a phone or tablet.
- 1.6. As the athlete inputs their data, it will populate the coach's dashboard. The coach will also be notified through email of when there are new entries for them to analyze.

- 1.7. The coach can assign priority for athletes. When that athlete enters their data, they will be at the top of the coach's dashboard. This will be optional for the coaches. This status can translate to the other dashboards as well, such as the injury list.
- 1.8. Once the coach provides feedback and has finished reviewing the data, their dashboard becomes empty until the next athlete. After finishing the analysis the coach clicks a submit button. Then the athlete gets notified through email that they have a new workout plan.

2. Database

The backend of the application holds the information together. The database connects the different dashboards discussed in the previous functional requirement. It not only holds the data for the coach but also allows for the athlete to have to submit once into their dashboard for the coach to receive it.

- 2.1. The athlete is not required to have data collected prior to account creation. When creating a profile on the web application they will be asked if they were already working with the coach that sent them the invite.
 - 2.1.1. For athletes that are new to the coach, they will be given a clean state with no previous data. The coach working with the background information they gave, can still assign a workout plan.
- 2.2. Athletes that have already worked with the coach in the past and worked with the previous iteration of the system do not have to start with a blank format. They will be allowed to enter their data in order to not feel that their previous work will not help them.
 - 2.2.1. Coach can migrate into the existing training log. For the athletes that the coach has data for, they can enter their information. This will help the coach mitigate the blank slate and continue the workout plan they had for them previously. In order for the coach to enter data it needs to be in one of the following formats as well as be in a specified data structure given by the current environment:
 - Excel
 - Google Sheets
 - CSV

3. Customization/Flexibility

Each coach values different information and our portal needs to give every coach a personalized dashboard that fits their unique needs. Coaches need to be able to prioritize the data that is most meaningful to them when working with athletes. Customization should be contiguous - the information a coach wishes to see one day may be different the next day and we need to account for constant changes in dashboard design.

- 3.1. The order of the columns for the dashboard, roster, and individual training logs needs to be able to be switched and moved around based on a coach's preference and priorities.
- 3.2. The data needs to be outputted and grouped based on time- i.e., days, weeks, months. A coach should be able to view data from each day as well as see patterns over weeks, months, and even years if desired.
- 3.3. Each column of data should be optional, meaning that if a coach doesn't wish to see a certain column, they should be able to hide it from their dashboard. This does not permanently delete the column or any data.
- 3.4. The portal will be able to prioritize and organize athletes as a coach desires based on certain characteristics. They should be able to order or rank the athletes by a specific data entry as well as be able to mark an athlete as a higher priority or a lower priority. Labels can also be given to athletes to help group them by a certain classification.
 - 3.4.1. As mentioned above, coaches should be able to group athletes based on a certain label. This could potentially result in multiple different dashboards such as:
 - Women's team
 - Men's team
 - Injury list
 - Freshmen, Sophomore, Junior, Senior lists

4. Account System

The creation of an account within the wellness platform needs to be easy and seamless. The entire process should take no more than 10 minutes as we do not want this to be seen as an inconvenience to users. A drop-down menu should be used when applicable to speed up the process as well as allow for more uniform responses in certain categories.

- 4.1. A link or access code must be given by the coach in order for an athlete to register for the wellness platform. After the coach enters the athlete's name and email address, an introductory email will be sent to the athlete with further instructions on how to complete their profile.
- 4.2. Athletes receiving a "welcome" email will receive a link to register for the portal. This email should look unique to each coach's preferences. The coaches should also have the option to write a unique welcome message if they so desire, and resort to a standard message if not.
- 4.2.1. The link will direct each athlete to submit all of the information, regardless of if a coach prioritizes it or not. They can customize their own dashboard, but to create a universal system, we need to account for all information that potentially could be of interest to a coach. For example:
- Height
 - Weight
 - Sex
 - Birthday
 - Hometown
 - Phone number
 - Address
 - Event
 - Injury History
 - Hobbies/interests
 - Majors
 - Emergency contact name
 - Emergency contact phone number
 - Time zone
 - Phone provider
 - Menstrual Cycle (Yes/No)
 - "How can I best help you as a coach?"
- 4.2.2. After completion, a coach should receive a notification that a new athlete successfully finished their registration. The athlete should also be notified that they have filled in all necessary information, and alert them that their coach has also already been notified of this.
- 4.3. Coaches should not feel the burden of controlling this system on their own. Support staff such as assistant coaches, sports medicine staff, athletic trainers, and any credited person should have permission to see athlete data so long as the coach and athlete approves - athlete approval is necessary.
- 4.3.1. The coach must invite each support staff member to the portal. They must then decide what data they will allow each member to see and create a sort of hierarchy. Support staff members can all have access to different data or the same data if the coach wishes. For example,

certain labels should be saved so that if a new athletic trainer is added, the coach can select the label 'athletic trainer' and correct authorization will be given automatically.

4.3.2. As mentioned above, coaches should be able to group athletes based on a certain label. This could potentially result in multiple different dashboards such as:

- Women's team
- Men's team
- Injury list
- Freshmen, Sophomore, Junior, Senior lists

5. **Workout Delivery**

5.1. Coaches will be entering a number of workout routines into the portal to be communicated with the athletes. These workout routines will range from those relating specifically to training, as well as wellness exercises such as meditation, yoga, and other workouts that may be beneficial to the wellness of an individual. Since many of these workouts will be entered more than once, the coach should be able to save workouts that are commonly prescribed and then select them to include in the email when informing an athlete of their respective routine.

5.1.1. Users should also have the option to save workouts that are prescribed to them. These saved workouts should be later accessible through a separate dashboard that includes saved workouts separated by category. For example, if an athlete wants to save a meditation routine, they should have the option to save it to a dashboard and delete it when necessary.

5.2. Messaging between athletes and staff should be clear and relevant to the information in the web portal. An athlete should have the ability to comment on a training exercise if necessary. This comment would then begin a thread about the topic from which the original comment stems. A similar function should be made available for possible communication on topics like daily exercise and mental health logs. These communication threads should later be capable of being resolved, similar to comments in a document, so that the messages are deleted once they are no longer necessary and do not clutter the user's dashboard.

5.2.1. An athlete or user should easily understand which "conversation" or "thread" they are interacting with. There will be a number of areas in

which users will be able to have a conversation about certain information relating to training. The main communication areas include email regarding training plans and the built-in commenting/chat function that will be available to users.

- Email
 - The most common form of communication between coaches and users will occur through email communication. These messages will most commonly include information on becoming registered in the portal as well as information that is later shared by the coach with users of the portal (i.e., workout information, training updates, giving specific portal members access to certain athlete information). Conversations begun in this format would simply include replying to the information that was delivered in the email, creating a clear thread.
 - Built in chat
 - The built-in chat function is the alternative way in which users of the portal can interact with the coach or other users, like a physical therapist. There are a multitude of areas for user entered information, from workouts to mental health and physical wellness logs. All of this information is made viewable to the coach, which should then have the capability of initiating a comment thread on any particular piece of user entered information. This is a quick way for a coach to communicate with an athlete on a concern or any important matter.
- 5.3. Coaches will be capable of assigning upcoming workouts through an email delivery system which will be initiated in the web portal. From the web portal a coach will be able to create a new message to send to athletes. From this message they will apply a template that is similar to a fillable form, they will fill the form out, and this will populate an email that will be sent to athletes.
- 5.3.1. Athletes will receive a notification when a coach has updated their portal with a workout routine. The coach sends out an email that includes a populated template of the workout for the week, once this email is received an athlete should be informed via notification.

- 5.3.2. Once an athlete has completed a workout, they should submit their data in the web portal or verify the data from their Apple Watch or other smart device was successfully added to their portal. An athlete should be able to see a dashboard that corresponds to each day. One of the views in this dashboard should include workout information for the day. If a smart device is connected to the portal, workout information will be populated automatically. Otherwise, a user will need to manually input their data into the exercise dashboard.
- 5.3.3. A coach is notified when information is submitted in the portal. Coaches will receive a notification when a user uploads workout information in the form of a quick summary (i.e., " [user name] uploaded their workout information for today").
- By seeing an automated notification for when certain portal information is completed, a coach is capable of more quickly monitoring and responding to certain details of an athlete's training or wellness.
- 5.3.4. The portal will include an option for coaches to log upcoming events or competitions. Since these are special events that athletes should be paying attention to and that the coach would want to keep track of, a countdown timer for events should be made available. This will be a simple day:hour:minute:second timer informs users of the portal how long until a specific event is supposed to occur.
- 5.3.5. A calendar will be a primary piece of background information and tool for organization that is used throughout the portal. The calendar will be a view in the dashboard that will provide a user a clearly organized depiction of what exercises, events, or other activities they should be aware of. The calendar will also allow a coach to have a detailed outlook on what events, competitions, or conferences they might be preparing for as well as weekly outlines of what athletes will be doing. Athletes will also be able to view a detailed weekly view of their exercise plans etc. since this information is provided in a template by the coach each week.

6. Wellness Analyzing

- 6.1. One of the main purposes of this portal is providing a simple way for coaches to view athlete information. This will be accomplished by developing the portal so that when an athlete uploads their information, the coach automatically receives a notification. Alongside this notification, a coach will

also be able to view a dashboard that is populated with athlete information as it is submitted and is categorized by the type of data submitted (i.e., daily logs, or workouts etc.).

- 6.1.1. As athletes submit their workouts, the coach's dashboard will also automatically update with the user's workout data. This gives coaches a real time notification of when an athlete has completed their workout. This is important because it will allow a coach to immediately become aware of an athlete reporting pain or other discomfort from a workout, or in general.
- 6.1.2. Once a coach has finished reviewing the data that was uploaded by an athlete, they will be able to manage that data in a couple ways. The coach will want to provide feedback on the data, view more data, or resolve the athlete from their dashboard. If a coach wants to view more data, they can see up to 6 days of data prior to the current day, for a total of one week of athlete data. This allows them to get a bigger picture of the data that an athlete is producing and helps in making a decision about athlete training.
- 6.1.3. Another requirement of the coach's dashboard is the option to make adjustments to upcoming workouts after viewing an athlete's uploaded information. A coach may encounter an athlete's data and/or comments about wellness and want to make a change to the athlete's training plan. A coach should have the option to edit an athlete's training template and make any necessary adjustments.

4.3 Performance (non-functional) requirements

Now that we have discussed the functional requirements of our wellness portal and outlined what our application will provide, we can further elaborate on how the above functions will be expected to perform. Our performance measurement will either be time based or pass/fail tests. These benchmarks will ensure that we will be providing not only a product, but an efficient product as laid out above.

1. Graphical User Interface (GUI)

The portal should decrease the time it takes a coach to organize and analyze data by at least 50%. Rather than spending 3 hours manually entering data, 2 additional hours analyzing it, and then another hour creating and adjusting workout plans, the coach should only need 3 hours as data will already have been input.

2. Database

Data should be inserted into our system no more than 15 minutes after the athlete uploads it. The transition time between when the coach receives the athlete's information and when vice versa should take the system 30 minutes to complete. This time does not include any buffer time for either party, such as bad connection.

3. Customization/Flexibility

Ultimately, we can only measure ourselves on a pass/fail basis when it comes to customization: either we offer a uniform template, or we allow users to change and personalize their own dashboard. The initial setup of the environment that the coach is creating should take a week for a new user to set up. For an existing user, it will take a full business day to set up. We are accounting for the initial understanding of the system the user will have to go through.

4. Account System

For coaches that are new to the system, the initial account creation should take around 20 minutes. For an existing account that is creating a new team, the account creation process should take no more than 20 minutes. For athletes, the same applies for the initial set up, with an additional 15 minutes added to new users for the initial questionnaire of the athlete's information. An existing account will not have to repeat the whole questionnaire but can edit for new, additional information. In order to allow for the coaches' current athletes to continue with their current journey we will allow for the upload of previous data that the coach has of the athletes.

5. Workout Delivery

The messaging system should be reasonably responsive, where, as workouts are delivered to athletes through the email templating system, the athlete dashboards should become populated with the respective workouts. In the email form, the athlete will receive an email within 10 minutes of the coach uploading the workout plan.

6. Wellness Analyzing

Again, we can measure our success in this aspect on a pass/fail basis. The coach either receives notifications when an athlete uploads their information or not. However, these notifications should be sent within a reasonable time, and we can determine our success on the timing of these notifications. Our goal is to have these notifications sent and received within 5 minutes of inserting information into the

database. This analysis will go hand in hand with the database upload as they work concurrently to update the information and the different users.

4.4 Environmental Requirements

In determining the functional requirements of the system for the client, the team was also able to define several environmental constraints that would be imposed on the web portal. Environmental constraints include anything from the need to use specific software libraries, programming languages, databases, or other structures/ hardware, as determined by the client's requirements. Many of these environmental constraints are subtly included in the functional and non-functional requirements.

The separate set system requirements that were addressed in developing a solution for PWR Lab are based on the set of environmental constraints that will be imposed on the system. These constraints are the result of existing design choices in software created by our client as well as the need to integrate client developed tools into a highly functional web portal that meets the requirements of both our client and their user base. An overview of these constraints includes a need to implement AWS hosting services, the use of PWR Lab's API, and the integration of a tool that is compatible for visualizing data collected by athlete devices or uploaded to the portal.

Implementing AWS hosting services:

- A secure database is necessary. Athletes using the portal should not be able to view each other's data under any circumstance. Other users of the portal should only have access to a particular athlete's data when granted permission by a head user (i.e. a coach grants a physical therapist access to an athlete's workout history).
- The use of this wellness portal by coaches to interact with a number of athletes and their personal information means that each user's privacy should be guaranteed. Permissions and access to data should only be allowed in the appropriate context (coach viewing athlete biometrics, or a physical therapist, etc.). Athletes should only have access to their own information. The client is very familiar with these privacy constraints and thus, has already implemented a secure AWS database to collect data and attach it to the user's profile which generated the data.
- Furthermore, the client's web portal is intended to be deployed to a number of teams and be capable of use on a wide scale. Therefore, the scalability, reliability, and security of AWS hosting services makes it an environmental constraint in our web portal solution.
- Finally, choosing AWS in our solution will also make it easier for our client to integrate our solution into their existing infrastructure.

PWR Lab's API:

- The client has already developed an API capable of collecting data streams from wearable devices and tagging it with a specific user's ID. Since this is already developed and is the focus of the data visualization, the client's API is required to be implemented.
- This is a key environmental requirement in terms of affecting the decisions that were made in choosing compatible softwares and frameworks.

Visualizing athlete produced data:

- The format in which data is streamed and sorted is in that of a JSON blob. That is, data from a device, such as an Apple Watch, tracks a wearer's heart rate, elevation gain, and other statistics and sends it into one large JSON blob. The client's API then collects that data and through their API, they can sort the data into the separate biometric streams once more (the elevation gain, pace, etc.). Since the API is developed to interact with JSON type data, the data visualization API that will be implemented needs to be .js compatible.
- Data visualization needs to be performed accurately and quickly. The data visualization is an integral aspect of the web portal's functionality and if not visualized accurately, it cannot be interpreted meaningfully. For this reason, the chosen visualization API will account for the necessity for quick and accurate rendering of graphically represented data.

The main functional requirements and environmental constraints described in this section have been determined through meetings with the client and in depth use cases of the web portal provided in client documentation. This section is intended to provide acknowledgement to any environmental constraints that will guide implementation decisions during the development of the web portal. The technical feasibility document can also be referred to alongside this for analysis on any major design decisions made regarding the use of existing technologies, such as those used and developed by the client. Furthermore, the technical feasibility document contains a cross comparison of potential solutions for achieving the functional characteristics necessary in the data visualization and other portions of the portal which should be met despite the environmental constraints.

5 Potential Risks

This section of the document covers potential risks that may arise when developing and implementing our system. These risks have to do with the future success of our product. Some potential risks may affect our system more than others. By acknowledging these risks, we want to get in front of the problem when it arises in order to continue

development. Below is a table that will represent the risks we believe our project may run into and our proposed solutions.

Risks	Impact	Possibility
API failing to deliver Biometric Data	Medium	Very Unlikely
Wellness Platform failing to notify Students	Medium	Unlikely
Failure in Securing data	High	Unlikely

Table 1. A Table that displays system risks and their impact and the likelihood of the risks occurring. Possibility Gradation: Very Unlikely, Unlikely, Likely, Very Likely. Impact Gradation: Low, Medium, High.

API failing to deliver Biometric Data

One potential issue that might occur is the API failing to deliver Biometric data to coaches. The possibility of this happening could occur through an issue with the database or through an error in the program. The impact of this would be a medium level impact as biometric data and its representation is a focal point of our system.

We believe that an issue with the API or database is highly unlikely as PWR Lab has been consistently using their API to send this data to coaches. The only way a failure might occur is through an issue with our system. Extensive testing periods on our system before we deliver it to PWR Labs will prevent this issue from occurring.

Wellness Platform failing to notify Students

Another potential issue could be the platform not notifying the students that they need to fill in their wellness survey, that their biometrics weren't recorded, and they need to fill it in manually, etc. This is set as a medium impact risk because this information reaching the coaching staff is critical for their evaluation of the student's health and workout for the week. However, we do not believe this is a high priority issue due to it not affecting the integrity of the platform in any way that could cause a critical error.

To prevent such an issue will require a functional system which we intend to produce. Like the previous issue the main way to deal with a problem like this would be prevention through testing our system. Setting up a test account throughout the development process to send and receive biometrics and feedback will be a solid way to ensure the system does not run into this error.

Failure in Securing data

The last main issue we will discuss is a failure in securing student data. The impact of this issue is very high. Student data must stay secure if we don't want to create legal issues for PWR Labs or the NAU coaching staff.

In order to mitigate this issue, we picked Django authentication to secure accounts, and will be allocating 2 week to work on authentication and 2 weeks to set up the API properly. We believe allocating this large amount of time to implementing these parts of the project will prevent any data leaks and create a well-designed and secure system.

6 Project Plan

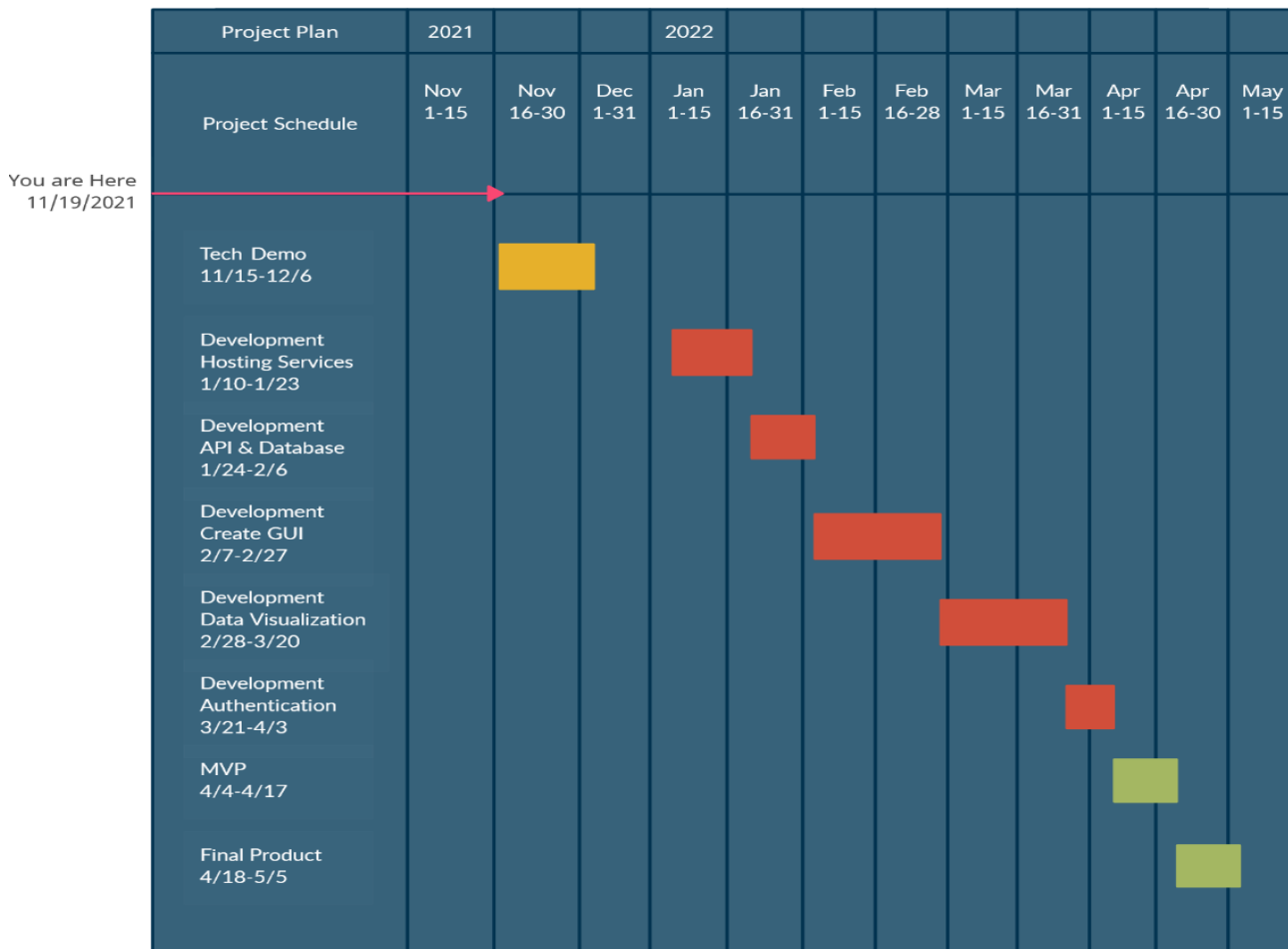


Figure 5. A Gantt chart that outlines project milestones. Each red box represents a task's time frame.

As our plan for the system progresses, we believe that there are certain milestones that will need to be met over the coming months. The main milestone that we will complete over the course of this semester is a technical Demonstration of our chosen technologies and their feasibility. For next semester we will be implementing development of our project, an MVP and our Final Product that we will introduce to our client.

Tech Demo

The Tech demo will be the last deliverable for the current semester. It requires us to test the feasibility of the technologies we have chosen. We will split up tasks between members to test one or multiple technologies for our Demo presentation. Our goal is to prove the technologies we have chosen will provide the necessary functionalities for our system.

Development

- **Hosting Services**

We will use this period to create our site server using AWS as well as setting up a skeleton site.

- **API and Database**

This phase will involve linking the PWR Lab's API to our skeleton site.

- **GUI**

Here we will be creating a Vue GUI that will provide many of the site's main functionality such as multiple dashboards that hold student data, and a coach/student chat system.

- **Charts and Graphs**

At this interval we will be visualizing the data using Apex Charts. During this phase data each data point will be manipulated to be visually appealing to the users.

- **Secure Authentication**

In the last development phase, we will be setting up user authentication services that will secure users account information using Django.

MVP

After our main development phase ends, our project will reach the Minimum Viable Product phase. All requirements will be developed to a point where the system is usable and performs the specified functions. Our team believes the product will reach further than the MVP phase, but we have set extended milestone dates to provide padding in case of any development issues. Throughout the MVP and Final Product phase we will be continuously testing the system. Testing will be done using our client's data. Our team will act as the coach using the web portal while our client will take the athlete role in recording biometric data and inputting wellness data for us to review. This will allow the team to test every aspect of the system.

Final Product

Once our MVP has been developed, we will spend the last part of the project timeline refining requirements for the system and continuing testing. At this point our team will

focus on the performance of the system and its features. Our team intends to meet with the client weekly to convey test results to them and to work through feedback provided.

7 Conclusion

This document has outlined the requirements, both functional and non-functional, necessary for a productive and innovative wellness portal. In addition, it has presented a detailed plan and schedule for our client. We have laid out the specified features and performance capabilities that we plan to fulfill when creating our final product. This document serves as a contractual agreement that we will incorporate the aforementioned functions into a solution for our client. This document also details the tests or standards that will be used to ensure the final product is delivered as expected.

Truly, the importance of being able to predict and prevent an injury before it occurs cannot be stressed enough. Athletes are constantly collecting data through their wearable devices, but that information is ultimately useless if it cannot be analyzed. Our wellness portal serves as an all encompassing solution for coaches to manage and visualize athlete data and provide accurate adjustment to training regimens to prevent injury. Essentially, this portal allows for data to become more than just a metric of athlete performance; this portal highlights the use of athlete data to promote both wellness and performance.

We predict that this wellness portal, with the help and support of PWR Labs, will be the first step in creating an innovative web-based environment for fostering athlete performance by providing a means to view athlete-produced biometric data and health logs, thereby reducing injury. After analyzing the key components of the functionality of our portal as well as the potential risks and plan for development in this document, we are looking forward to developing a wellness platform that has a lasting impact on our client and users of the system.