PaddlePals

# Team G01-2

## Deliverable D: Conceptual Design

## Engineering Design GNG1101

Team Members:

| | | | |
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# ***ABSTRACT***

*In the previous deliverable, the benchmarking for the different applications was derived from the analysis of design criteria. Target specification for the application were obtained from the interpretation of needs and benchmarking. Next, these criteria and specification were used to design three conceptual designs which will be seen in this report. The purpose of this report is to outline and explain the three conceptual designs and to compare the group design to the other similar applications.*

## Table of Contents

### List of Figures

### List of Tables

# 1. Introduction

The last deliverable (deliverable C) defined important design criteria and constraints needed to produce a protype of the Paddle Pals application. The criteria were based on the client's, Manit Ginoya's, ideas as well as benchmarking of similar products currently in the public domain.

Using the design criteria gathered from deliverable C, this document contains conceptual drawings of the optimal design layout of the application's user interface (UI) and camera set up. These drawings will continue to be improved and will be used as a reference to estimate costs and develop future prototypes.

This document will include the following:

- Subsystem designs
- 3 possible design ideas
- Final functional solution

# 2. Other Ideas

## 3.1 Camera Set-up

For the camera set up two ideas were discussed as follows:

The placement of the camera will be in a protected clear box made of plexiglass and attached to the wall of the court. The phone angle is adjustable and may be placed at any angle to allow for a great angle of vision of the court but leave room for the addition of other cameras and personalized views by the ability to remove the camera and its box from the court and place it anywhere on the plexiglass court surroundings. This idea is shown in figure 1 on the right.

The placement of the camera may also be on a tripod that is also able to be moved around the court for future flexibility of the addition of cameras. The camera can also be angled at any desired angle and is protected by a clear box for protection, so players are not worried about camera damage while training. This idea is shown on the left in figure 1.

Our project will be based on the use of one camera as a starting point and will therefore be placed at the best angle of vision, which was discussed to be the corner of the court.

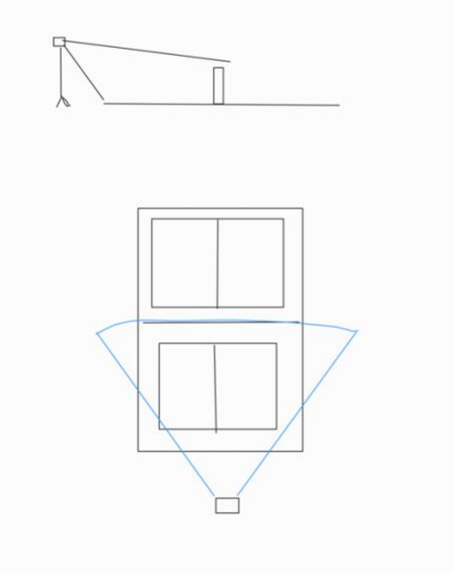


Figure 1: Conner's Camera Angle Ideas

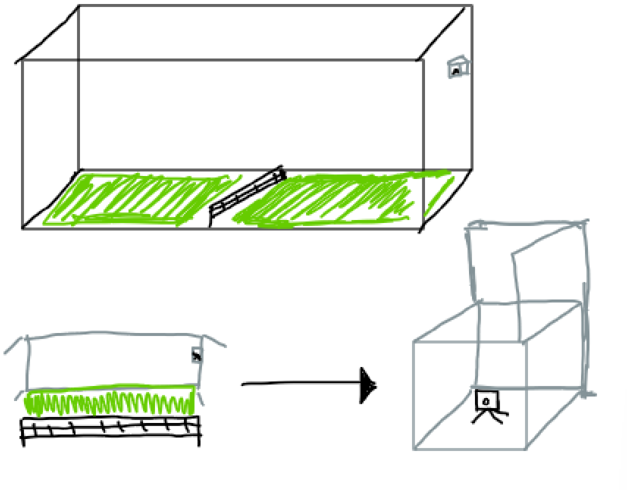


Figure 2: Marissa's Camera Angle Ideas

## 3.2 Opening Screen

The user will be greeted by a friendly and intuitive design. This will allow for any new players or coaches to incorporate the Paddle Pals application into their practice smoothly. The startup page will have four key components including: record match, view previous matches, a training module and the user manual.

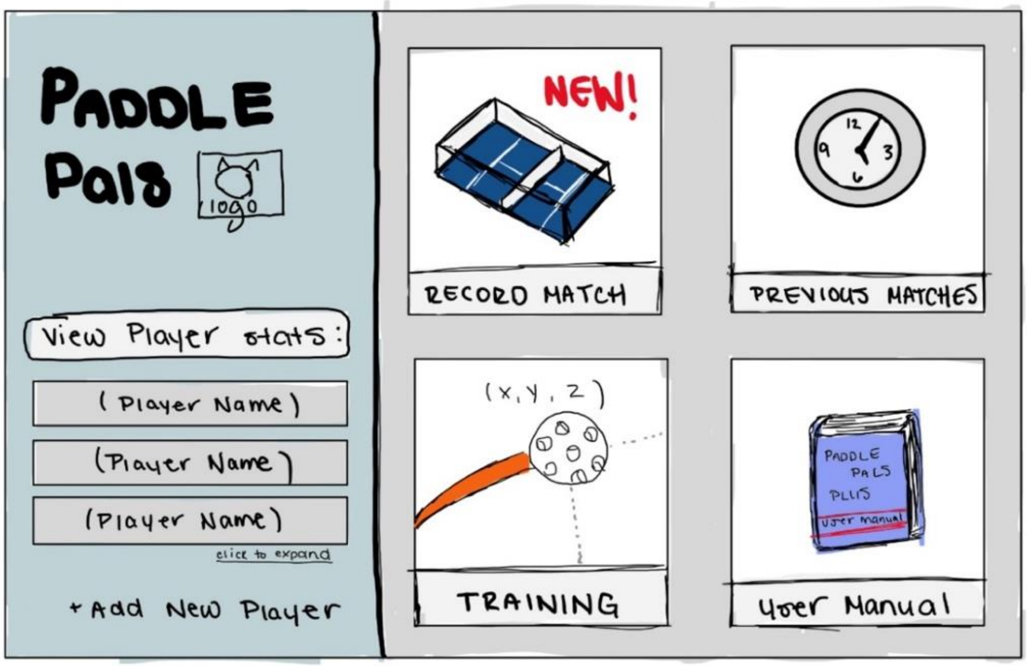


Figure 3: Faith's Opening Screen idea

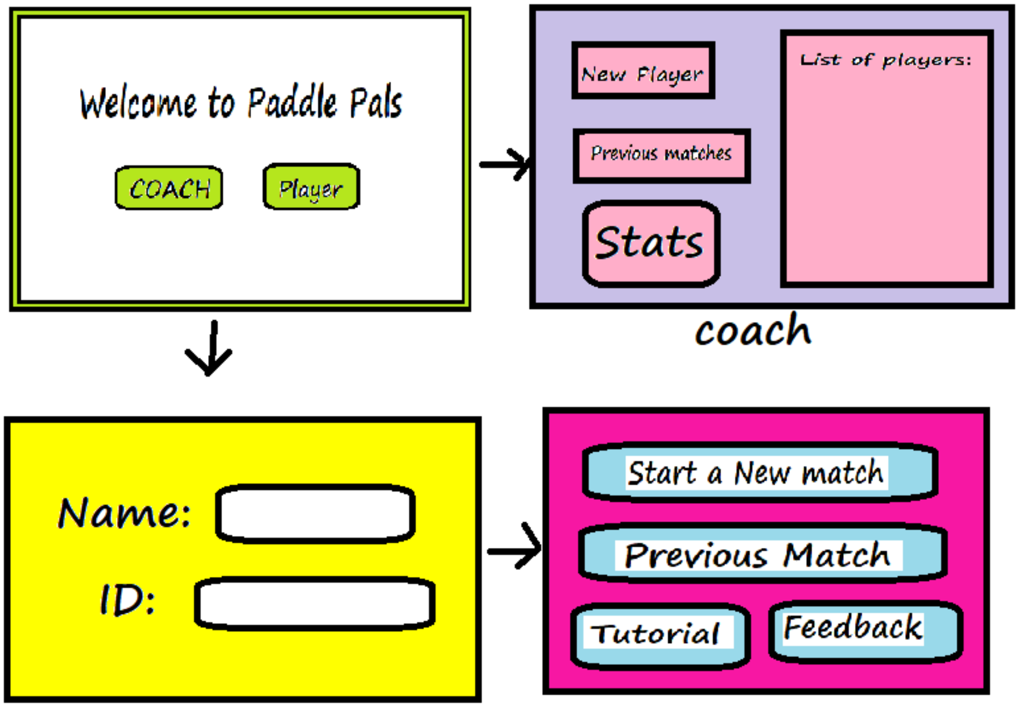


Figure 4: Zahra’s Opening Screen idea

## 3.3 Match-Viewing Interface

The Match-Viewing Interface allows the user to record and view the match in real time, with a screen that focuses on the ball’s movement only and a tab with the different data concerning the ball’s position and motion. The user is also able to write notes or comments for a given timestamp or time interval that will be saved with the recording.

On the side of the main screen, different functions can be accessed. A direct shortcut to “Previous Matches” called “Your Data” can be found. Its purpose is to redirect the user to the data they have recorded in the past to compare it with their current performance. Both windows may be open at the same time.

Tips on how to use the application/website are found in the “Tips” window and can be accessed at any time. That includes the basic functions the website offers, accessibility options and customization. The window may be closed if the user chooses so.

The “Viewing Options” allows the user to select what elements they want to be included in the live stream. Those elements include switching the camera, seeing the displacement arrows of the ball, as well as rewinding the video and editing it to include the most important moments of the match.

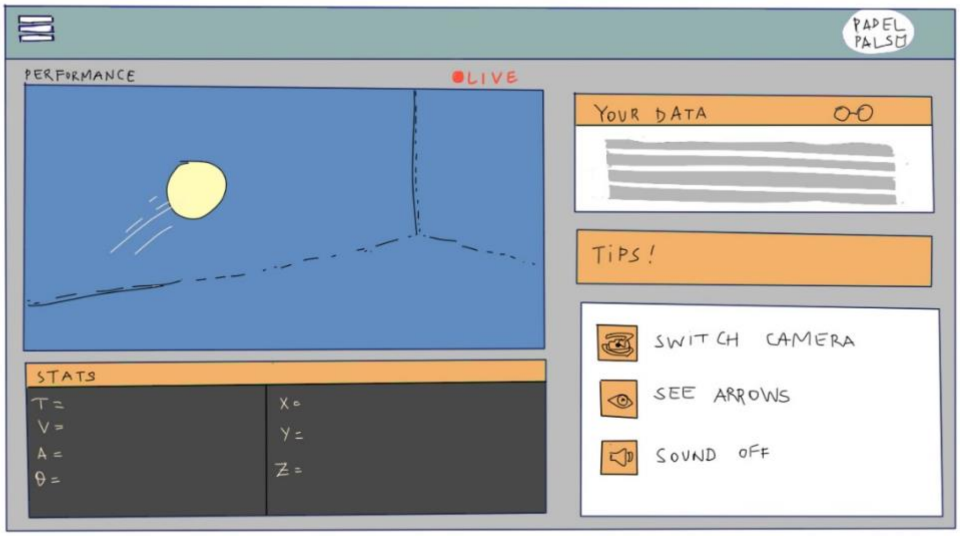


Figure 5: Layane's Match-Viewing interface idea

## 3.4 Previous Matches Interface

This Interface will include all previous data collected for each player. Including the date of the recording and the stats of the player's game. The user can rank their favorite matches and share them to other people in a video format. The user can access all the related data, comments and statistics by clicking on the "View Stats" tab.

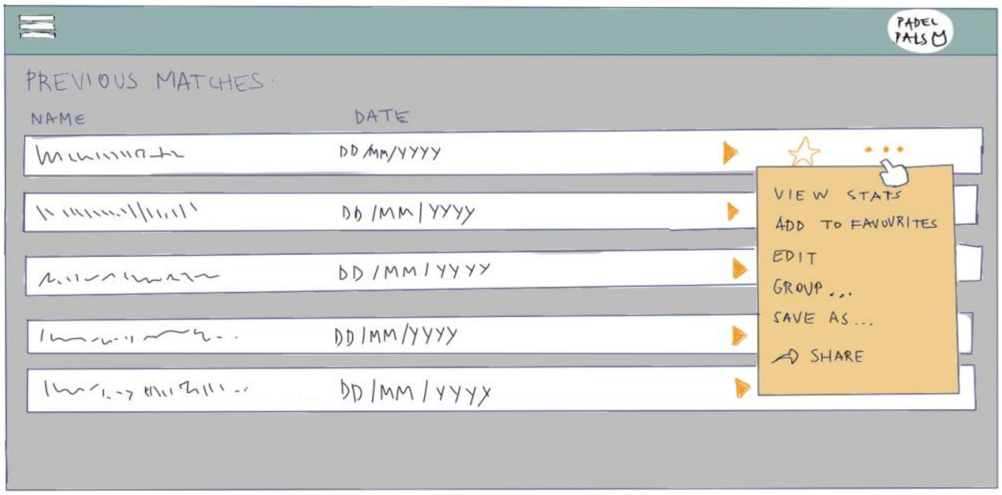


Figure 6: Layane's Previous Match idea

### 3.5 Training Interface

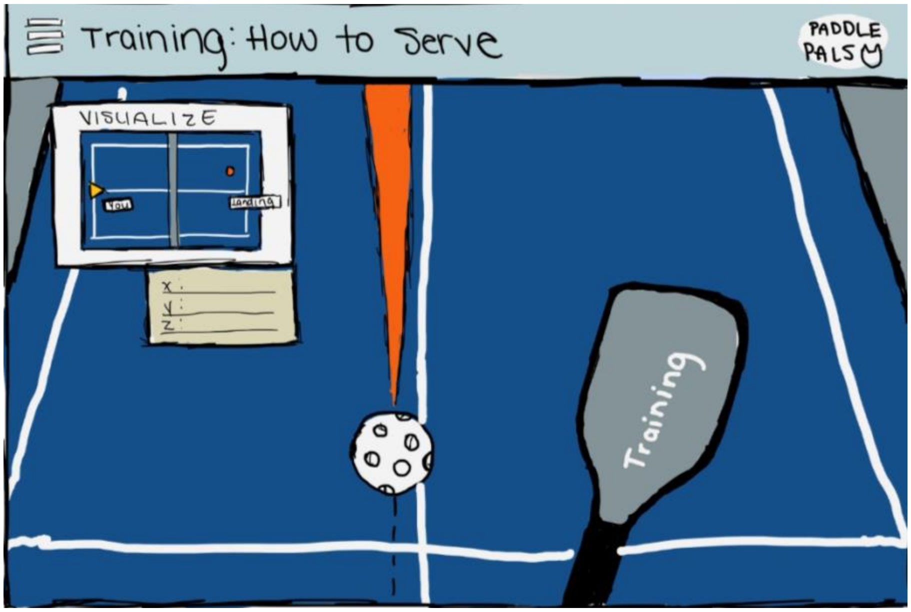
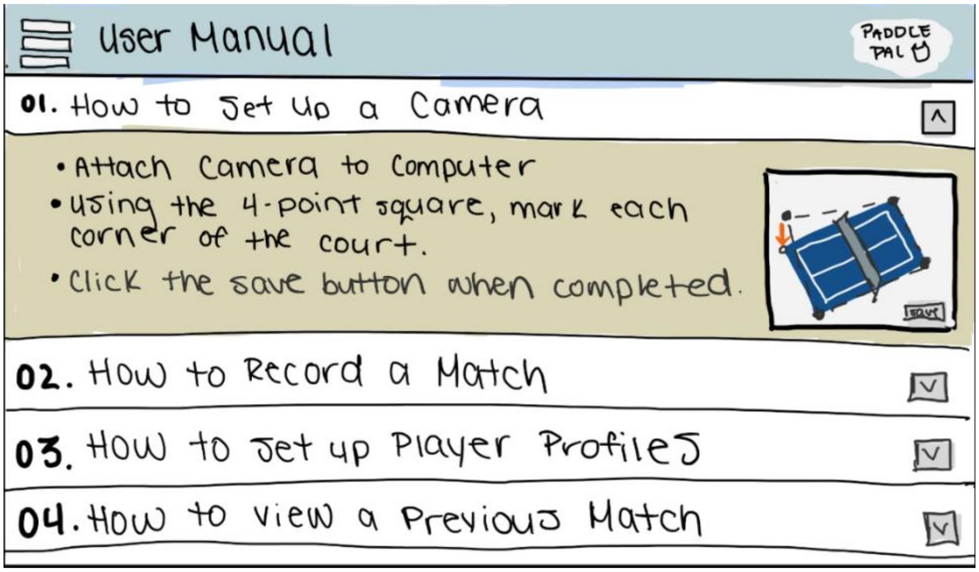


Figure 7: Faith’s Training Interface Idea

### 3.6 User Manual Interface



01. How to Set Up a Camera

- Attach Camera to Computer
- Using the 4-point square, mark each corner of the court.
- Click the save button when completed.

02. How to Record a Match

03. How to Set up Player Profiles

04. How to view a Previous Match

Figure 8: Faith’s User Manual Interface Idea

## 3. Final Design

After discussing all ideas and considering all design criteria and client comments we have come up with a group idea. The group design is a compilation of all team members' ideas and is discussed as follows:

The user interface will be designed neatly and will be visually pleasing. There will be sections including the video of play, all ball measurements, add new game, user manual, and tips on player gameplay. The user will be able to select a time of play and calculations and videos will be displayed.

For our project we will be using one camera, and the camera will be in a fixed position which will require set up instructions in our application user manual. After discussing the position of placement for our camera, we decided on placing the camera in the corner of the court for our project. We have considered an important comment from the clients regarding flexibility to add more cameras to the application as well by making the camera set up adjustable for movement for future application adjustment.

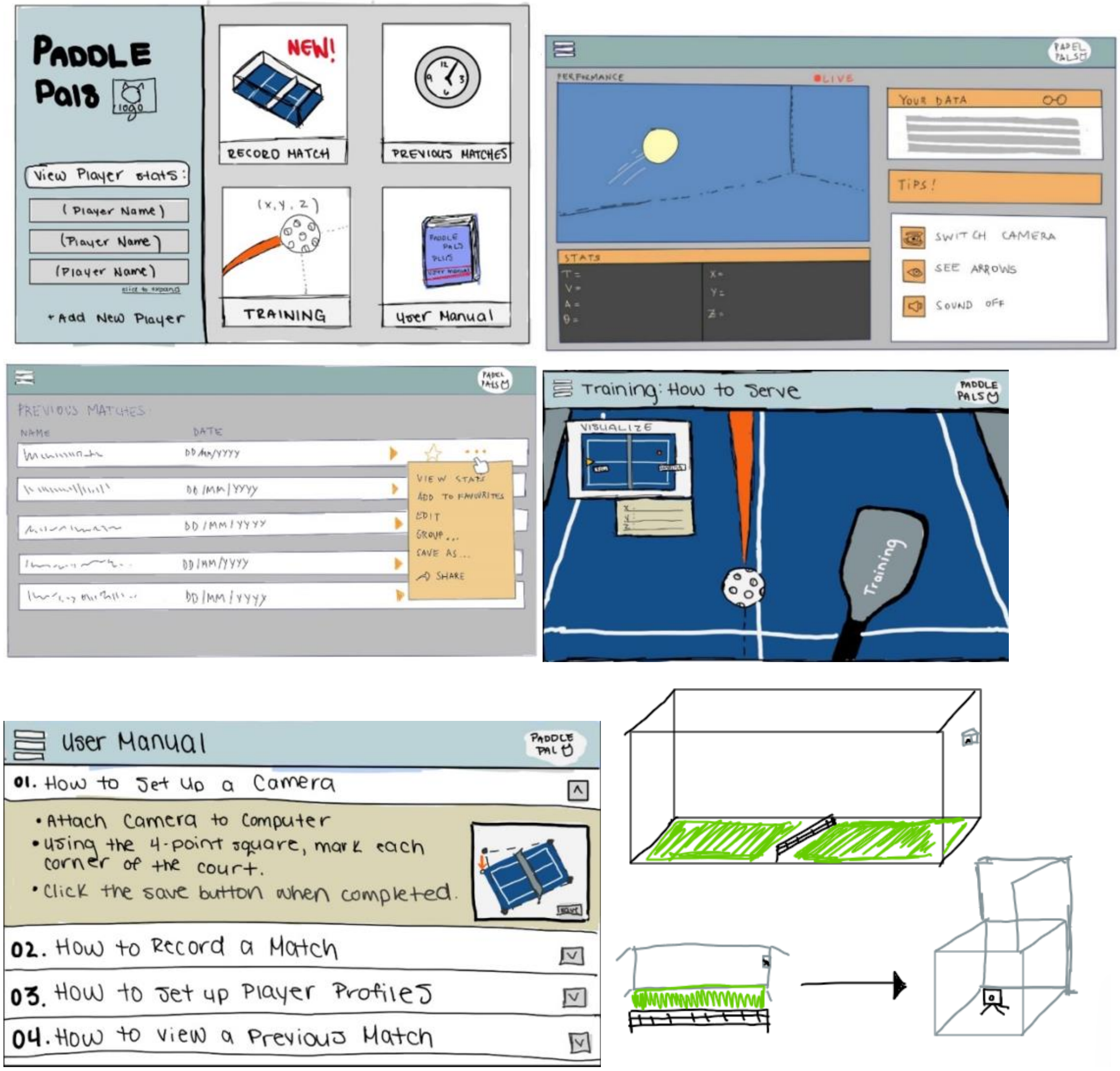


Figure 8: Final Design

## 4. Benchmarking Summary

For this deliverable we have added our own group design discussed in section 2 to our previously prepared benchmarking tables from deliverable C. The purpose of adding our design is to ensure that our design application is in competition with competitors and our design meets all the required criteria given by the clients. In the following benchmarking tables, it is highlighted that our design meets all the desired criteria and is beyond the competitors' designs.

Table 1: Analyzing similar products based on Design Criteria [1]-[3]

| Company | Swing Vision | Top Tennis Tracker | Squash Track | Paddle Pals |
|---|---|---|---|---|
| Subscription Cost | $269.98 (per year) | $40.32 (per year) | $215.85 (per year) | Free |
| Video Analysis | Yes | Yes | Yes | Yes |
| Shot Tracking | Spin, speed, placement, rally length, stroke. | Momentum, serve, rally, scores | Ball position, detailed analysis | Speed, placement, rally length, stroke |
| Instruction Manual/Tutorials | Yes, many video instructions | Yes, some video instructions | Yes, but very few. | Yes, many video and written instructions |
| Aesthetically Pleasing | Yes | Yes | No | Yes |
| Outdoor use ability on rainy days | No | No | No | Moderate outdoor use |
| Gameplay Advice | Yes | Yes | Yes | Yes |
| Cloud Storage | Unlimited storage, accessible on any device, lifetime backups | Yes | Unlimited Storage on match or training records | Yes |

Table 2: Benchmarking system based on Design Criteria [1]-[3]

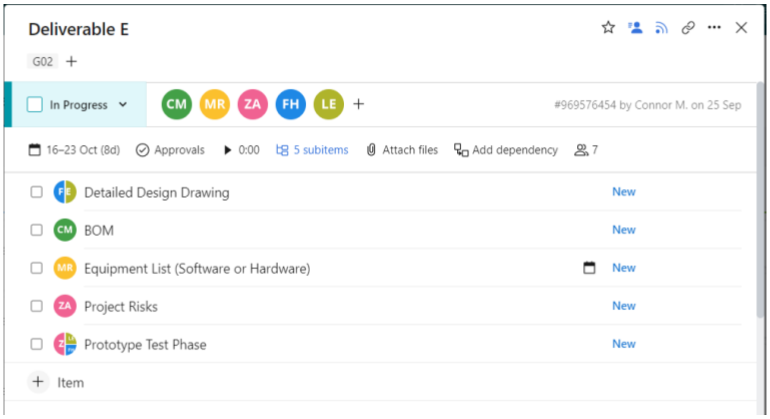
| Company | Importance | Swing Vision | Top Tennis Tracker | Squash Track | Paddle Pals |
|---|---|---|---|---|---|
| Subscription Cost | 1 | 1 | 3 | 2 | 3 |
| Video Analysis | 5 | 3 | 3 | 3 | 3 |
| Shot Tracking | 5 | 3 | 2 | 1 | 3 |
| Instruction Manual/Tutorials | 3 | 3 | 2 | 1 | 3 |
| Aesthetically Pleasing | 1 | 3 | 2 | 1 | 3 |
| Outdoor use ability on rainy days | 1 | 1 | 1 | 1 | 3 |
| Gameplay Advice | 4 | 3 | 3 | 3 | 3 |
| Cloud Storage | 3 | 3 | 1 | 3 | 3 |
| Total |  | 65 | 52 | 48 | 69 |

## 5. Conclusion and Recommendation

After discussing all ideas with all team members, a final design will be discussed and presented to the client for analyzation. The client comments will be used to further edit and discuss our design going forward.

## 6.Wrike Update

Link: [Deliverable E - Wrike]()



#969576454 by Connor M. on 25 Sep

16–23 Oct (8d) · 0:00 · 5 subitems · 7

☐ Detailed Design Drawing — New
☐ BOM — New
☐ Equipment List (Software or Hardware) — New
☐ Project Risks — New
☐ Prototype Test Phase — New

## Bibliography

[1] *SwingVision: A.I. scoring, Stats & Line calling for tennis*. SwingVision: A.I. Scoring, Stats & Line Calling for Tennis. (2022). https://swing.tennis/c/cracked20

[2] Kolonic, A. (2020). *Top tennis tracker - pro stats for serious players*. Top Tennis Tracker - Pro stats for serious players. https://www.toptennistracker.com/

[3] *All About Squash Track App*. SquashTrack. (2019, March 3). https://www.squashtrack.com/