

## **Description and Discussion of the Development of the Analytics Question**

The question that will be answered throughout this paper is: *From the 2019-2023 seasons, has the UO Women's Volleyball team been stronger offensively or defensively?* The progression of the volleyball team under head coach Matt Ulmer will be analyzed with a focus on both offensive and defensive aspects. The analysis will involve examining the team's performance in these areas separately to determine strengths and weaknesses. Given a background in playing as a libero, which emphasizes defensive skills, a comparative study of these statistics will provide insights into which aspect of the team's performance is stronger.

## **Discussion of Variables Available and Variables Needed to Examine the Analytics Question(s)**

The data available of statistics includes: Player #, Last Name, Position, Points generated by player, Games Played, Games Played %, Attack attempt count, Kill count, Kill count %, Attack Efficiency, Attack error %, Block stuffed attack %, Passing attempt count, Average Passing Grade (3 Point Scale), Average Passing Grade (4 Point Scale), Good pass %, First ball side out %, Serve attempt count, Aces %, Serving Error Count, Serving Error %, Point Serving %, Block Stuff Count, Block Touch %, Good Block Touch Count %, Block Error %, Touched Count, Digs, Digs %, Digs that Result in an Attack%, Percentage of Digs that Result in Point %, from the years 2019-2023. \*More information about the statistics can be viewed [here](#).\* The data was split into offensive and defensive statistics, with an analysis conducted on each player's performance in both areas. To maintain a balanced comparison and ensure a consistent baseline, only players with non-zero values for both offensive and defensive statistics were included in the analysis. This approach was designed to prevent any distortion of results by players with no statistical data.

## **Method of Constructing the Variables Needed**

The project began with cleaning the data and observing all the information the data contained. The data was then separated into offensive and defensive variables. From there, basic visualizations were graphed, which have helped to gain a basic understanding of the dataset and gave further direction on how to proceed. It helped to visualize the statistics and have a basic understanding of the overview of the data. To begin, the total point comparison between 'Oregon and Opponents' from 2019 to 2023 was graphed. Subsequently, the averages of each column were calculated, providing a deeper insight into the team's performance over the past few years. This analysis specifically facilitated an understanding of how the average offensive player compared to the skillset of the average defensive player.

## **Flowchart of the Analytics Logic to Answer the Analytics Question**

Once obtaining this data through the professor, data cleaning techniques were applied to filter out unnecessary columns, renaming columns to be clearer, and dropping 0 values. For example, when comparing the average attack efficiency of the team, but for defensive players, they had an individual efficiency of 0, which would skew the data and provide inaccurate results. Therefore, all values of 0 were removed, resulting in an accurate calculation of the average attack efficiency of offensive players. This adjustment significantly contributed to addressing the research question. During the initial stages of data cleaning and analysis, the total point count for Oregon and its opponents from 2019 to 2023 was graphed. It was found that Oregon scored a total of 2,270 points, while its opponents scored 1,698

points. The analysis then proceeded to focus on offensive statistics, revealing the following findings: 'The average attack efficiency of the team is: 21.4%. The average ace percentage of the team is: 6.3%. The average attack error of the team is: 13.2%. The average serving error of the team is: 10.7%. The average point-scoring of the team is: 45.6%.' On the other hand, for the defensive statistics: 'The average block stuff count of the team is: 44.25. The average block touch of the team is: 6.29%. The average good block touch of the team is: 46.35%. The average dig count per player is: 143.23. The average dig count that resulted in an attack per player is: 66.12%. The average dig count that resulted in a point per player is: 24.83%.'

### **Tool(s) Used**

This project was conducted using a Jupyter Notebook and various python packages. There is a PDF of the notebook with all the work and additional graphs/visualizations included as well. In python, the visualization package matplotlib.pyplot was utilized, as well as Pandas and NumPy. Prior knowledge of analysis and visualization was utilized from previous data science classes. Using these specific python – and data cleaning and visualization – tools helped achieve valuable insights into team performance and informing strategic decisions.

### **Primary Findings and Conclusion**

Using the data found above, and in the Jupyter notebook, the players attack attempts were compared to their kill statistics. This provided a clear visualization within attacks, and allowed for a pattern to emerge, keeping in mind that the kill average of the team was 21.4%. When researching, it was stated that a strong kill average of a D1 women's volleyball team should be ranging from 25-30+%, which UO falls below.<sup>1</sup> On the other hand, when comparing the dig % to the dig resulting in a point %, there was a closer relationship between the two variables. Additionally, each player's serve attempt percentage was compared to the percentage of aces scored. Online, it states that an ace range of 7-10% is considered strong for a player.<sup>2</sup> When observing the graph, it is apparent that the average is 6.33%, which is incredibly strong for a team. From this data and visualization, it can be deduced that the team is overall very strong in serving. On the defensive side, players' overall dig percentages were analyzed in comparison to their dig percentages that specifically resulted in a point. Players were incredibly strong defensively, with their dig statistics ranging from 75.8-100%, with an average of 74.95%. Overall, it seems that the UO Women's Volleyball Team has a stronger defense than they do offense. Logically, this makes sense as defense is the backbone of volleyball. Without a strong defense, the offense will rarely get the opportunity to attack and showcase their skillset. Although the team is incredibly strong as a whole, they excel more at defense, which consequently allows their offense to truly thrive.

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<sup>1</sup> <https://volleytalk.proboards.com/thread/55132/hitting-percentage-d1>

<sup>2</sup> ChatGPT