Recommendations for Athletic Directors to Support a Successful Pacific-12 Football Program.

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Executive Summary

The objective of our analysis is to determine on-field factors that may contribute to success for Pacific-12 conference football programs. A mixed methods approach, utilizing criterion purposive sample of professional sport journalists was used to determine typical factors of success on a per game basis. Examining events at the single game level, we find post game narrative seems to follow a common theme, breaking down victory or loss into a few simple categories. Identified themes state games may be lost based on a dominant performance in a single category, a substandard performance in a single category or a combination of dominant and substandard performances in multiple categories. Offense was overwhelmingly identified as the primary driver of victory. Critical analysis of themes failed to prove that offense is more important than defense when building a competitive Pacific-12 football program. Instead, analysis indicated that individual elements, offensive line and defensive line, present a more appealing opportunity to influence success. Analysis suggests that an offensive line that can limit sacks and establish a run game in early downs may be effective at influencing outcomes, but the defensive line who forces sacks may have a larger impact on end of season success.

Football is typically thought of to have 3 phases; offense, defense and special steams. Qualitative research suggests that offense determines success more than defense. Offense and defense are measured using the same metrics. A particular play in the game, an observation in our dataset, will result in a yards gained (zero or a positive number) or yards lost (a negative number). An offense earns yards as a result of a play, while the opposing team defense surrenders those same yards on the play. More yards is good for an offense, while less yards is good for a defense.

College sports can be broken into revenue and non-revenue generating sports. A university with successful revenue generating teams holds a multimillion dollar advantage over those that do not. The Pac-12 has a reputation for supporting non-revenue sports equally to revenue sports. Some attention has been given to this strategy as flawed, yet the intent remains to field a nationally competitive division. College football, a revenue generating sport, has financial implications for individual teams, media companies, gaming and gambling industry as well as impacting travel and tourism. A successful football program engages current students, alumni, fans and produces national level exposure for the university and athletes (Silverthorne, 2013). The university benefits from exposure through increased student applications, alumni donations and even an increase in political capital (Chung, 2013). The financial impact of a high level bowl game invitation can be millions of dollars more than a low level bowl game invitation (Wikipedia, 2019).

The desired outcome is to win football games with the benefit of generating exposure, revenue and fan engagement. This benefits individual stakeholders, such as athletes and coaches, as well as taxpayers, who fund athletic departments.

Method

Participants

Post event analysis of 11 games sampled from our dataset were examined to determine prevailing themes. Expert analysis came in the form of articles published by ESPN, Inc credited to the associated press. Additional analysis from National Collegiate Athletic Association sources outlined memorable elements of programs with the highest winning percentage over the previous 150 years. A retrospective examining the 150 greatest college football teams in history was also examined. Teams were debated and ranked using expert feedback. From ESPN.com, 'The group of 150 voters is made up of influential figures and minds from across college football, including current and former writers, broadcasters, administrators, sports information directors and ESPN personalities.' Detailed op-eds from Denver Post, Harvard Business Review and Bleacher Report, a division of CNN Sports, contributed to research.

Data Collection

I performed quantitative analysis on a dataset containing observations for every play in the 2018 college football season. The dataset is granular, with 32 columns describing each play. Time-series data is recorded using the official game clock. Numeric identifiers for team and game correspond to those assigned and maintained by ESPN.The dataset began as every play that occurred in NCAA football during the 2018 regular season. I reduced the file to include only games involving 1 or more pac-12 team.

The granular nature of the data prevents an explicit game won or lost field. Instead, the results of individual plays are documented as yards gained. The outcome variable, game won or lost is not explicitly stated. The score is recorded, along with the timestamp of the play, as

'homeScore' and 'awayScore'. End of season win percent was calculated from the data, and confirmed using results published by ESPN. (ESPN, 2019)

Data Analysis

Data Analysis focused on determining strength of relationships of identified themes to end of season win percentage. Successful teams are defined as finishing the season ranked top 2 in their division. Unsuccessful teams are defined as finishing in the bottom 2 of their division. (Table 1.) Overall season performance of top performers (n=4), bottom performers (n=4) and league (n=12) were compared to determine support for our research. (Table 2)

Synopsis of Findings

Analysis does not prove that offense is more important than defense, but some evidence lends support. Successful teams established a running game in early offensive opportunities. Bottom performers fared consistently with league average in rushing yards earned during early opportunities. Yards allowed by defense and yards earned by offense failed to correlate to win percentage. This suggests individual elements of an offense may be more important than individual elements of a defense.

Analysis strongly supports a quality offensive line will indicate a higher win percentage at season end. Poorly performing offensive lines allowed twice as many sacks as our top performers. This suggests additional AD attention and financial resources would be justified for offensive line resources. Offensive line as well as strength and conditioning coaches that have established success may be more difficult to source, but analysis supports the additional investment.

When examining measures related to offensive performance specific to rushing yards, the top 4 performers rarely had values significantly better than league average, yet the bottom 4 performers often had values significantly lower than league average. When early game possessions are considered, top performers again were well above league average, but bottom performers were consistent with league. For example, Stanford averaged the least rushing yards in early possessions, 3.2 but ended the season with a respectable 0.692 win percentage. University of California Los Angeles (UCLA) earned the most at 5.9 yards yet ended the season with a difficult 0.250 win percentage. This suggests establishing a running game early may support wining, but failing to establish a running game may not indicate a team will lose.

Our suggestions are based on the assumption that athletic directors have equal access to resources such as budget, time and energy. These factors, while important in business decisions, are beyond the scope of our data. Strategy also assumes top tier talent can be retained among lower level coaches. This statement may not hold true, as many coordinators and position coaches desire to advance in their careers. Factors such as notable donors, team history and culture and personal preference may also support or inhibit an AD's capacity to execute a staffing strategy (Vickery, 2011).

Recommendations

Athletic Directors who intend to build or maintain a top tier program should distribute resources such as budget to the coaches who our analysis suggests are in the best position to influence end of season outcomes. Offensive coaches who establish an early run game while limiting sacks should remain a priority. Athletic directors are advised to support efforts to attract, recruit and retain a coaching staff with a high offensive focus, but not to the point of over

investment. We have support that a strong offense is important, but not enough to surrender other priorities. AD's with high performing line coaches should take measures to retain their talent. AD's without high performing offensive line coaches are advised to maintain an awareness of opportunities to attract a more qualified professional into that key position. Neither offense alone nor defense alone is a reliable strategy to build a successful program.

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Tables Figures and Charts

Table 1. End of season results, Pacific 12 North and South Division

PAC-12 North Team	Conf	Overall	Home	Away	Strk	Overall Win%
Washington	7-2	10-4	6-0	3-2	L1	0.714
Washington St	7-2	11-2	6-1	4-1	W1	0.846
Stanford	6-3	9-4	4-2	4-2	W4	0.692
Oregon	5-4	9-4	6-1	2-3	W3	0.692
Cal	4-5	7-6	4-3	3-2	L2	0.538
Oregon St	1-8	2-10	1-5	1-5	L4	0.167

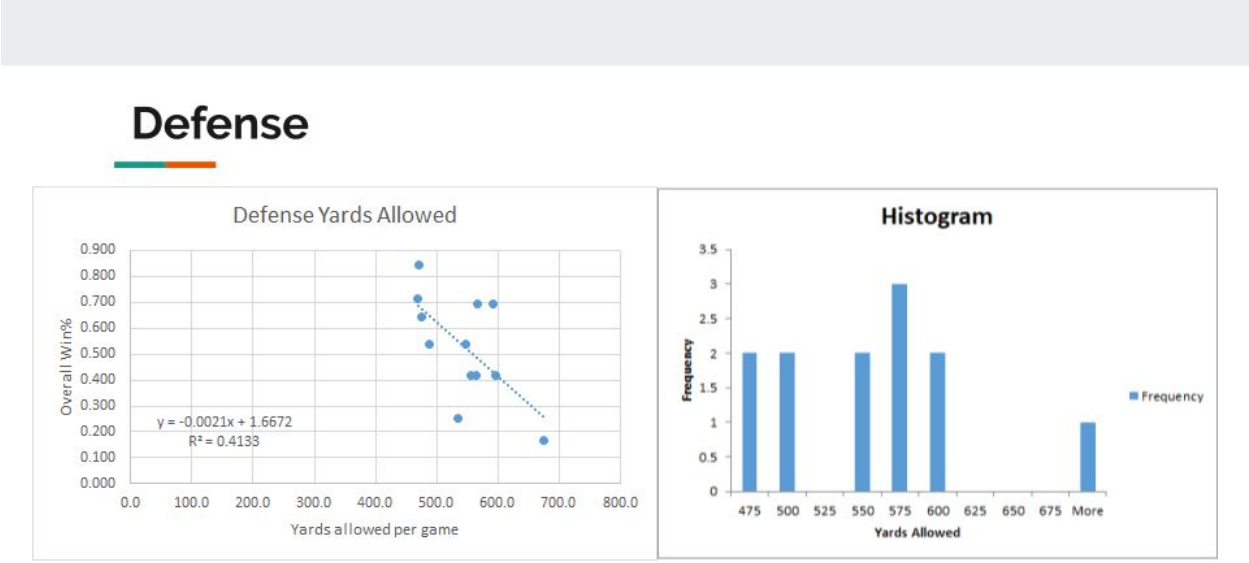
PAC-12 South Team	Conf	Overall	Home	Away	Strk	
Utah	6-3	9-5	5-1	4-2	L2	0.643
Arizona State	5-4	7-6	5-1	2-4	L1	0.538
USC	4-5	5-7	3-3	2-4	L3	0.417
Arizona	4-5	5-7	4-3	1-4	L2	0.417
UCLA	3-6	3-9	2-5	1-4	L1	0.250
Colorado	2-7	5-7	3-3	1-4	L7	0.417

Table 2. Top and Bottom Performers against league average in categories identified through qualitative research.

Null Hypothesis	**Pacific-12**	**Top 2 (n=4)**	**Bottom 2 (n=4)**
Win Percentage	0.52762515	0.68543956	0.342948718
Offense	—	—	—
Average Yards (Play)	6.02206558	6.219645317	5.786279858
Average Yards (Game)	560.332071	586.7916667	540.8503788
- Completion Rate			
Run Game	—	—	—
-Rush Yards 3 possessions	4.9896649	5.361677294	4.927609072
-Rush Yards per possession	4.95164401	5.093709067	4.666091234
QB & O-Line	—	—	—
-Sacks allowed	1.82905983	1.336538462	2.625

Figure 1. Relationship between offensive yards earned and end of season win Percent.

Figure 2. Relationship between defensive yards surrendered and overall win percent.



Mean	544.79	Standard Deviation	62.05	Standard Error	17.91	Skewness	0.520
Kurtosis	0.235	Median	552.5	Range	206.14	Mode	#N/A
Minimum	469.5	Maximum	675.64	Sample Variance	3850.81	Sum	6537.48

Figure 3. Relationship between offensive line performance and end of season win Percent

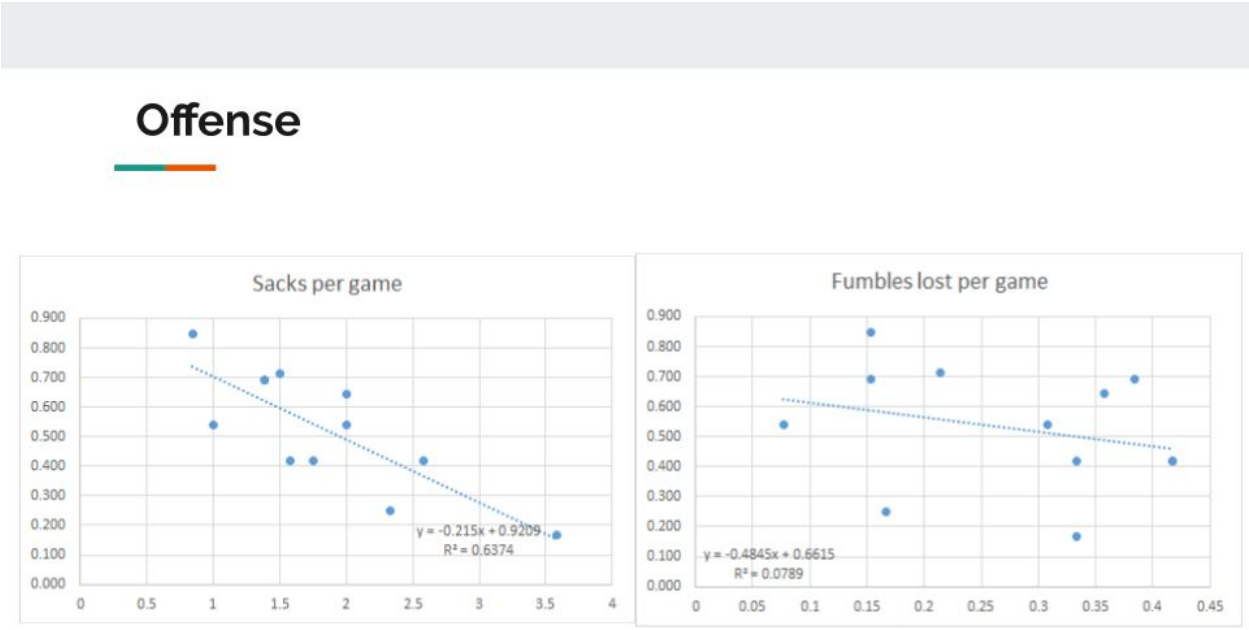


Figure 4. Relationship between defensive line performance and end of season win Percent