UTILIZING ANALYTICS TO BUILD, RUN, AND SUSTAIN COLLEGE ATHLETIC PROGRAMS IN 2022 AND BEYOND

by

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ABSTRACT

The following thesis will examine many of the modern problems and questions around the intercollegiate athletic environment in the years 2022 and beyond. The analytics-based reasoning will give reasonable suggestions to players, coaches, and administrators that can make their jobs easier and processes more efficient. Focuses will begin with the history of the NCAA and the state of the current environment. After a literary review, topics explored will vary between sports and between fields of thinking. Recruiting analytics, sports science, data analytics, transfer analytics, social media analytics, and NIL analytics will highlight this thesis with an eye toward the future. Implications of the utilization of such things will be discussed, and the thesis will conclude with a serious introspection into the future of the NCAA, as it will be determined by the response to NIL. A quick review of the previous topics will be included as well.

I. Introduction and Research Question

The past two years have seen a seismic shift in the landscape of college athletics. The power struggle between the National Collegiate Athletic Association (NCAA), players, athletic departments, and boosters has seen a sharp turn toward student-athlete freedom. First, a history of the situation.

Collegiate sports fans, college administrators, and even the NCAA, have constantly perpetrated a myth that intercollegiate athletics used to be a pure combination of prioritized academic achievement and a secondary commitment to sport. However, going back to the very beginning of college sports, that pure idea is just that: an idea. Commercialization has always had its place in intercollegiate athletics. One of the first major college sports rivalries, the Harvard vs. Yale regatta, was sponsored by the powerful Elkins Railroad Line.[1] The level of competition, fan support, and commercialization continued to rise to a point where cheating became inevitable. In this highbrow sport, Harvard brought in a coxswain who had no affiliation with the college to lead the team.[2] These events occurred in the late 19th century, long before anyone who complains about the purity of collegiate athletics was ever born. The difficult truth is that collegiate athletics, even with the purest intentions, have always succumbed to the financial pressures of commercialization, and will continue to bow to these powers in the future.

However, for as long as college sports have been commercialized, there has been opposition to said professionalization. While the first examples of excess in

[1] Rodney K. Smith, A Brief History of the National Collegiate Athletic Association's Role in Regulating Intercollegiate Athletics, 11 Marq. Sports L. Rev. 9 (2000)
[2] Rodney K. Smith, A Brief History of the National Collegiate Athletic Association's Role in Regulating Intercollegiate Athletics, 11 Marq. Sports L. Rev. 9 (2000)

intercollegiate athletics reared their head, University Presidents Eliot of Harvard and Walker of MIT publicly bemoaned the trend. Eliot claimed that "lofty gate receipts from college athletics had turned amateur contests into major commercial spectacles." Walker opined that, "[i]f the movement shall continue at the same rate, it will soon be fairly a question whether the letters B.A. stand more for Bachelor of Arts or Bachelor of Athletics."[3] There certainly was validity to these concerns, as the line between amateur college students and professional athletes was quickly blurring. Despite faculty and conference regulation, the wild west nature of intercollegiate athletics would not go away. Finally, the United States government was forced to become involved.

The valid concerns about lack of regulation were combined with the fact that 18 collegiate football players died playing the sport in 1905 alone. College football was so dangerous at the time, the United States government convened under President Theodore Roosevelt to determine whether collegiate football could be regulated, or whether the dangers of the sport should cause it to be abolished at the collegiate level entirely.[4] It is quite interesting that Roosevelt was the man who happened to be in office at the time, as the President had the reputation as a "tough-guy" due to his wartime actions and foreign policy views, yet also made a name for himself politically through his trust-busting, regulatory ways. In a way, he was the perfect executive to oversee collegiate athletics regulation. After a rules check was

[3] Rodney K. Smith, A Brief History of the National Collegiate Athletic Association's Role in Regulating Intercollegiate Athletics, 11 Marq. Sports L. Rev. 9 (2000)

[4] Rodney K. Smith, A Brief History of the National Collegiate Athletic Association's Role in Regulating Intercollegiate Athletics, 11 Marq. Sports L. Rev. 9 (2000)

unsuccessful, Roosevelt helped organize a rules committee to regulate the sport. The rules committee's efforts to redesign the game of football led to the creation of the Intercollegiate Athletic Association (IAA) with 62 original member schools, which would become the NCAA in 1910.[5]

Ever since that point, the NCAA has been the main regulatory body in college sports, with its member schools growing to over 1000 4-year universities across multiple competitive divisions. As a part of this rise in numbers, the NCAA has also had to evolve its regulatory role. While still being advocates for player safety, the NCAA began to act as a law enforcement agency, punishing teams and players who gave or received impermissible benefits. One of the most famous NCAA punishments was the "Death Penalty," given to Southern Methodist University in 1987. The NCAA banned the Mustangs from competing in football competition for a year, yielding massive scholarship losses that the program has still yet to fully recover from over 30 years later. The reason for such harsh penalties given to SMU were the emergence of boosters, powerful and wealthy alumni who finance advances in athletic programs. On paper, there is nothing wrong with alumni funding advances in their university's athletics programs, but the problems arose in the recruitment of high school athletes. Boosters were often responsible for providing outrageous benefits to the students, and the NCAA laid the hammer down on SMU, partially to scare other universities engaging in such actions, as probation was apparently not doing the job.

[5] Rodney K. Smith, A Brief History of the National Collegiate Athletic Association's Role in Regulating Intercollegiate Athletics, 11 Marq. Sports L. Rev. 9 (2000)

Problems with boosters and coaches providing impermissible benefits persisted to this day, despite the warning sent by the NCAA through SMU.

Fast forward to the early 2010s. The NCAA's most profitable sport, college football, had announced a move to a four-team playoff system that the NCAA does not have jurisdiction over. The move had been seen as a money-grab by high-level Division 1 athletic departments. Possibly because of this, players began organizing as a way to make sure they were being fairly compensated for the cash cow that collegiate athletics had turned into. University of Connecticut star basketball player Shabazz Napier utilized his platform of winning a national championship in the 2014 NCAA Division 1 Basketball Tournament to advocate for player unions, opining that the benefits players received were not enough to live on.[6] In the same year, Northwestern football players were deemed employees and were granted the right to unionize by a regional NLRB director.[7] These events helped set the stage for the events of the last two years.

The COVID-19 pandemic wreaked havoc amongst the NCAA, forcing the cancellation of multiple championship events, as well as costing athletic departments

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[6] Ganim, Sara. "UConn Guard on Unions: I Go to Bed 'Starving'." *CNN*, Cable News Network, 8 Apr. 2014, https://www.cnn.com/2014/04/07/us/ncaa-basketball-finals-shabazz-napier-hungry/index.html.

[7] Gregory, Sean. "The Northwestern Union Decision and College Football's Future." *Time*, Time, 19 Aug. 2015, https://time.com/4002245/after-union-setback-heres-the-road-ahead-for-college-athletes/#:~:text=A%20regional%20NLRB%20director%20ruled%20that%20Northwestern%20football,and%20other%20benefits%20at%20the%20collective%20bargaining%20table.

major funding. As a result of this financial distress, efforts were made to play the 2020 college football season. Players were informed of the risks, but many athletes held well-founded reservations about playing the season. The resulting NCAA concessions brought a large amount of power toward the athletes, and the United States government took notice. While arguments about the implementation of a season continued, new legislations were being drafted in states. The season was played with multiple disruptions but ended relatively well all things considered. The state legislations are what became important. Beginning in 2021, players would be able to utilize their name, image, and likeness (NIL) for monetary purposes. The bipartisan legislation, originally written in specific states, was passed federally on July 1, 2021.

Since the early 2000s and the advent of "Moneyball", analytics have become increasingly utilized in sports to help teams who have disadvantages win games. With analytics already prevalent in professional sports, they have begun to reach intercollegiate athletics as well. Since there is a much greater gap between the "haves" and "have nots" in collegiate sports than professional sports, analytics looks to be a way to even the playing field. My goal is to explore analytics through multiple sports and see how I can apply them to help athletic programs sustain success both on and off the field, especially looking for ways to utilize NIL for the benefit of all.

II. Literary Review

As shown earlier, there is a well-documented history of regulation in intercollegiate athletics. The introduction explores this, as well as the rapidly

evolving landscape of intercollegiate athletics today. To understand how the NCAA and the universities got to this point, context is crucial. Therefore, Rodney K. Smith's "A Brief History of the National Collegiate Athletic Association's Role in Regulating Intercollegiate Athletics[8]" provides valuable build-up to the crux of the point. It details the history of NCAA regulation, as well as providing precedence and context to the environment that led to the explosion of NIL.

Providing more recent context in brief references are Sara Ganim's article for CNN on UConn basketball guard Shabazz Napier's post-championship comments on UConn's food situation at the time[9] as well as Sean Gregory's article for *Time* magazine on Northwestern football's decision to unionize.[10] These two articles have very different subjects, but both articles highlight the disillusionment with the system from athletes across multiple sports. Napier's comments reflect the athlete's need for "pocket change" and buying necessary items for college life. The Northwestern union article signalized the nascent steps toward the compensation of college athletes and possibly gaining university employee status. Two separate incidents from the early 2010's helped provide the groundwork for NIL legislation, and these incidents should be recognized in a contextual sense.

There is a great amount of literature on the emergence and application of analytics amongst multiple sports. I have compiled sources relating to the subject, and I

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[8] Rodney K. Smith, A Brief History of the National Collegiate Athletic Association's Role in Regulating Intercollegiate Athletics, 11 Marq. Sports L. Rev. 9 (2000)

[9] Ganim, Sara. "UConn Guard on Unions: I Go to Bed 'Starving'." *CNN*, Cable News Network, 8 Apr. 2014, https://www.cnn.com/2014/04/07/us/ncaa-basketball-finals-shabazz-napier-hungry/index.html.

[10] Gregory, Sean. "The Northwestern Union Decision and College Football's Future." *Time*, Time, 19 Aug. 2015, https://time.com/4002245/after-union-setback-heres-the-road-ahead-for-college-athletes/#:~:text=A%20regional%20NLRB%20director%20ruled%20that%20Northwestern%20football,and%20other%20benefits%20at%20the%20collective%20bargaining%20table.

believe I can utilize them to put together different gameplay plans for football and basketball at the very least. For football, analytics are utilized in gameplay, but it is much more based on scouting, watching film, and instinct than other sports. However, there are still plenty of advanced metrics to look at when evaluating the strength of college football teams. Some of these are even utilized by the college football playoff selection committee, as detailed in Neil Greenberg's blog for the *Washington Post.*[11] These details help show the implementation of analytics in playoff team selection, and it might also show where improvements can be made. When it comes to basketball, an interesting story on some of the origins of analytics in the college game comes from Michigan State University. The story details the metrics developed by Michigan State director of basketball operations Kevin Pauga and his power index that eventually became RPI, the widely utilized tournament projecting metric that was only recently replaced by the NET rankings.[12] In general basketball gameplay, the website Moreyball 101 gives explanations and examples of advance basketball statistics that NBA front offices utilize.[13] The cite is named for current 76ers GM Daryl Morey, and it provides a look into what NBA teams want out of players. In baseball, analytics are widely utilized, yet college baseball has always been more concerned with more traditional scouting and development methods. In

[11] Greenberg, Neil. Weblog post. *Washington Post – Blogs*, Washington: WP Company LLC d/b/a The Washington Post. Jul 22, 2014.

[12] "Analytics in College Hoops: A New Type of March Madness." *Michiganstateuniversityonline.com*, https://www.michiganstateuniversityonline.com/resources/business-analytics/analytics-in-college-hoops-a-new-type-of-march-madness/.

[13] "Moreyball 101." *Advanced Basketball Analytics*, https://moreyball101.com/.

recent years, with technology spreading to more levels of play, collegiate baseball has taken steps toward becoming more analytically driven. A 2018 article by Collegiate Baseball Nation Magazine gives some examples of technology in college baseball,[14] and I can back this information up due to first-hand experience as a TCU baseball manager. Throughout multiple sports, there are gameplay analytics in place, and these sources give a surface level overview of where the sports are respectively in analytics. Other sources detailed below will help provide a deeper dive into the true direction of analytics in intercollegiate athletics.

One area that analytics could be especially helpful is program-building. Smaller programs will not be able to out-recruit bigger programs with more resources conventionally. Therefore, schools with less resources have found other ways to recruit and develop star football players, as detailed in Chris Hummer's article for 247 sports, one of the most trusted football recruiting sites. The article details how teams have begun to focus on traits of more raw, undeveloped players that lend them to becoming future pros. Hummer takes multiple examples of players and programs that look for these traits, especially speed.[15] At FCS Campbell University, coach Mike Minter is recruiting better than some Power 5 schools, as detailed by David Hale in an article for ESPN. Minter does this by taking a chance on elite athletes that

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[14] *How Analytics Is Transforming College Baseball - College ...* https://www.collegebaseballdaily.com/2018/03/20/how-analytics-is-transforming-college-baseball/.

[15] Hummer, Chris. "Behold the Analytics Revolution: If You're Gonna Miss, Miss Fast." *247Sports*, https://247sports.com/Article/College-football-recruiting-testing-numbers-Tracking-Football-133192451/.

have fallen through the cracks due to injury or other risks.[16] Coaches have found ways to try to even the playing field in football, where there are few haves and many have-nots. I believe that these recruiting ideas can be applied across multiple sports, especially in sports such as baseball where recruiting information is considered less reliable. A big issue in baseball recruiting is cold-weather players, who often fall through the cracks due to the timing of the high school baseball season. A graphic by Richard Florida for Bloomberg illustrates where major league baseball players come from.[17] Many come from recruiting hotbeds such as Texas, Georgia, and California. However, there are certainly some from these cold weather states that go unnoticed. This could be useful information for college baseball coaches looking for a leg up. In recruiting, I will also hope to focus on the analytics behind a player's personality and how they will fit into a certain team's culture. There are articles surrounding social media analytics that have promise and appear to be predictive. One example is a University of Iowa study that utilizes recruit social media data to predict decommitments.[18] Giving coaches these analytics could provide opportunities for finding recruits that might be on the fence about their current commitment. Through

[16] Hale, David M. "How Campbell, a Small FCS School in North Carolina, Is Competing with Deion Sanders and FBS Teams." *ESPN*, ESPN Internet Ventures, 23 Feb. 2022, https://africa.espn.com/college-football/story/_/id/33323417/how-campbell-small-fcs-school-north-carolina-competing-deion-sanders-fbs-teams.

[17] Florida, Richard. "The World Series Isn't Global, But Baseball Players Are." *Bloomberg.com*, Bloomberg, https://www.bloomberg.com/news/articles/2019-10-22/the-cities-that-produce-the-most-mlb-players.

[18] Bigsby, Kristina Gavin, et al. "The Turf Is Always Greener: Predicting Decommitments in College Football Recruiting Using Twitter Data." *Decision Support Systems*, North-Holland, 9 Oct. 2018, https://www.sciencedirect.com/science/article/abs/pii/S016792361830160X.

previous research done by recruiting services and coaching staff, the literature provided will provide a solid information base for my methodology, which I will detail in the next section.

Another concept that I wish to explore is the modern emergence of the transfer portal. There is literature written about the portal and how staffs are choosing to use it, such as this introduction provided by ESPN's Jeff Borzello. Borzello gives a good summary of what the transfer portal is and what its implications for the sport of basketball are.[19] As more data appears on the portal, I project more analysis will be made available to the public. I believe there is an analytics market for the portal, and there are coaches already beginning to take advantage of it.

Finally, I would like to explore the emergence of NIL and the potential to utilize marketing analytics in the context of making student-athletes money through their name, image, and likeness. More information continues to present itself almost daily on the subject. For example, the University of Texas, the most profitable athletic department in the country, has recently formed an NIL program for their student athletes. TCU has Opendorse to help its student-athletes find NIL deals and build their own personal brand. An article by collegeinsight.com gives the full backstory behind Opendorse, including what they do, how it started, and what their mission is.[20] Whether it be Opendorse, a booster-funded pool or some other way, NIL is in the

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[19] Borzello, Jeff. "What Is the Transfer Portal?" *ESPN*, ESPN Internet Ventures, 16 Apr. 2019, https://www.espn.com/mens-college-basketball/story/_/id/26529645/what-transfer-portal.

[20] "Everything You Need to Know about Opendorse & It's Nil Operations." *College Athlete Insight*, 20 Oct. 2021, https://collegeathleteinsight.com/opendorse-nil/.

wild west stage, and analytics may be able to help organize and provide benefits for everyone involved.

Overall, there is a sizable amount of literature on college athletics and its latest trends. However, analytics are still new to college athletics, and there is yet to be many articles on the application of data in college sports. Also, with NIL being almost brand new, there is little information on the full effects, and the situation changes almost daily.

III. Methods, Results, and Discussion

The very foundation of intercollegiate athletic programs is recruiting. As the traditionalist proverb goes, "it is not so much about the X's and O's as it is about the Jimmy's and the Joe's." The proverb is hokey, but there is certainly some truth to it. The best programs get the best players, and powerhouse programs have massive built-in advantages as well as financial advantages over smaller, less historically successful programs. This leads to major inequities in intercollegiate athletics; programs do not get a high draft pick for losing seasons, and the winning programs attract the best players. If one is not a part of a "blue-blood" program, a school that has a history of success and winning as well as a current commitment to sustaining that success, how do they recruit successfully? That is the key question when it comes to recruiting.

To beat the best programs, one must understand what goes on in a powerhouse athletic program. To do this, I called Ben Schmidt, an analytics-based graduate assistant at the University of Georgia with prior experience at Texas A&M University. I asked Schmidt, who works with football (by far the highest revenue sport in collegiate athletics), what Georgia does to recruit so well. Schmidt said that

Georgia (who has had a top three recruiting class every year since 2017 according to 247 Sports,[21] utilizes their coaching connections around the country every year to bring in top recruits. There are not too many analytics put into recruiting at a program such as Georgia because there do not need to be. They have combined sustained success with a desirable location and a good coaching staff to attract elite, 4- and 5-star talent to Georgia. They are not the only program to accomplish something like this. Alabama, Ohio State, and LSU are three other college football programs who have accomplished similar feats on the recruiting trail. Schmidt also says that Georgia was successful with a few of their lower-ranked recruits, for example star defensive tackle Jordan Davis was only a three-star recruit from North Carolina.

I asked Schmidt how programs such as Georgia continue recruiting success, while other successful programs have struggled to recruit recently. Schmidt says that this aspect of recruiting has to do with relationship building. He says that Georgia head coach Kirby Smart will hire position coaches based on the experience they have in a certain recruiting area, or "hotbed." One example that Schmidt cited was James Coley, who was an offensive coordinator for Georgia and now works at Schmidt's alma mater of Texas A&M. Coley has many ties to South Florida, one of the strongest recruiting grounds in the country for football (and many other sports for that matter). Smart, and now Texas A&M head coach Jimbo Fisher would utilize Coley to get access to South Florida recruits and hopefully get them to commit to the

[21] "2022 Recruit Football Team Rankings." *247Sports*, https://247sports.com/Season/2022-Football/CompositeTeamRankings/.

program. An example closer to here would be former TCU running backs coach Rashaad Samples, who currently works for the Los Angeles Rams. Samples has many connections in the DFW area, another massive recruiting ground and utilized them at his previous job at SMU to help bring in unprecedented recruiting classes to the school. The position of the recruit does not matter as much as the area of the recruit. Schools who struggle with recruiting often do not have coaches that make these relationships and therefore have more difficulties contacting recruits and earning a good reputation in a specific area. This has led to many good on-field coaches' downfalls. I wanted to see just how important recruiting was to winning in college football, so I created a chart to track average recruiting rankings, based on 247 Sports' composite rankings of multiple trusted sites and average wins since 2012, when the latest conference realignment happened. I stuck to the Power 5 conferences, as the Power Five and the Group of Five play different levels of competition, and the Power Five is generally the highest level of competition in college football. Here are the results:

There is a statistically significant correlation between recruiting rankings and on-field success. This is not surprising, as the best teams tend to win the most games. However, there is plenty of useful information in this data below surface-level. The trend-line pictured above was a linear regression I ran with the data. The regression function is Average Season Win Total = 10.08205-0.0820486(Average Recruiting

Class Ranking). The p-value is less than 0.0001, and the r-squared value is 0.533578. This suggests that slightly over 53% of on-field winning can be explained by better recruiting. That is a significant number, and it speaks to the importance and value coaches should place on recruiting elite players. However, there is still another 47% of winning in football that cannot be accounted for by recruiting advantages. To explore what goes into that number, I decided to look at some outliers in the dataset.

The outliers included top team Alabama and bottom team Kansas. However, two very interesting teams in the middle may have created competitive advantages for themselves to consistently outperform their recruiting ranking. The first team is Wisconsin. The Wisconsin football team consistently averages slightly under 10 wins a season despite middling recruiting classes. Jesse Temple from ESPN sought to understand the secret to their success, and the answer has everything to do with location. Former head coach Barry Alvarez set out to keep his best players in the state, a group that is often made up of elite offensive lineman. They use the strategy that "there are a lot of big people in Wisconsin" and conform their team around it.[22] This strategy seems silly, but Wisconsin constantly churns out elite lineman for the NFL. Their strategy of taking projectable, large human beings and turning them into elite lineman does not seem very analytics-based, yet the Wisconsin coaching staff understands that good running backs will follow an elite line anywhere, even the cold weather of Madison, Wisconsin. This weather also plays into the Wisconsin style of

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[22] Temple, Jesse. "How in the World Does Wisconsin Keep Winning like This?" *ESPN*, ESPN Internet Ventures, 7 Apr. 2017, https://www.espn.com/college-football/story/_/id/19092583/how-world-do-wisconsin-badgers-keep-winning-this.

play, as their physical, run-first offense is built for inclement weather. This adaptation of "big, burly, man-ball" seems like an archaic style of play, but to Wisconsin, given their environment, it is a competitive advantage, something very valuable anywhere but especially in the world of college athletics.

The second notable winning outlier was Kansas State. In a similar location with similar resources to their in-state rivals the Kansas Jayhawks, Kansas State has built a far more successful program in the last ten years. They have done so by taking a far different approach than Wisconsin. Whereas Wisconsin finds their advantage in size, Kansas State finds theirs in those who lack much size at all. School legend and NFL veteran Darren Sproles stood at only 5'6", the same height as current star running back Deuce Vaughn. Former star receiver Tyler Lockett stood at under 6 feet and barely weighed 180 pounds, and current star defensive end Felix Anudike-Uzomah carried serious doubts if he would weigh enough for the position. One thing all of these players have in common is elite athleticism, which differentiates Kansas State's lower-ranked recruiting classes from other lower-ranked recruiting classes. Both Kansas State in their athleticism strategy as well as Wisconsin in their size and physicality strategy feature aspects of college football that cannot be taught, which might give a clue as to how to recruit certain players.

According to Ben Schmidt, analytics have only been in college sports for about ten years. Since the implementation of these analytics in football, it has become clear that there is one great equalizer among programs: speed. Measuring speed seems incredibly easy on the surface. However, according to Schmidt, there is a difference between regular speed and game speed. Game speed measures how quickly one

moves with the ball and how well raw speed translates onto the football field. One example Schmidt gave was John Ross, who set the NFL 40-yard dash record at the combine. However, Ross was not very successful in the NFL due to injuries and underwhelming performance despite being selected high in the draft. Schmidt says that Ross' game speed was much more average than his elite combine speed and that lack of translation between the two led to an underwhelming professional career. With that in mind, Schmidt's old boss at Texas A&M developed an algorithm to help measure and compare game speed of high school recruits utilizing HUDL high school recruiting tape. He then compares the tracked game speed by position to give Texas A&M the best chance to get the true fastest guy on the field. Obviously, one must still be naturally fast to have good game speed, but it does not necessarily mean that the fastest track runners will have the best game speed. According to Schmidt, there has been a big push in the NFL recently to measure more game speed, and college coaches, such as Jimbo Fisher at Texas A&M, are beginning to catch on.

Former Temple and Baylor coach Matt Rhule did an interview with 247 sports in which he discussed his recruiting strategy. He said he understood the natural advantages built into a place like Penn State, one of Temple's in-state rivals. Penn State will seemingly always get better players than Temple, so Rhule focused on players that had elite size or elite speed, similar to the Wisconsin and Kansas State strategies mentioned earlier. At a smaller program, coaches will not be receiving perfect recruits. They will have fallen to these programs due to some deficiency, so coaches must focus on risk management, a key component in business and recruiting as well. Rhule's strategy of taking developmental projects with top-end athletic traits

worked very well. As part of the interview, former Baylor recruiting coordinator and cornerbacks coach Evan Cooper said, "I feel like we might value numbers just as much as tape, and maybe even more in some cases. We're a big, big believer in development. Sometimes you get kids who are maxed out whose ceiling might not be as high. We take the approach of what they'll look like in five years. If he has the requisite size, speed and strength we feel like we can turn them into good football players. In recruiting you miss. You're going to miss. So, we figure: If you're going to miss, miss fast."[23] Big programs such as Georgia do not put as much of an emphasis on recruiting analytics or finding developmental traits, Schmidt says. They do utilize GPS technology to track recruits' speed at showcases, but Georgia does not look for competitive advantages through analytics because they already have the biggest competitive advantage there is: access to the best talent in the country.

A common theme among overachieving football programs is finding unteachable athletic traits and trusting the coaching staff to develop the coachable aspects of players. Trait analysis analytics are in the works, as shown through programs like Texas A&M. Next, the key becomes properly developing these players. There are ways to utilize analytics in the context as well.

Coaches are still trying to find a way to truly incorporate analytics into player development in college sports, especially football. According to Ben Schmidt, there are two main types of analytics that college football programs try to utilize: sport science and data analytics. Sport science concerns the preparation and performance of players at practice and in the weight room, as coaches need to make sure that a

[23] Hummer, Chris. "Behold the Analytics Revolution: If You're Gonna Miss, Miss Fast." *247Sports*, https://247sports.com/Article/College-football-recruiting-testing-numbers-Tracking-Football-133192451/.

player is ready to play on gameday and that they are not exhausting themselves in practice. Examples of sports science data that college coaches utilize include physical data, training data, and intensity data. Schmidt says that Georgia utilizes these forms of data during the week to see how well players respond to different intensity levels at practice. To track sports science data, Georgia and many other schools utilize Catapult GPS tracking technology. Georgia has set practice days with higher intensity and set practice days at lower intensity with a goal that practices during the week will be more difficult than the game on Saturday. Sports science analytics can help track how players are responding to higher intensity practices, and they can inform coaches as to how tired the team is. When Schmidt was at Texas A&M, he says that Jimbo Fisher would often look at sports science data over week-by-week periods, comparing data from every Monday to Monday, Tuesday to Tuesday, etc. By doing this, Fisher would be able to assess performance over a comparable timeline of intensity, as Texas A&M's practice schedule was similar to that of Georgia, though Schmidt notes, without quite as much intensity due to less depth. Metrics Fisher would look into included number of yards ran over certain mph and amount of acceleration on certain runs. In fall camp, these metrics are especially important, as the intense build-up to the regular season can tire players out. In the NFL, coaches hold more walkthrough practices to keep players fresh. In college, coaches cannot afford to do this with the amount of practice time available considering players are still student-athletes who work on a set, compressed schedule.

The second set of analytics applied in college football, data analytics, applies more across game planning, play calling, and analyzing trends to improve play

selection. Teams are utilizing these trends to try to predict what the opposing team will do before the play happens based on the situation. However, according to Schmidt, with both sports science analytics and the application of data analytics into play calling, coaches are still learning and working on what exactly to do with this information. With analytics only being around for ten years in college football, it will be interesting to see how the use continues to evolve over time.

Speaking of new developments in college football, a major change in the structure of college athletics has been the rise of the transfer portal. Players have always been able to transfer schools, but NCAA legislation used to discourage this by making transfers sit out for a season unless they had graduated from their previous institution. This is no longer the case, as the new one-time transfer rule allows players in all sports to transfer one time without consequence. This has led to a sort of transfer portal mania, especially in football, basketball, and baseball. Teams have begun utilizing transfers to plug holes in their teams, as they have experience playing college sports and are much more proven than incoming freshmen out of high school. There are a few problems with the transfer portal that coaches must still figure out: how to evaluate potential transfers based on their previous level of competition and due to the newness of the transfer portal, whether this works.

When it comes to the portal, possibly the best example of early success comes from current Arkansas and former Nevada basketball coach Eric Musselman. Musselman is known for transfer portal success stories such as Caleb and Cody Martin at Nevada, as well as Arkansas transfers such as JD Notae and Au'Diese Toney. When asked how he is so successful in the transfer portal, Musselman says,

"The evaluation part is really the most important part, especially with this many guys. You've got to clearly identify what your team needs and clearly identify what a player can do." As to how Arkansas evaluates potential transfers so well, Musselman says, "We have statistical formulas that we've created - not any outside company - we've created internally from the last six years that we continue to build on, where we plug a player from one conference in and how do we project them as an SEC player. We had that down really well in the Mountain West and now we feel, after the last couple years, that the same formula can help us moving forward in the SEC."[24] Due to the internal and secretive nature of Arkansas' transfer strategy, there is no data available to the public to show what exactly Musselman and the coaching staff are projecting from these transfers. However, the Arkansas coaching staff says they can eliminate 80% of transfers purely on numbers, another 15% on lack of available playing time, and about 2.5% on not being true difference-makers for the particular team. Impressively, Arkansas eliminates almost 98% of potential transfers without even needing to talk to them. With the analytics making Musselman's job of player evaluation much easier, he is then free to pursue the remaining transfers and assess intangible things such as character and competitiveness.[25]

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[24] Hutchinson, Andrew. "Hawgbeat - Musselman Shares Strategy for Recruiting the Transfer Portal." *Arkansas Razorbacks Coach Eric Musselman Shares Strategy for Recruiting the Transfer Portal*, 2 Apr. 2021, https://arkansas.rivals.com/news/musselman-shares-strategy-for-recruiting-the-transfer-portal.

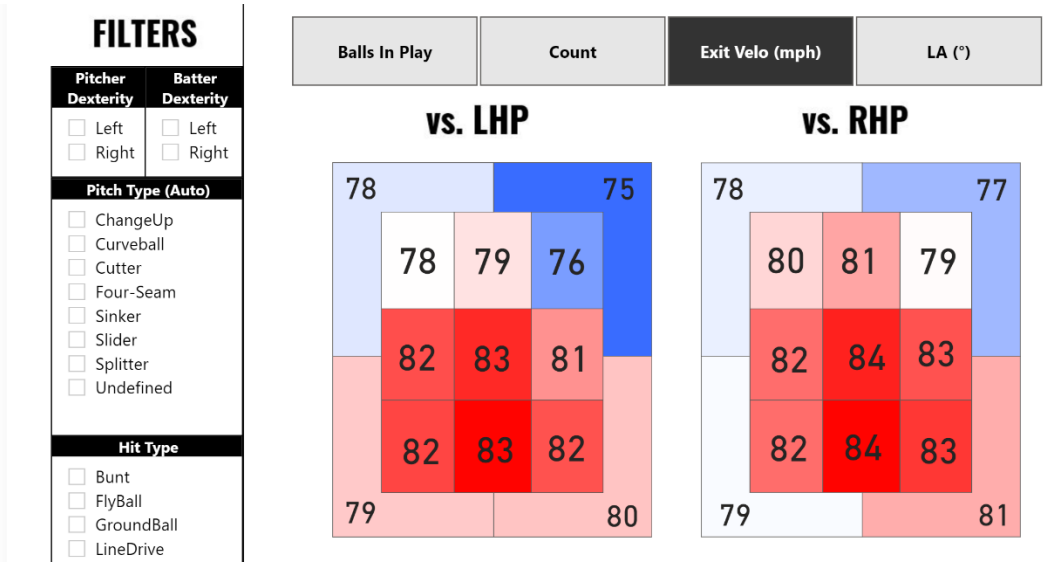
[25] Demirel, Evin. "The Big Red Flag That Eric Musselman Looks for When Interviewing Potential Arkansas Basketball Transfers." *Arkansas Fight*, Arkansas Fight, 21 May 2021, https://www.arkansasfight.com/2021/5/21/22447401/eric-musselman-red-flag-arkansas-basketball-transfers.

Despite the secrecy of Arkansas' exact formula, the narrowing down of prospects described by the Arkansas basketball coaching staff show an ahead of the curb evaluation process for transfers that could certainly become standard practice eventually among coaching staffs. The results are certainly there with Musselman taking Mountain West Nevada to the NCAA Tournament and now going to the Elite Eight for two straight years with Arkansas. Although this particular example is from basketball, given the right data, coaches could certainly build a model for other sports that could lead to plug-and-play transfer success.

In college baseball, for example, having access to Trackman data allows coaches to see what kind of quality of contact a hitter makes, or what kind of "stuff" a pitcher has. Most college pitchers throw hard, but Trackman tracks movement and shows underlying physics behind what makes certain pitches more difficult to hit. Coaches can look at this physical data as potential to put together a formula like what Musselman does for basketball at Arkansas. There is also Trackman data on some high school recruits, but not as much as there would be for a potential D1 transfer.

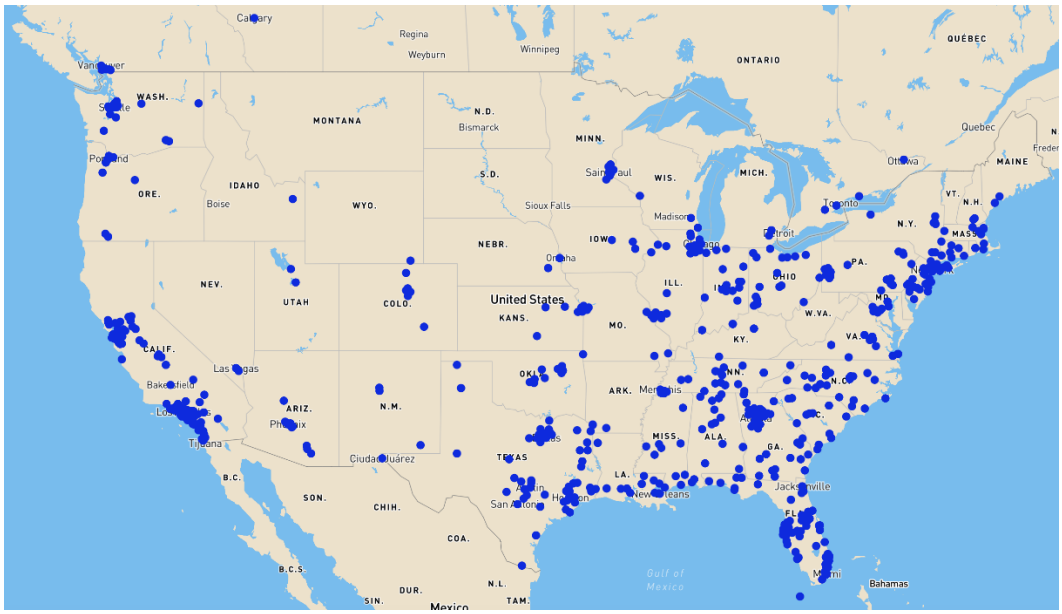
Player Name	Team	Count	Speed	Spin	IVB	HB	TotBreak	Ext
Joyce, Ben	Tennessee	14	100.97	2405	15.20	16.34	22.39	6.25
Pelio, Mason	Boston College	4	98.13	2508	19.08	11.23	22.34	5.54
Brecht, Brody	Iowa	65	98.08	2354	14.24	-1.61	14.66	6.73
Gair, Marty	UNC Wilmingt...	53	96.71	2271	13.66	-0.83	13.84	6.46
Simon, Liam	Notre Dame	60	96.69	2184	19.16	10.76	22.10	6.01
Paplham, Cole	New Orleans	7	96.63	2137	11.43	8.12	14.20	6.16
Swan, Eriq	Middle Tennes...	81	96.63	2181	16.00	15.80	22.69	5.46
Brannigan, Jack	Notre Dame	80	96.54	2539	11.80	17.33	21.30	5.62
Dollander, Chase	Tennessee	72	96.49	2378	17.82	13.20	22.31	5.86
Hoppe, Alex	UNC Greensb...	202	96.48	2146	18.08	12.11	22.04	6.30
Watters, Jacob	West Virginia	234	96.28	2424	17.31	9.34	20.02	5.51
Sproat, Brandon	Florida	193	96.02	2083	13.49	16.17	21.34	6.03
Nichols, TJ	Arizona	325	96.01	2146	13.89	14.69	20.45	5.86
Adler, Eric	Wake Forest	28	95.88	2555	17.41	4.41	18.18	5.48
Cortez, Christopher	Texas A&M	188	95.81	2205	13.03	8.79	15.93	5.42
Cossio, Andrew	Northwestern ...	24	95.72	2260	13.77	13.64	19.54	5.71
Ekness, Josh	Lamar	9	95.70	2421	21.27	11.97	24.45	5.64
Brock, TJ	Ohio St.	24	95.69	2052	12.88	12.83	18.72	5.21
Stuart, Tyler	Southern Miss...	49	95.49	2221	11.26	18.08	21.69	5.99
Wright, Garrett	TCU	71	95.46	2312	17.70	5.17	18.62	5.62
Waldrep, Hurston	Southern Miss...	35	95.43	2359	17.63	2.02	17.97	6.72
Dean, Noah	Old Dominion	12	95.41	2367	21.08	-10.89	24.02	6.16
Birdsell, Brandon	Texas Tech	144	95.29	2224	18.32	11.74	22.05	5.56

Above: An example of a trackman data dashboard, that I filtered to show top fastball velocity.

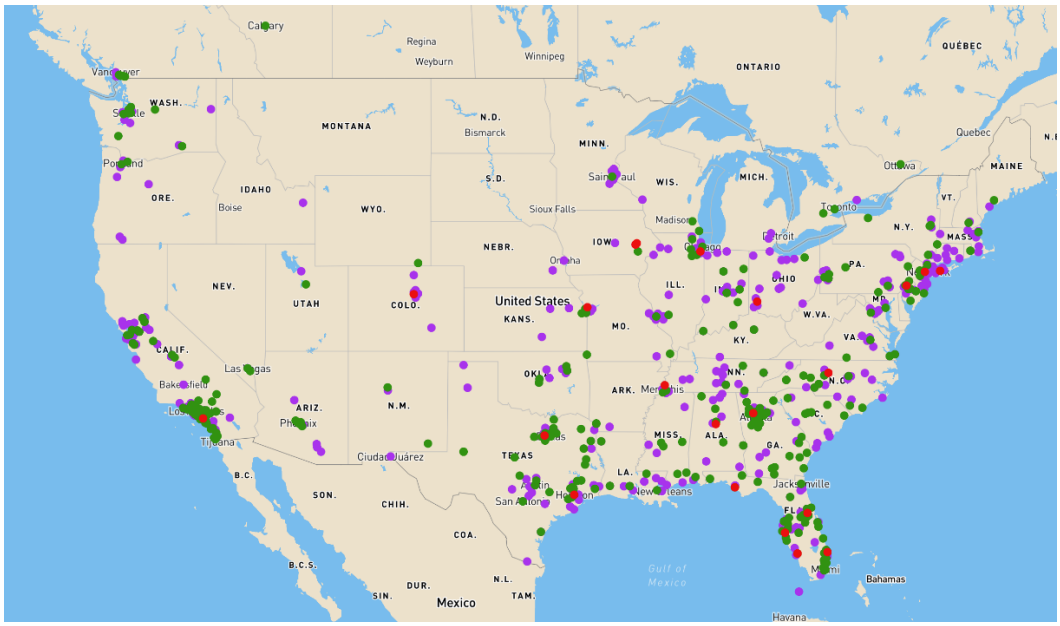


Above: A heatmap showing the average exit velocity by pitch location in college baseball. Coaches can look up specific exit velocities by filtering the hitter, and they can also track what pitch type was hit in each location.

Utilizing trackman data can help collegiate baseball coaches recruit transfers better, but what can coaches do about high school recruiting? Like football and basketball, baseball recruiting depends heavily on building relationships with high school coaches. However, baseball talent seems harder to come across than football or basketball talent. Since the sport depends so heavily on large sample sizes (there is a reason Major League Baseball has a 162-game schedule), it can be hard to spot good recruits without multiple showcases, which many top recruits get, yet others may not be able to afford or travel to. To attempt to solve some of these location-based issues, I created a heatmap that showed locations of first-round draft picks in baseball over the last 20 years. Here it is below:



The locations seem reasonable, they are well-distributed across the country with a focus on warmer weather locations with higher populations. Baseball talent seems to exist all over North America. Next, I tried to see when each player got drafted, out of high school or college.



Here, the same locations exist, but the data tells a slightly different story. The green dots signify that a player was drafted out of high school and the purple dots

signify that a player was selected out of college. Also, the red dots displayed show the location of a Perfect Game showcase, the largest high school baseball showcase circuit in the country. There seems to be more drafted high school players from warmer weather areas with high populations. It might help to be near a Perfect Game showcase as well, but the data is not fully conclusive. The upper Midwest, Pacific Northwest, Colorado, and the Northeast all appear to be locations where prospects are missed out of high school. With high level college coaches competing with the draft and lower-level college coaches looking for competitive advantages, these colder weather areas where high schoolers get less exposure to coaches and scouts might be locations to explore.

With different aspects of analytics to cover recruiting, gameplay, and looking for competitive advantages within a program covered, it is time to look to the future. Social media has become a major part of building programs through attracting recruits. Programs spend lots of money on top notch social media teams that make programs look very desirable to prospective recruits. Recent videos of new LSU coach Brian Kelly dancing with recruits have gone viral and been ridiculed, but videos such as this are becoming the new normal in college football and other sports as well. Coaching staffs are learning to embrace social media as a tool to improve their team, and there are analytics that might be able to help staffs utilize social media to their advantage.

University of Iowa professors Kristina Gavin Bigsby, Jeffrey W. Ohlman, and Kang Zhao investigated whether social media could be utilized to predict decommitments from recruits. They found that there were certain aspects of social

media, specifically Twitter, that were potentially predictive. By incorporating Twitter network data, coaches can add value to decommitment predictions. Recruits who connect with new schools have an association with decommitments. Recruits who unfollow future teammates may be about to decommit according to the study, as well as those who begin following more coaches and fellow recruits.[26] These are all potential warning signs that a recruit might decommit to a coach, and to outside coaches these signals may all be interpreted as a commit who may be thinking about reopening their recruitment.

Finally, there is the rise of NIL. NIL, as described earlier, is brand new and there is little data on what it may bring to student-athletes. Schools have begun providing resources to their athletes to take advantage of the new NIL rules. For example, TCU has provided athletes with an NIL-based course to promote responsible money management as well as building a personal brand. Fans of large universities have organized NIL collectives to help compensate athletes at their school. Despite these steps, schools and athletes alike are trying to find new ways to connect with partners for NIL.

That is what Opendorse is for. Opendorse is a company that makes money through connecting athletes with a sponsorship. Opendorse utilizes social media analytics to connect popular athletes with brands that would like promotion. After connecting the two, companies send athletes what to post on social media through Opendorse, and the athlete promotes the product. Schools are partnering with

[26] Bigsby, Kristina Gavin, et al. "The Turf Is Always Greener: Predicting Decommitments in College Football Recruiting Using Twitter Data." *Decision Support Systems*, North-Holland, 9 Oct. 2018, https://www.sciencedirect.com/science/article/abs/pii/S016792361830160X.

companies like Opendorse to get their athletes noticed and recognized in the community, and the connection between athlete and product is carried out by an algorithm.[27] With the nascent beginning of analytics benefitting athletes through NIL, now the attention turns to what programs can do to position themselves through NIL.

College athletic departments are currently bound by state laws regarding NIL, some of which are more restrictive than others. The good news for athletic departments is that states are rewriting their NIL legislation to make it as non-restrictive as possible, as restrictiveness was not the original goal of NIL legislation at the state level. As states further loosen the rules on NIL, the more lucrative NIL deals begin to be. Recently, 2023 quarterback prospect Nico Iamaleva committed to Tennessee in large part due to an NIL deal that could make him eight million dollars. While that number seems incredibly high, at a powerhouse like Tennessee with many wealthy, rabid donors, that just pennies on the dollar for the opportunities Iamaleva may provide the program. Not only is the consensus five-star quarterback talented, he also has the requisite social media presence and even signature pajama pants.[28] Tennessee coaches and boosters believe in him as a player and a brand for the university.

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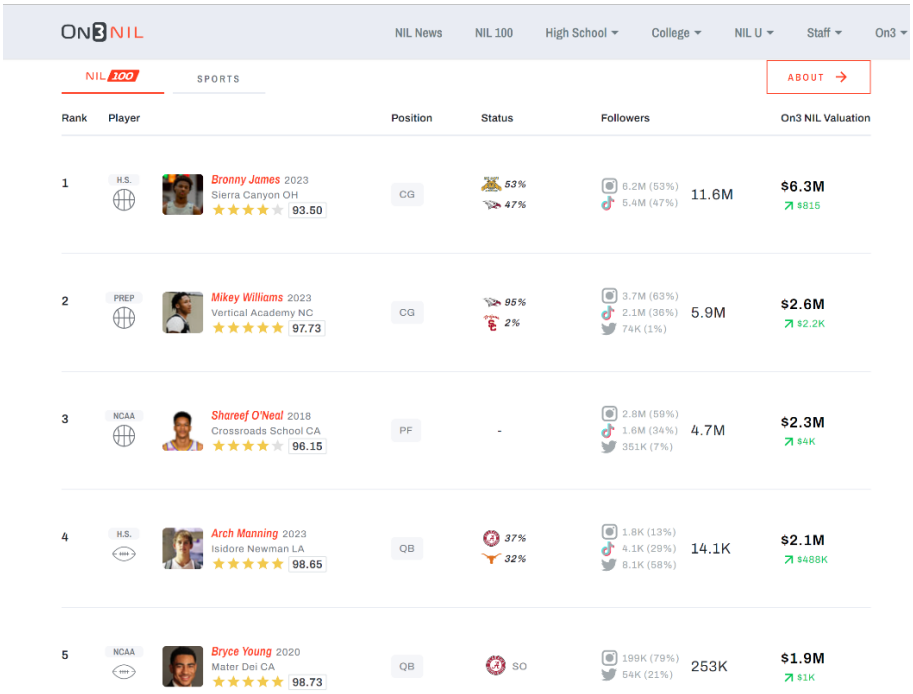
[27] "Everything You Need to Know about Opendorse & It's Nil Operations." *College Athlete Insight*, 20 Oct. 2021, https://collegeathleteinsight.com/opendorse-nil/.

[28] Staples, Andy. "Nico IAMALEAVA Has Arrived. If He's the $8 Million QB Recruit, He's the Best Gamble." *The Athletic*, The Athletic, 13 Apr. 2022, https://theathletic.com/3241640/2022/04/11/nico-iamaleava-tennessee-nil/.

However, despite how talented and marketable Iamaleva may be, it is not easy to judge the value of a high school student who has never played a game of NCAA Division I competition. NIL deals such as the one Tennessee has reportedly made with Iamaleva are high-risk, high-reward propositions. One rising recruiting service, On3 Recruits, has designed a tool to evaluate high school prospects not by talent but by NIL market value. It combines social media analytics such as following, engagement, and social media strength with on-field performance, emphasizing awards and media appearances, as well as school prestige and existing NIL deals.[29] By creating this formula, On3 is designing a way to evaluate the market value of players which should become more accurate as more NIL data presents itself. As for now, utilizing analytics to project value of players could help schools recruit players they believe can help their brand. Following is the beginning of On3's NIL 100 list, which covers the top 100 most valuable current and future college athletes through NIL money.

[29] Terry, Shannon. "About on3 Nil Valuation, per Post Value, and the on3 Nil 100." *On3*, 13 Apr. 2022, https://www.on3.com/nil/news/about-on3-nil-valuation-per-post-value/.



There are some familiar names near the top of the list, as number one, Bronny James, is the son of Lebron James, widely considered to be the most famous athlete in North America. Ranked second, Mikey Williams is valued highly due to his massive social media following, millions of followers on both Instagram and Tik Tok. Similar to Bronny James, Shareef O'Neal is valued highly due to being the son of NBA hall of famer Shaquille O'Neal. Ranked fourth, Arch Manning is part of the legendary Manning family and is considered to have a similar talent level to his more famous relatives. Finally, Bryce Young comes in fifth after a Heisman trophy winning season at the University of Alabama. The top of this list shows the different ways that collegiate athletes can build NIL value.

All of the findings, from recruiting to data science to NIL analysis, with everything in between can help coaches and administrators chart a plan for improvement in the future environment of college sports.

IV. Implications

Beginning with recruiting analytics, I believe we will see more smaller programs attempt to create a program identity (if they do not already have one) and recruit traits based on location, program identity, and coaching philosophy. There are multiple ways to win in college sports, and each program has different values. There is no one right way, but analytics do suggest picking developable traits and fitting them to how the team plays. Coaches must continue to build relationships with prospects, families, and high school coaches to recruit at a high level over an extended time. Although this has little to do with analytics, expanding the potential player pool for a school is a massive advantage, as a larger sample size is more likely to produce the desirable traits for a team.

Next, sports science and data analytics are only good for game planning if utilized properly. This is easier said than done, as according to Ben Schmidt, analysts will often withhold information out of fear of consequences. Schmidt gave the following realistic hypothetical: a sports science analyst has been collecting sleep data for a college football team. They notice that sleep has tailed off lately for a starter, and the starter's performance has thus suffered. When the analyst tells the coach about the sleep changes, the coach benches the player, who approaches the analyst angry and bewildered that the sleep data took away their starting spot. For reasons like this, Schmidt says it is incredibly important to effectively communicate the purpose of data collection to both athletes and coaches and to make sure both sides buy in and are aware of the potential consequences of data collection. Data collection should be about improvement and efficiency, not trying to bring people down for bad habits.

When analyzing performance data, it is important to have a relationship with the athlete in question. Understanding their personality could be very important in recognizing whether a drop in performance analytics is due to an injury, exhaustion, or plain lack of effort. Coaches should make decisions based off data, but they should make these data-based decisions along with an understanding of an environment and culture that exists at the program.

Program culture is another topic that really cannot be explained by data. It is not something that is forced by a coaching staff; good culture must come naturally through player motivation. Coaches can have all the talent and data optimization in the world and still underachieve due to a poor culture. Therefore, building relationships and having a pulse of what is going on with the team is still quite important for a coaching staff.

As for the transfer portal, the last part of Eric Musselman's criteria for bringing in transfers centers around transfer fit. For example, Musselman will not take any potential transfer that asks questions about the roster in their talks. Musselman wants players who are willing to compete and win starting roles. Analytics and data account for nearly 98% of Arkansas' transfer success, but that last two percent might be the most important part. Having good analytics behind an idea is nearly worthless if the data is not interpreted properly and executed in a human manner. Musselman's success in the transfer market is built upon a foundation of data, but peaks due to good culture.

In college baseball, location matters, but due to the inconclusiveness of the location data, it is hard to say how much. There are kids being underrecruited in

college baseball and making Trackman or another similar mechanism's data more widespread could help more prospects get exposure and find spots on good college teams. It could also help in the transfer portal, as finding developmental traits works just as well in baseball as other sports. Spreading out analytical technology as it advances can decrease the importance of small sample size showcase performances and draw a more accurate picture as to who the best baseball prospects are.

Social Media and NIL are only going to grow in the immediate future, so coaching staffs need to adapt to a new generation of college athletes: Gen Z. Gen Z will still want to win, but there will also be a focus on brand building and social media presence for many of these athletes. I predict that the most successful coaching staffs in the NIL era will either ensure complete buy-in without social media, or (more likely) embrace NIL and social media while still keeping athletes focused on the main goal. As Ben Schmidt says, NIL is great for athletes in school and those who do not have a shot at the next level, but a massive professional paycheck is still worth way more than most people can dream of making through NIL. Instructing athletes on financial literacy, as well as money management will be very important for schools in order to set up their athletes best for their future both in NIL and possibly in professional athletics.

Overall, there are multiple ways to find competitive advantages in college athletics, and the methods may vary due to both sport and location. Recruiting analytics suggest the best way to gain a competitive advantage is to find specific traits that fit a program's philosophy. Developing these traits comes down to coaching and program culture. Sports science and data analytics allow coaches to find an efficient

and working gameplan, as well as track player development and safety. Everyone must buy in to the things for success to occur. The transfer portal is not going away, and programs like Arkansas basketball are utilizing analytics to find players that best fit their team. For college baseball, Trackman data and location data can help coaches find kids who may be undiscovered coming out of high school and give an advantage on developing stars at programs with less resources. Finally, social media and NIL analytics will help athletes create moneymaking opportunities and build their personal brands, and they will allow schools to make better investments in players they feel should represent the university's brand. All of these applications of analytics are happening in college sports and will continue to grow and become an integral part of program-building in the future.

V. Conclusion

The NCAA is arguably at its biggest turning point since its creation in 1910. The future of intercollegiate athletics is through analytics and NIL, and the NCAA must be ready to adapt to that. Many respected officials and coaches have sounded warnings about the direction of college sports. I argue that college sports might not have to go down this dark road of deregulation and wild west rules similar to pre-NCAA athletics. In fact, allowing athletes to be properly compensated for their talent and more freedom to go where they want to is objectively good for the NCAA. It creates a better, more marketable product that the general public will support more. However, the NCAA must handle this situation well or risk obsolescence. Regulations will need to be made in the NIL market to ensure some semblance of competitive balance, or there will be a

seismic shift in the landscape of intercollegiate athletics. It is too early to tell which direction the NCAA will go in.

No matter what happens with NIL and the NCAA, college coaches and administrations should continue to embrace analytics, not to go away from what has worked in the past, but to understand why things have worked the way they have. Analytics will help coaches do what is most important in sports and in business in general: adapt. Programs must adapt to current times in recruiting, game planning, and now with NIL strategy. Though the available data is limited on these things, it does demonstrate trends that could be very helpful for coaches looking for a new way to win or a competitive advantage. After all, to break through a glass ceiling, a program must build a foundation to get there first. Analytics can build that strong foundation, and a strong culture can help shatter that ceiling.