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TESM-S501: Advanced Sports Analytics

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<div align="center">Sprint Challenge 1</div>

Why is analytics important for today's sport business (10 points at minimum that refer specifically to the sources provided on Canvas)? Refer to the learning activities that would help support this response (cognitive bias, example analytics applications, and book chapters).

- ➢ As stated in the article "Scientific American: Cognitive Biases in Sports," commentators seem to overcomplicate situations during games like, for example, when a team goes on a "streak." They tend to support these streaks with things like better coaching or players being more focused, but research goes to show that these streaks are completely unrelated to the previous outcome, no matter what it was (McNerney 2011). Analytics is important in today's sport business because in this case, it can aid in disproving the constant assumptions of teams going on streaks and players having "hot hands," and can wake up stakeholders in the sports world to the fact that as a whole, humans are bad at interpreting streaks.

- ➢ In the article "Scientific American: Cognitive Biases in Sports," McNerney states that our intuitions about sports are usually not at all close to what analytics tells us. For example, a study done on fourth downs in the first quarter of every NFL game from 1998 to 2000 resulted in David Romer discovering that statistically speaking, it's smarter to go for it on fourth down, when what actually happens is coaches electing to punt on fourth down a majority of the time. These decisions are not optimal for the good of the team even though their intuition tells them it is. Analytics is important here as using models or studies like Romer did and presenting it to a team or coach can help with their success in future games in certain situations, turning them from their

existing intuition and to an alternative that, statistically speaking, boosts their rate of success far more.

➢ Again, in the article "Scientific American: Cognitive Biases in Sports," McNerney states that coaches and managers are the same as everyone else, and only look for what confirms their intuitions and ignore the contradictions to their intuitions, also known as confirmation bias. NYU professor Gary Marcus says that fans were more likely to think referees made the right call when it favored the home team after showing them replays from controversial plays, and that humans simply enjoy being "right." He goes even further to say that fans can view the exact same statistics, standings, and plays and come up with vastly different conclusions. Analytics are important in this case because relying on data negates the comfortability of a personal bias as well as fan perception and can help teams make better decisions and bring a sense of objective thinking rather than subjective thinking.

➢ In the book *Better Sport Performance,* specifically chapter 3 "The Data Game: Analyzing Our Way to Better Sport Performance," written by Maria Nibali, it leads off with how financially valuable the global sport industry actually is, which is $1.5 trillion, and the US contributes to $498.4 billion of that. The individuals that make this industry what it is are the athletes, and they are also extremely valuable, and organizations are doing nearly everything they can to help protect and preserve these athletes. Analytics are important in today's sport business because analytics can help solve this concern for organizations by monitoring athletes in order to keep them performing at the highest level and simply keeping them healthy.

➢ In chapter 3 of *Better Sport Performance,* authored by Maria Nibali, in past analyses of athletes, tests have been run in conditions that simulate what happens in game, but the tests have never been able to be run during an actual game or sporting event. Today, with the advancements and innovations we have now, measuring performance is better than ever before. Analysts can now gather massive amounts of data on athletes while they actually compete and can use this data to make informed decisions in real time. This proves analytics is important for today's sport business

because many organizations are very concerned about their athletes and their health and
longevity, and this real time data being recorded can inform analysts and those in the organization
with useful information that can be used to help protect these athletes.

➢ Continuing through chapter 3 of *Better Sport Performance,* with all of the real time data now
being produced through innovations and advancements, the need for those who can manage and
analyze this information is at an all time high. There is constant data coming in regarding player
performance and athlete welfare, for example: wellness, nutrition and recovery, GPS, medical
screenings, performance analysis, etc. This goes to show that analytics is important for today's
sport business because with this amount of data coming in for organizations to use, there is an
absolute demand for analysts in this field to help monitor and analyze this data and turn it into
useful information for organizations and for the upkeep of their athletes.

➢ Again, in chapter 3 of *Better Sport Performance,* the emergence of wearable technology has
changed the game in monitoring athletes during training and during competition, which in turn
collects a great amount of real time data for organizations to analyze and make informed
decisions on. Some of these devices are global positioning systems (GPS) and radio frequency
identification (RFID) and are essential in athlete load management and performance analysis.
This suggests that analytics is important for today's sport business because this wearable
technology can help prevent injuries of valuable assets, athletes, and similarly use certain metrics
to determine the risk of injury to the athlete.

➢ In the book *Evolution and Impact of Business Analytics in Sport* written by Scott Bukstein, one of
the first ideas revealed is that the Atlanta Hawks moved their tip time to 8pm in 2015-2016 from
the original 7:30pm tip time in 2014-2015 due to the organization making a data based decision.
They looked at ticket holder arrival times and tracked this based on when tickets were scanned
while fans entered the arena, as well as tracked traffic patterns to help justify if pushing the start
time back would help boost fan engagement. Surely enough, this change yielded an increase in
fans in seats at tip-off, and the Hawks now want to view data on how gameday revenue changes

based on the variation of game start times. This is an excellent example of why analytics is important in today's sport business because if they didn't look at the data and try something new to help bring in more fans, fan turnout could have decreased and in turn decreased revenue. Instead, they used their data to find a solution to better their organization, and that couldn't be done without analytics.

➢ Next, in the book *Evolution and Impact of Business Analytics in Sport,* organizations are attempting to analyze impression-based metrics and attention-based metrics to see just how effective social and digital media marketing campaigns are and want to leverage these platforms to drive ticket sales. For example, the Sacramento Kings used LinkedIn Sales Navigator to build a rapport with existing ticket holders, which resulted in a higher season ticket renewal rate. This shows analytics is important for today's sport business because in the world currently, social media is nearly everywhere, and using social media to help boost season ticket sales wouldn't be at all possible without those who can analyze the existing data to provide insights to find a solution to increasing season ticket sales.

➢ Lastly, in the book *Evolution and Impact of Business Analytics in Sport,* organizations first want to determine the "right" system(s) for data collection, but then want to access and assess the "right" data based on business strategy. The example given is if a team plans to use surveys to determine the probability of season ticket holder renewals, the team could focus on collecting certain information, like: amount spent on season tickets, years of season ticket membership, number of games attended during the current season, etc. This further proves that analytics is important for today's sport business because organizations can use data and the information gathered from these surveys to calculate a rough probability of renewal by season ticket holders, which could help estimate the potential future revenue for this field. It is also imperative that when sending out these surveys in the first place that analysts identify the key performance indicators (KPIs) that may drive season ticket holders to renew again.

Sources:

McNerney, Samuel. "Cognitive Biases in Sports: The Irrationality of Coaches, Commentators and Fans."
    Scientific American, Scientific American, 20 Feb. 2024,
    www.scientificamerican.com/blog/guest-blog/cognitive-biases-in-sports-the-irrationality-of-coaches-commentators-and-fans/.

Bukstein, Scott. "Evolution and impact of Business Analytics in sport." *Sport Business Analytics*, 18 Nov.
    2016, pp. 25–46, https://doi.org/10.1201/9781315367613-11.

Nibali, Maria. "The Data Game: Analyzing Our Way to Better Sport Performance." *Better Sport
    Performance*, pp. 49–75.

Describe (in your own words) the CRISP-DM and descriptive/predictive/prescriptive frameworks.

In my own words, the CRISP-DM (Cross-Industry Standard Process for Data Mining) is a baseline process or model in which analysts can utilize to work through the analytical obstacles they encounter. The CRISP-DM process includes the following: Business Understanding, Data Understanding, Data Preparation, Model Generation, Model Evaluation, and Solution Deployment. Something essential to understanding the CRISP-DM process is that the process is iterative. One may work through the steps of the process, but if something needs to be changed from a previous process step, it is fluid to where the user can simply go back and make changes, then work back through the process. This goes to show every piece of the process fits together somehow and every step is necessary in order to complete the process for a successful implementation of the CRISP-DM. This process is also intuitive because it helps analytics projects generate faster, yet maintaining reliability, and is cheaper than using other processes. As for the descriptive/predictive/prescriptive frameworks, this framework allows analysts to use data to ask

analytical questions and segments them into these three categories. The descriptive framework takes data from the past and present to make certain decisions and ask descriptive questions. The predictive framework is useful in attempting to predict future outcomes by reviewing historical data and seeking patterns or relationships that could come up in the future. This also allows analysts to ask questions pertaining to prediction. Lastly, the prescriptive framework is focused on how optimal something is to try and locate the best solution to mitigate the negatives and maximize the positives. It then allows analysts to ask prescriptive questions.

Choose an MIT SLOAN conference video from the youtube channel 42 Analytics. Describe how each of the phases of the CRISP-DM are covered (or not).

SSAC25: NCAA 2.0: What's Next?

Business Understanding:
- 1st settlement is payment for past opportunities for NIL broadcasting, as well as other revenue like video games, worth about $2.8 billion that is paid over a 10 year period
  - Paid to division 1 athletes going back to about 2017
- 2nd settlement is revenue sharing in division 1 college sports among participating schools
  - If approved, colleges can opt into a system where they share up to 22% (could be stretched to 50%, like the panelist mentioned due to it being in addition to athletic scholarships) of revenue for broadcasting, media rights, and ticket sales that lead to a cap of $21 million of direct payments from schools to athletes
- Objections to the settlement include that it isn't lawful under Title IX, violates state laws
  - Want to make sure it's staying NIL and not just becoming pay to play

- NCAA says they need to do more to help them generate more revenue, whether that's selling more tickets to championships that they directly control or helping them market conference championships or regular season games
- The national office is trying to make sure two things happen: athletes that deserve to be compensated can do that in a way that's fair and equitable, but it is based on how much the specific program is generating, while the playing field is level enough to where somewhere like Vermont can still win a championship
- Regarding private equity, they don't think schools necessarily need it, but conferences could use it as a whole (BIG10, SEC), but they also don't need it
  - It would be just borrowing a lot of expensive money
- If the settlement is approved, are we entering a period of stability? (settlement is a 10 year deal)
  - The next 5-7 years could be different, with lots of new TV deals coming up for big conferences
    - 60% of the revenue set aside (example) would be dispersed to those teams that have the highest TV ratings, however it's split up
    - Ohio State, Michigan, Penn State are taking up a lot of viewership compared to Northwestern
  - With conference realignment purely based on football, NCAA takes into account travel and different things for smaller sports and want to be adaptable for those sports as well
- Transfer portal will not be resolved in the settlements
  - Is the transfer portal going to make college football look more like free agent type deals with athletes transferring in the spring
  - NCAA hoping with the money given to athletes it'll limit the number of transfers and keep athletes from jumping from school to school

- ○ Transfer portal can be healthy, allows those who weren't recruited or physically have advanced in their first couple years in college to move to bigger schools and have better opportunities

Data Understanding:

- Northwestern has a $100 million program

    - ○ Thinks about how innovate, how to creatively think about revenue

    - ○ Northwestern is in a pro league city which makes it hard to get real NIL value

    - ○ Northwestern can't generate the amount of money in Chicago the same as somewhere like Texas, Texas A&M, or UNC

- Price control is challenging in the market economy

- NCAA spending far more time than the national office did 5-10 years prior collecting data and building marketing capabilities to help sell tickets to all sports

- 11.3 scholarships for baseball and will go up to 35, same for women's soccer and tennis, etc.

    - ○ Scholarships given will rise, and will grow tremendously in women's sports

- Northwestern Athletic Director asked to share numbers, but they told him not to, thus <u>effecting any data preparation, model generation, model evaluation, and solution deployment unfortunately</u>

- Use a backward looking algorithm, 75% football, 15% men's basketball, 5% women's, 5% other

Data Preparation, Model Generation, Model Evaluation, Solution Deployment:

- As for these steps in the process of the CRISP-DM, this specific video about the coming NCAA settlements doesn't hardly touch on anything referring to data, but is more of a talk about how it will affect the business. A council advised the Northwestern AD to not speak on numbers specific to the school, so there wasn't much of anything to list under these steps in the process. The NCAA representative also didn't speak on data, models, or solutions, which also left nothing to fill in these fields unfortunately. I do wish this video touched on data far more and how programs, conferences, and the NCAA will go about navigating sport once these settlements are decided, and showed more models and solutions to see how they are doing this currently.

Choose one of the contexts below (or a context that reflects your career goals). List 5 different analytics questions that would be important to ask in the context you chose.

- **Player Analytics**
  - How does a player's acceleration and speed correlate with their success to create separation or break tackles? (Descriptive)
  - Can a player's practice metrics accurately predict their performance in a game? (Predictive)
  - What is the most optimal rotation of players in order to maximize performance while mitigating fatigue in a game and across the season as a whole? (Prescriptive)
  - Are we able to measure year to year improvements in a player's physical performance and game performance metrics? (Descriptive)
  - What combine performance metrics most accurately predict the success of a high school recruit in their first season with the college football program? (Predictive)

What are your career goals? (This one is for me - I like to tailor the class to the class). What specific types of data will play a role?

My career goals would have to begin with me getting my foot in the door at the collegiate football level, or NFL football level. To start in those areas in an entry level position would be amazing, but I would definitely accept an internship as well to get acclimated to the world of college/NFL football and get to really understand the organization I was brought into. More specifically, I'd love to do player analytics, player performance efficiency, or professional athlete agency/branding. As of right now, my dream would be to do player analytics/performance efficiency for an SEC or BIG 10 program. Some of the specific types of data that would play a pretty big role in these professions would be player performance data, player health and wellness data, scouting/recruiting data, team strategy data, and branding data.