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Nature of Science: Assignment 1

<https://www.coachup.com/nation/articles/the-magic-baseball-formula-behind-mo>

The Magic Formula Behind Moneyball.

This article is an explanation of how science and math shifted the course of professional baseball, forever. Allow me to explain.

Prior to bringing a statistician on the a professional baseball team's payroll, recruiters would simply look for strong, fast, big hitting athletes. The league was only interested in players who could field the ball, and hit an impressive amount of "Home-runs." The team with the most money could buy the most sluggers, and the team with the most sluggers, won the championships, resulting in more money. Now, here is the problem. What if your franchise doesn't have as much money as the other teams? How can a team compete?

So here is the science. The general manager of the Oakland A's, Billy Beane, was in an environment that wasn't sustainable. He was given a certain amount of money to build a team. The amount of money he was given wasn't enough to buy the talent that would lead a team to the play-offs, a championship, so he had to change his way of thinking. He had a real problem that needed a new approach, a complete paradigm shift in regards to structuring a team. Billy Beane hired the statistician Peter Brand (who knew nothing about baseball) and they came up with a system (hypothesis) of making a finite resource (money) work to support their existence (jobs on a professional baseball team).

Here are the details of the experiment:

"First Brand calculated that in order to guarantee a spot in the playoffs the Oakland A's would have to win 99 games, which equates to a win percentage of 61.1%, since there are 162 games in a season. Brand then uses the Pythagorean Expectation equation to determine how many runs the A's need to score and could allow over the course of the season.

So the A's put the 0.611 as the desired win percentage and we find out that the runs allowed/runs scored must be less than 0.798. Brand did further calculation of runs per game and found that over the course of a season the A's must score at least 814 runs and not allow anymore than 649 runs.

Brand used:

$$RPS_{it} = \beta_1 + \beta_2 OBP_{it} + \beta_3 SLG_{it} + \beta_4 NL + e_{it}$$

Where:

RPS= number of runs scored by team
OBP= on-base percentage of that team
SLG- slugging percentage
NL- 1 if team is in the National league, 0 if not
e- error of the equation

This means that the amount of runs scored by a team in a season is directly correlated to the teams on-base percentage, slugging percentage and conference. Although this seems to be a relatively simple idea, it hit the league by storm. General managers tended to have tunnel vision for a particular talent of a player. They wanted a big hitter and they would only look at the number of home runs he hit or they would look negatively on a player with a weird form. Although people were skeptical of this idea at its entrance, it eventually became widely accepted to like at a wide array of correlations instead of specific skill sets.

Brand then used formula to find out how much each player should be worth. The player's salary formula takes a couple things into account. First the numbers of games played. It gives players value based on their experience in the MLB and then will gradually devalue them at the end of their career. The formula also uses on-base and slugging percentage, which should add to the number of runs the team will score. Finally, it takes into account if the player is a skill position (catcher or shortstop) and if he is in the National League or not. Brand would look at how much that player's salary should be according to his formula, and then find out how much the A's could get them for. They were able to find several players that were undervalued and even worth twice as much as they were going for in the free agency or their contract at the time." (CoachUpNation)

Spoiler Alert: The experiment worked and it changed how all organizations evaluate their programs.

What I most appreciate about this article is the cross-connection of professional sports with math/science.

This example illustrates perfectly the use of 21st century skills, adaptability, complex communication, non-routine problem solving, systematic thinking, and working as a group with different strengths (Baseball Jock and Statistician)

If everyone could use an open/ whole-brain perspective with every aspect of our life, how much improvements could we experience in how efficiently we exist?