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SPEAKERS

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So our next example is from sports analytics. The use of data in sports has become really pervasive. And a lot of different sports, whether it's baseball, basketball, soccer, football, almost any professional sports that you can think of these days, they have a data analyst or a sports analyst on that staff. Right, and what they do they do, they use data to evaluate their own players, evaluate opponents players and, and help the team come up with strategies against particular opponents. So sports analyst has also become an interesting career choice for university graduates as well. So even if you're not really interested in sports, you may have seen this Hollywood movie starring Brad Pitt which is Moneyball. And this was the true life story of the Oakland A's, which is a baseball team. And they had this innovative manager who took the low budget team like the Oakland A's, from pretty much bottom dwellers to the top of the division. And the way he did it is that he used data to evaluate players. And using those measures, he recruited the appropriate players for the team. And that's how he made the team basically hit way above what it was doing before.

So in this particular example, we're not going to do anything as fancy as what real life sports analysts do. But we're going to take a simple example from basketball, particularly from the NBA, and try and come up with a measure or, or to evaluate how a particular player is doing. Now basketball is a team sport. And players do a lot of things right. They contribute to the team by scoring points, by taking free throws, doing rebounds, blocks, steals, and so on. So the question is, how would you aggregate all of these into one particular measure to evaluate the effectiveness of a particular player. So in basketball, the particular measure that they use is called efficiency of a player, EFF. And this is basically a formula, which takes into account the various things that a player does, right. And here's this particular formula. So it adds up the points that a player scores, the rebounds by a player, the assists, the steals, the blocks, right, so these are all positive contributions by the player. So it adds all of these up. And the negative contributions are missed field goals, missed free throws, the turnovers. So it subtracts those, and takes this whole thing and divides it by the number of games played by the player to come up with a single number, which is called EFF.

So now, if we look at this, this is nothing but a mathematical expression. And here the variables are all of these different components, like points, rebounds, assists, steals, blocks, right, missed field goals, missed free throws, and turnovers. So if you have data on all of these, right, you can compute

this. It's a big expression. But after all, it's a mathematical expression. And what I'm going to show you is that you can use either Excel or Google Sheets to exactly come up with this measure for individual players. So let's do that.

So here, what I have done is an Excel spreadsheet of statistics from the 2017-18 NBA season. So this was the season that was won by the Golden State Warriors, and they faced off against Cleveland in the finals. So what I've done is I've taken some of the top players that here like LeBron James, Stephen Curry, Kevin Durant, etc. And from the nba.com website, I've calculated, I've collected the statistics like the, let's look at LeBron James, the number of games he played, the points he scored in the season, the rebounds, assists, steals, blocks, and the negative ones, the missed field goals, missed free throws and turnovers, right. And what I want to do is I want to combine this to come up with a value for the efficiency of LeBron James. And how do I do that? I do that by using the formula function in, in Excel. And the way the formula works is that you put a equal to sign there, right. And remember, our formula was that you added up the contributions of various things like the, the points scored, right, so this comes in D3. So that's why I have D3 here. Plus, I have to add up the rebounds. Now the rebounds for LeBron comes in E3, right. So, so I add up E3. And similarly, I add up his assists, which comes in F3, right, the steals, which comes in G3, his blocks, which come in H3, right. And then I have to subtract out his negatives, which is the missed field goals, which comes in I3, so I'm going to do minus I3, right, minus his missed free throws, which is in J3, minus K3, which are the turnovers, right. And all of these have to be divided by the game played. And remember, the game's played is in column C, cell 3. So this has to be divided by C3, right. And once I hit, the hit the enter button, this calculates the efficiency for LeBron, which is 32.6 times, right? So typically, in the NBA anything over 30, that's a great efficiency, okay, and LeBron easily beats that, it's 32.6 times. Now, suppose I want to calculate this again, for Stephen Curry, for Kevin Durant, and so on. Right. So I can go into the particular cell for Stephen Curry, Curry, and do the same thing that I did for LeBron, right. But Excel allows you to do it a little bit easier. All I have to do is I go to the cell for LeBron, which I've already calculated, right, and I'm going to copy that. So I hit the copy. And that copies that cell, right. And what I'm going to do is I am going to highlight the cells for all the other players like Curry up to Jimmy Butler, right. And then I'm going to go to paste, and see there are lots of different options for paste. I'm going to choose the formulas, which is the second one. So if I hit that, right, what it does is automatically calculates using the same formula as we did for LeBron, automatically it calculates for Curry, for Durant, for Lillard, and all of these players, right? So for example, if you look at Damian Lillard here, right, so automatically, the formula knows that he is in row 6, so it adjusts its it uses D6, E6, F6, G6, and so on.

And same way now, if you want, so the next I have calculated some of the Toronto Raptors that year, that was Kyle Lowry, Fred Van Vleet. Right, so this was the year remember that hadn't yet won. The the winning of the NBA would come the following year, right. So this year, they are okay team, right. So if we were to calculate the efficiency for these players, all I'm going to do again, like let me go back to one of the cells that have already calculated, I'm going to copy right, and paste it here. Again, I go to paste, hit the formula button, and that automatically calculates it for these players, right. And then, even below, I have some of the greats like Michael Jordan, Larry Bird, Magic Johnson, so on. And I've taken a particular season for Jordan, particular season for Bird. And I want to calculate the efficiency for these players and see how they stack up against LeBron, Curry and so on, right? So if I want to calculate, for example, for Michael Jordan, again, I go back to a cell which I've already calculated, right again to copy. And I'm going to select the cells where I wanted to, to calculate, right and again, I go to paste hit formula, and that calculates for these greats. Right. Now if we look at this right now, suppose you wanted to compare how does Michael Jordan rank up with LeBron, right? So

remember, Michael Jordan is 31.9. That's his efficiency rating. Now, if you compare it with LeBron James, it's 32.69 for LeBron. So LeBron does better than Jordan in this measure, right? How does LeBron do against Stephen Curry? He does way better, right, it's 32 versus 27. In fact, even Kevin Durant has performed better than Stephen Curry that particular season. Right. And even James Harden, Bradley Beal, and in fact, Anthony Davis, right? So this is the player who has the highest efficiency in the 2017-2018 season. And if you compare these players against the greats, right, if you look at the efficiency measures of the greats, two completely stand out, one is Magic Johnson, and the second is Shaquille O'Neal. Right, so they are both 33.82. And in fact, Shaquille O'Neal is 33.82, Magic Johnson is 33.31. And both of them, in fact, are better than LeBron James. And in fact, Kareem Abdul-Jabbar, his efficiency is also higher than LeBron James in the 2017-18 season. And, in fact, you know, like, you can now put in the statistics of any player that you want, and you, you may want to put in statistics of a particular player, who is your favorite from this particular season. Put in the statistics, and you can use the efficiency formula to calculate the efficiency measure of your favorite player, right. And this is how you can compare across players.

The other thing you can do is remember, this is a formula, right? And in this formula, we're giving same weightage to points, rebounds, assists, everything, right. And maybe those of you who really follow baseball, you know, that maybe assists don't shouldn't count the same way as points, right. Similarly, should steals which are given by G3, right, should they count the same way as assists, right? And see, you can change this formula, right? So for example, if you only want to give half weightage to assists as compared to points, all you have to do is you, if you want to give only point five to assists, right, you just change it to point five star times F3. And and if you hit Enter, right, this will compute the efficiency under this new measure. Right. And then you can do the same thing for all the other players using the same this new your formula right? And then and it will calculate the efficiency measure under this new formula. So you can change this formula. You can introduce new players, you can do a whole lot of stuff.