

Daniel Carter & Josiah Jackson

CSC-362

5/12/2025

Larry Bird Vs. Magic Johnson, who had the Better Prime?

Introduction

For our final project, we have decided to create an accessible data physicalization analyzing the performance of Larry Bird and Magic Johnson through their prime years, where each of them won three league MVP awards. The rivalry between Bird and Magic is iconic, to say the least. It all started in the 1979 NCAA Men's National Championship game, where Magic and the Michigan State Spartans defeated Bird and the Indiana State Sycamores to win the National Championship. Magic would go on to be drafted by the Lakers while Bird went to the Celtics, setting the stage for one of the greatest sports rivalries to ever exist. In this project, we will analyze Bird's and Magic's stats throughout each of their three MVP seasons, as well as present the data in an engaging and accessible manner in which users can see comparisons between their greatest performances to each other, as well as to an average player at the time to provide needed context.

Data Exploration

We found our dataset on Kaggle, and it is titled NBA Player Stats since 1950, created by Omri Goldstein. The data was scraped from the Basketball Reference website, which is a very reliable source when it comes to keeping sports statistics. The dataset contains many useful features and items. The items in this dataset consist of a combination of a player and a unique year, denoting the NBA Season in which these players' stats were obtained. This dataset also consists of useful features such as points, rebounds, assists, blocks, 3PT%, and FT%. We have linked our dataset [HERE](#). For this project, we will only be focusing on Larry Bird and the 1983-1984, 1984-1985, and 1985-1986 NBA seasons, and then Magic Johnson and the 1986-1987, 1988-1989, and 1989-1990 NBA seasons where they each won the Most Valuable

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Player award for the league. This dataset provides aggregate stat totals for each year, making our job easier as we plan to create a data physicalization that compares the totals for points, rebounds, and assists, as well as checking if that player won the NBA Championship that year. We also plan to calculate average totals for an “average” NBA player at the time to help provide context for Bird’s and Magic’s incredible seasons.

Overall, our dataset was missing some values in general, but there were no missing or null values for Bird’s or Magic’s MVP seasons, so we won’t have to worry about handling null values within our dataset. We decided to use JupyterHub and, more specifically, Python and the pandas library to clean and filter our dataset to only the relevant data that we need. We simply just filtered by player and years combinations to obtain the stats for each respective player’s MVP seasons, and then researched on the internet to see if the player’s team won the championship that year, which we just created an extra column for, which is binary. After this filtering has been completed we have six items in our dataset which represent the three MVP seasons for each player, and the features consists of point totals, rebound totals, and assist total for each year as well a a binary variable denoting whether that player won the NBA championship in that season or not. We plan to explore a variety of different ways to physically represent this data in an interesting and accessible way, which we will dive into shortly.

Paper Prototypes

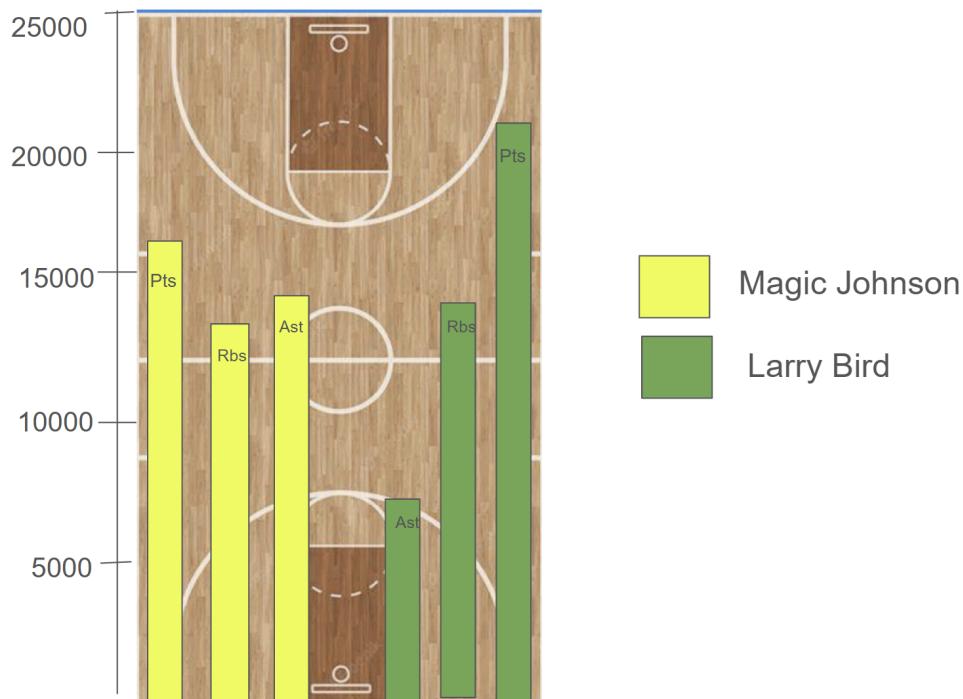
The next step in our design process is to create a few prototypes of what we expect our final data physicalization to look like based on the information and feedback we receive during the design process. Our idea for our final data physicalization is to roll out colored sheets of paper over a basketball court to create a grouped bar chart where we can compare Bird’s and Magic’s stats on a large scale. We can see in the image below our first prototype for our data

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physicalization, which is simply a grouped bar chart laid over a basketball court. For our initial prototype, we planned to simply compare the point rebound and assist totals from each of Bird's and Magic's three MVP seasons, with a bar representing each aggregate total.



We can also see in the initial prototype that each bar is labeled points, rebounds, or assists, and it is also color-coded yellow for Magic and green for Bird. The stats in this prototype are just made up for the sake of simplicity, but in our final version, we will need to scale each aggregate stat total with the length of each paper to accurately depict each respective player's stats over their prime years.

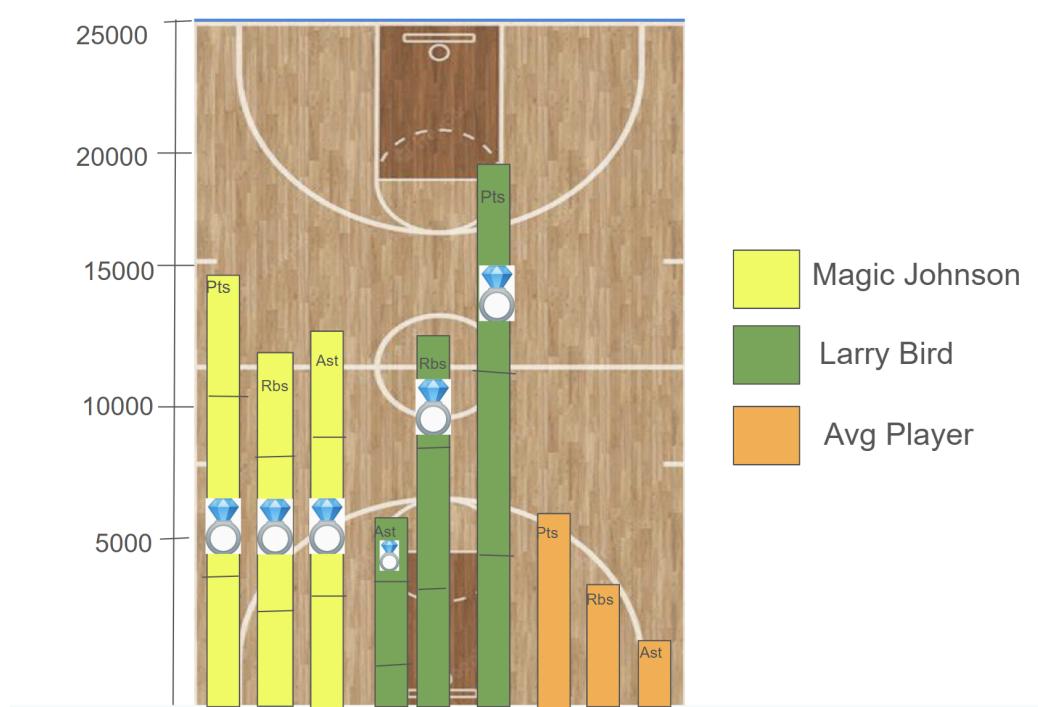
We can see in the image below a sketch we made using PowerPoint to create our 2nd prototype in the design process. During our initial presentation, we received feedback from Dr. Williams and the rest of the class that it would be helpful to have an average player's stats during a three-year period during the Magic and Bird era in the NBA to provide context for how great Bird and Magic were playing at the time. We can see in the visual for our 2nd prototype

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that we added a third grouping of bars, which are colored orange, and these bars represent an average player's stats over a three-year period during this time in the NBA.



We also added dividers for each season, which are denoted by a black line on the bar as well as a picture of a ring to denote whether that player won the NBA championship during that year. This can help the viewer to compare certain seasons from one player to another, as well as adding a metric to measure team success during their respective seasons.

Our 2nd prototype adds a bit more complexity to our final physicalization, as we will keep aggregate totals of player stats the same way, we will just need to separate totals by season and find an effective way to label the years for each MVP season for each player. We plan to use a posterboard beside each bar to label the respective years and likely black tape or some other sort of divider to separate the years of each bar. We also plan to print off large images of a

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ring and place it on each year that a player won an NBA championship to be able to measure team success on top of the player's individual success. The last thing we need to be able to make this prototype into a physicalization is to calculate an average NBA players' stats over a three-period during this era in the NBA. This will not be difficult, we may just have to find another dataset that is complete with no null values to calculate average player statistics at the time. As far as the materials that we need to implement this physicalization will likely consist of a few different colored rolls of construction/art paper, a black marker/tape, and a high-quality camera to record our physicalization in action.

Task Analysis

Our physical visualization supports many tasks, which allow for ease of user interpretation and necessary accessibility use as well. The first of these tasks is the ability for the user to compare between key stats of Larry Bird and Magic Johnson. The first task, specifically, necessitates for the user to compare the total points scored by Magic Johnson and Larry Bird and say which one is the highest. To compare and determine the highest total of points scored between the two athletes, the user must first look at the color hue for each of the bars and note which bars are green, therefore pertaining to Larry Bird, and the bars that are yellow, which pertain to Magic Johnson. Afterward, the user must look at the labels for points for the appropriate bars for each athlete, and then compare the vertical length of each bar to find which athlete has the most points. The next task for the user asks them to find the range of a value. In our dataset, this task asks the user to find the range between Larry Bird's and Magic Johnson's assists. To determine this, the user would go through a similar process of identifying the proper bars as described above. However, the difference would be that the user would be looking to identify labels for the assists of each player instead of the points. After the user does this, they would then look at the labels for each player's "assists" bars which gives the total

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number of assists. They would see that Magic Johnson totaled 2872 assists over his three MVP seasons, which stands comfortably over the 1608 assists that Larry Bird amassed over his three MVP seasons. With these figures, the user can do math and conclude that the range of assists is from 1608 to 2872, or 1264. The third task required of the user is the ordering of data. For our data, the user would be required to order Larry Bird's stats from least to greatest. In a similar procedure as the previous tasks, the user would identify the distinctly green color hue to note which set of bars belongs to Larry Bird. The user could then use the vertical length of each bar, as well as the identity labels to note which bar is least and then order the remaining bars in their appropriate order. For the two accessibility tasks, the user will be able to accomplish them through the listening to the video showing the set-up and task run-through of the physicalization. The first user accessibility task, which would be doable by a blindfolded user is to locate the highest statistic among the dataset. This could be done by using the enter button on the keyboard to start the video and simply listening to the video. By listening to the video, they will hear that Larry Bird has the highest statistic among the whole dataset with 6318 points. The second accessibility task that a user could perform non-visually is to summarize certain aspects of the data. The task that will be implemented using summary is to summarize the general relationship between the statistics of Larry and Magic versus the average player. In a similar manner to the previous accessibility task, a user will be able to non-visually hear the data and therefore the stats associated with each player. In doing this, a non-visual user will be able to summarize that Larry and Magic, while beating each other in different stats, both had significantly higher numbers across all categories than the NBA average during that same time period.

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Finalize Visualization

We can see in the image below a picture of our final data physicalization set up on the Davidson Basketball Court, with labels and a table providing the total statistics for Larry Bird's and Magic Johnson's three MVP seasons, as well as the three-season stat totals for an average player during this time period.

Name	Bar Color	Points	Rebounds	Assists
Larry Bird	green	6318	2443	1608
Magic Johnson	yellow	5404	1633	2872
Average Player	orange	2289	861	590



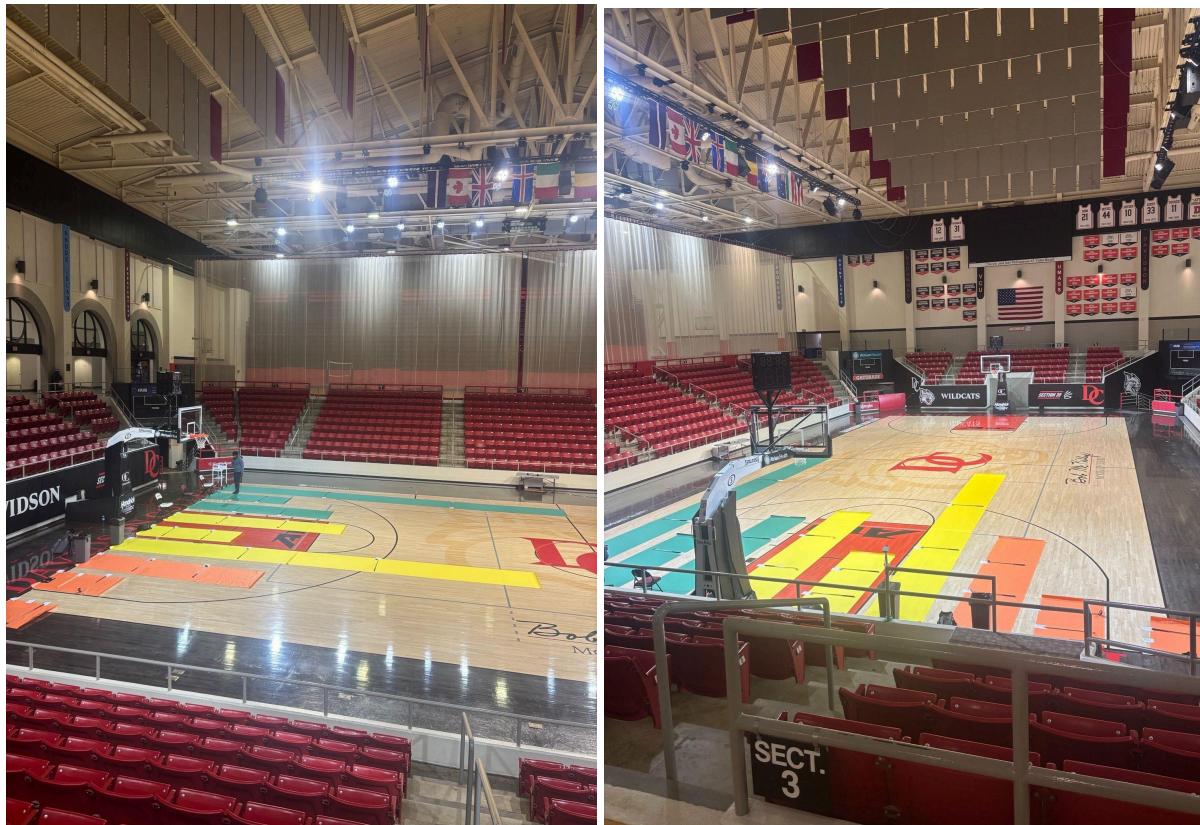
We have also provided two other unlabeled images of our data physicalization from different angles, shown below. Due to the sheer size of our data physicalization, it was difficult to find a good angle where we could capture the entire bar chart. There was also the backboard of

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the hoop in the way, which prevented us from getting a direct shot from what would be the x-axis of our chart. The side bleachers were also not out, and the nets were up on the side courts, which prevented us from getting a bird's eye view of our barchart, but we feel that the provided angles provide well enough of a view of our total physicalization.



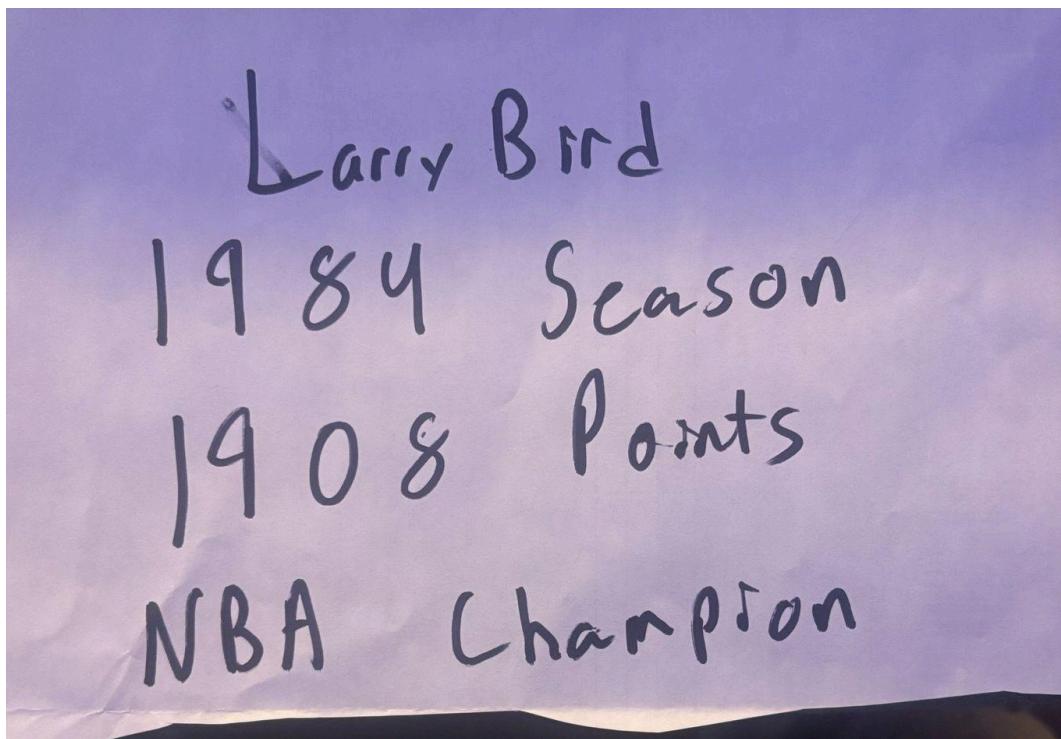
We also thought it was best not to include a scale with our visualization because it would have been a tight fit and made the final physicalization look worse. If we made a physical scale, it would have to be the same color as one of our three players, which would be confusing, and due to no aerial angle of our physicalization, the scale would be very hard to read, as well as accurately eyeball measurements. We also believe it would've worsened the look of our physicalization if we had edited a scale onto a photo of it due to the lack of effective angles and the amount of difficulty there would be with eyeballing measurements with the scale.

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Our final visualization consisted of nine total bars, with points, rebound, and assist totals for Larry Bird, Magic Johnson, and an average NBA player over the course of their three MVP seasons. We used golf clubs to separate the yearly totals for each player, which can be seen in the provided images, as well as providing a piece of paper at each divider denoting the year, stat total for that season, and whether or not that player won the NBA championship that season. We feel that providing these notecards with accurate stats is a more effective way of measuring than providing a hard-to-read scale. We can see an example of one of the notecards in the image below from Larry Bird's first MVP season.



Overall, setting up the actual physicalization was a lot more difficult than we had originally anticipated. This mainly came from the tediousness that came with scaling and measuring each strip of paper for each player's stats for each year. It was also a lot more difficult to capture a good angle of our complete physicalization, but overall, we are very happy with how the finished product turned out, and our glad that we chose to go this route over the

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web-based visualization. Our main takeaways from our final visualization were how impressive Larry Bird's and Magic Johnson's three MVP seasons were when compared to an average NBA player at the time. From a brief glance, you can tell that Magic and Bird outperformed an average player by a large margin in every statistical category, with Bird taking the lead in total points and rebounds, and Magic taking the lead in total assists over their three dominant seasons.

[Final Physicalization Link](#)

User Testing

Testing represents an important aspect of a data visualization, due to the perspectives which a user may have that the designers of the visualization may not have accounted for. For our visualization this is no different. That being said, there were testing difficulties which were not accounted for which influenced the way we tested and the write-up concerning it. For this reason, we did not implement pilot testing. The constraints concerning the size of our visualization, availability of testers, and how long we were able to keep the visualization up disallowed us from properly setting up and adjusting a full semi-working visualization. Moreover, due to the specificities of this implementation, the accessible facet of our physicalization lies in the description of the video, as opposed to the physical visualization itself. Due to this, we were unable to properly user test this facet of the task analysis. This also caused struggles in our user testing as we were only able to secure two users to test our visualization. However, this did not keep us from adequately testing our visualization and gaining valuable user feedback on the efficacy of our visualization. The actions and feedback of our participants are discussed below:

Henry Dolan:

- Major: Communications Studies
 - Minor: Economics

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- Notes on participants:
 - After receiving the instructions for the first task, the first participant, Henry, started by looking at the different colors for each bar chart. Noting by logic and by the labels on each chart that green represented Larry Bird and yellow represented Magic Johnson, the participant walked in the divide between the two sets of bars. Using basketball logic, the participant reasoned that the highest bar in each color represented points for each respective user, so they walked down the court towards those bars. After noting which bars represented points for each athlete, the user immediately went to and noted Larry Bird as having the most points in the dataset. For the next task dictating the requirement to order Larry Bird's statistics from least to greatest, the participant immediately noted the color denoting Larry Bird's set of bars. Identifying that multiple statistics were represented, and noting that some of the statistics had closer ranges than others, the participant looked at the label on the ground next to the bar closest to him. He saw that the label was assists and then, remembering that the highest bar was points, reasoned that the other bar represented rebounds. Thus the participant correctly answered that Larry Bird's statistics over his three MVP seasons, ordered from least to greatest, are assists, rebounds, and points respectively. For the final task, the user was asked to locate the highest data point in the whole dataset. The participant proceeded by glancing at the entire visualization, noting the vertical positioning of the bars. Afterward, they began walking towards the halfcourt line, noting which bars reached closest to that line. After noting these things, the participant correctly located the greatest data point in the dataset as Larry Bird's point total.

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- Feedback from participants:
 - The participant did not provide much feedback. The tasks were done quickly and quite easily and the participant noted this.
- Summary of performance and feedback:
 - We were very pleased with the performance of the visualization and the user's work in doing the task. The color hue and vertical positioning of the bars allowed for ease of identification of the different statistics for the user.

Aaron Maione:

- Major: Communications Studies
 - Minor: None
- Notes on participants:
 - The participant received the first task which requested them to compare the total points score between Larry Bird and Magic Johnson. Similar to the last participant, Aaron quickly noted which color hue represented which athlete. He then went to the highest bars for each athlete and saw the vertical positioning of Larry's points bar exceeded that of Magic Johnson; thus he correctly chose Larry Bird as having the highest total points between the two. For the second task, the user quickly noted the green bars as those representing Larry Bird's statistics. In a similar manner as the previous participant, Aaron looked at the labels representing each bar, noted their vertical positioning, and ordered the bars as follows: assists, rebounds, points. This correctly ordered Larry Bird's statistics in the dataset from least to greatest. For the final task, after already having identified the statistics belonging to each athlete, the user quickly analyzed the

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bars near the halfcourt line to find the highest data point. Having already noted that Larry Bird had a high number of points, after a quick comparison, correctly located where Larry Bird had the highest statistic, points, in the dataset.

- Feedback from participants:
 - The participant did not provide any feedback. They did the task fairly easily and did not comment much on it.
- Summary of performance and feedback:
 - We were similarly pleased with the performance of this visualization as well as the performance of the user tester. The layout of the barchart allowed for the user to accurately identify the necessary statistics to fulfill the tasks. Moreover, the barchart, in large part due to the colors and simplicity, allowed for easy recognition of where to find certain statistics for each athlete.

Personal Reflections

Josiah: One the whole, this project was very eye-opening. At the onset of this class I was very much expectant to learn and think of visualizations in a very particular way. I had previously felt that the more complicated a visualization was, the more effort and therefore better result it would entail. This was very different from reality as this process, especially the user testing, showed that the best visualizations are those which are easily understandable, visually stimulating, but not optically overwhelming. Moreover, I learned the difficulty of physicalizations and the limits of their feasibility. While it was rewarding to see the participants understand the physicalization, I did grapple with its practicality due to the effort in securing paper, measuring the bars, and setting up the entire physicalization. Due to the physical nature of the process, I also better appreciated the advancements of technology, as well as the ability to show more complex pieces of data in efficient manners. With the project completed I can look back and

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appreciate the physicalization that was completed while also understanding that the practicality of the project was likely lower than I would have previously thought. This lies heavily in the fact that the physicalization, though cool, could not be left up for an extended period of time which rendered it, functionally, a one-time event. This made the effort in putting the physicalization together feel a little unnecessary after the fact. In conclusion, the visualization which Daniel and I created produced a very clear and understandable view of data between two great players, but it pushed the bounds of practicality in the cases of multi-use and efficient visualizations.

Daniel: Overall, I found this project to be slightly tedious and more time-consuming than I had originally thought. However, I found it to be very interesting, and I had a great sense of fulfillment when we had finally finished setting up our data physicalization. When we were first presented with this project, I knew I wanted to make a data physicalization because of my experience making one last semester in Dr. Williams' Human Computer Interaction class, and because it is something different from what we have been doing all semester in labs and homework assignments. With Josiah and I both being athletes as well, we knew we had to find a way to incorporate sports into our final project, which we did by comparing Magic and Bird's three MVP seasons to each other. Looking holistically at our project, I would say that the first portion of our design process was a lot more fun and easier than the latter half. This is likely due to the fact that planning, brainstorming, and sketching require a lot more creativity and free-thinking, and not so much of actual work as when it comes to implementing our data physicalization. Actually implementing the data physicalization was not too bad; it was just a very tedious process, as there were many moving pieces going into getting it to work. We had to first get the materials for the physicalization, rent a camera from the library, as well as find a time when the basketball court was open, which is not as easy as it might seem. We also had to

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find dividers for the bars and add labels for each player's year as well as measure out and mark bars using a one-meter stick. Overall, I am happy with how our project turned out and think me and Josiah equally contributed during all parts of the design process and implementation.