

Analysis of HBCU Graduates  
Average Income and HBCUs Available  
to Incoming Freshmen  
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## Introduction

Attending Historically Black Colleges and Universities (HBCU) provides the black community a sense of belonging in a nourishing environment. More than 300,000 students enroll into an HBCU each year (*2022-2023 best hbcus in the U.S. [ranking] | US news rankings*), but these efforts to create a safe space for people of color brings to light the racial inequality in the workforce.

Resilience and hard work are some characteristics that have to be developed by attending an HBCU and preparing for the workforce, following graduation. A sense of uncertainty is brought upon students when they notice not many people with the same skin tone as them at their internships or conferences, culture shock if you will. A question that is on many college students' minds is, "Will I be able to be employed and compensated correctly after receiving my degree?" We created a code to help answer this question, to analyze and visualize if HBCU graduates are on the path to earn the proper compensation.

We both are first generation HBCU students, one first generation college overall and the other first generation Masters student. In high school we did not have the opportunity to be greeted by HBCUs during the college fair. Not having that exposure minimized our options of schools we sought out. Our goal is to prove or disprove the notion that individuals graduating from an HBCU are beginning to earn more in terms of starting salary. Also, we hope that our outcome will increase the amount of high school students to learn more about HBCUs during their college search.

## Methods

The school population involved 10 top HBCU schools, which includes Spelman College, Howard University, Tuskegee University, Morehouse College, Xavier University of Louisiana, Hampton University, Florida A&M University, Delaware State University, Claflin University, and North Carolina A&T State University. We curated this data set from various resources to provide starting salaries from the years 2015, 2016, 2021, and 2022.

Below is the data set of salaries from the top 10 HBCUs.

College	2015	2016	2021	2022
Spelman College	\$41,100	\$34,700	\$50,200	\$49,625
Howard University	\$44,700	\$39,500	\$52,900	\$61,000
Tuskegee University	\$33,900	\$34,500	\$60,600	\$37,483
Morehouse College	\$38,000	\$48,100	\$51,400	\$44,135
Xavier University of Louisiana	\$57,200	\$46,700	\$40,200	\$52,582
Hampton University	\$39,800	\$41,644	\$52,600	\$47,197
Florida A&M University	\$38,500	\$31,800	\$48,300	\$39,700
Delaware State University	\$30,200	\$30,100	\$42,300	\$47,400
Claflin University	\$25,800	\$27,200	\$38,300	\$58,000
North Carolina A&T State University	\$31,700	\$32,100	\$41,157	\$54,900

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Using R, we found the descriptive statistics to analyze the data. The descriptive statistics that were found are nbr.val (the number of values), nbr.null(the number of null values), nbr.na (the number of missing values), min (the minimal value), max(the maximal value), range(min to max), sum(sum of all non missing values), median, mean, SE.mean (standard error of the mean), CI.mean (confidence interval of the mean), var (variance), std (standard deviation) , and the coeff.var (variation coefficient). This analysis showed trends of the four years observed.

Using C++, we created a HBCU search tool that focused on the four main things most students seek out when searching for their ideal school. The four main components are year, type, size, and setting. The year component gives the student the option to choose whether they would like to go to a two-year or four-year school. Type of school means whether it is public or private as this is important for students that are concerned about how they are going to pay for school. The size options given are small - less than 3,000 students, medium - 3,000 to 10,000 students, and large - more than 10,000 students. The last option for students to choose is the setting in which the school is in: urban - located in a large city, suburban - located in a small city, large town, or residential area near a city, or rural - often located near farms or wilderness and a small town. All of these choices are crucial when it comes to picking a school as students want to pick somewhere that is going to be comfortable and not give them too much of a culture shock as they enter this new stage in their lives. The search tool gives students information about each choice that they are making.

Below are screenshots of the code used to make the search tool.

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6
7     printf("HBCU (Historically Black Colleges and Universities) Search Tool\n");
8     printf("This tool will help you choose the HBCU that is right for you!\n");
9     printf("This search engine is designed to not only help you find the right school but also give you information\n");
10
11     // Separator
12     printf("-----\n");
13
14     int Year;
15     int Type;
16     int Size;
17     int Setting;
18
19     cout << "Two-year schools focus more on hands-on education of the core classes, and also tend to provide real-li\n";
20     cin >> Year;
21
22     cout << "Public colleges are government-funded, while private schools rely more on tuition and endowments. \nCho\n";
23     cin >> Type;
24
25     cout << "A smaller sized college can feel more comfortable while a larger school can give a sense of freedom with\n";
26     cin >> Size;
```

```
28     cout << "Lastly, choose the type of setting the school is located in: \n1. Urban - Located in cities\n2. Suburb\n";
29     cin >> Setting;
30
31     printf("Thank you for answering those questions, now lets determine which schools fit your preferences.\n");
32
33     // Year == 1, Type == 1
34     if ((Year == 1) && (Type == 1) && (Size == 1) && (Setting == 1))
35     cout << "The schools available to you are: \nClinton College - Rock Hill, SC\n" << endl;
36
37     if ((Year == 1) && (Type == 1) && (Size == 1) && (Setting == 2))
38     cout << "Unfortunately, no schools match your criteria. Please search again." << endl;
39
40     if ((Year == 1) && (Type == 1) && (Size == 1) && (Setting == 3))
41     cout << "Unfortunately, no schools match your criteria. Please search again." << endl;
42
43     if ((Year == 1) && (Type == 1) && (Size == 2) && (Setting == 3))
44     cout << "Unfortunately, no schools match your criteria. Please search again." << endl;
45
46     if ((Year == 1) && (Type == 1) && (Size == 3) && (Setting == 2))
47     cout << "Unfortunately, no schools match your criteria. Please search again." << endl;
48
49     if ((Year == 1) && (Type == 1) && (Size == 3) && (Setting == 3))
50     cout << "Unfortunately, no schools match your criteria. Please search again." << endl;
51
52     if ((Year == 1) && (Type == 1) && (Size == 2) && (Setting == 2))
53     cout << "Unfortunately, no schools match your criteria. Please search again." << endl;
```

## Results/Discussion

With the results of the descriptive statistics found using R, we were unable to prove that graduates of HBCUs are starting to earn more in terms of starting salary. This could be because of a multitude of reasons but one is because of the Coronavirus pandemic. We seen in our research some of the median salaries increase over the years and then decrease the year the pandemic started. The pandemic caused a recession which ultimately caused some people to lose their jobs and even caused those who graduated in 2020 to not be able to find work in their field.

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For those who did find a job in their field, COVID could have affected them getting a high salary as some companies struggled during that time.

Below are the results of the descriptive statistics.

College	2015.0	2016.0	2021.0	2022.0
nbr.val	NA 1.000000e+01	1.000000e+01	1.000000e+01	1.000000e+01
nbr.null	NA 0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
nbr.na	NA 0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
min	NA 2.580000e+04	2.720000e+04	3.830000e+04	3.748300e+04
max	NA 5.720000e+04	4.810000e+04	6.060000e+04	6.100000e+04
range	NA 3.140000e+04	2.090000e+04	2.230000e+04	2.351700e+04
sum	NA 3.809000e+05	3.663440e+05	4.779570e+05	4.920220e+05
median	NA 3.825000e+04	3.460000e+04	4.925000e+04	4.851250e+04
mean	NA 3.809000e+04	3.663440e+04	4.779570e+04	4.920220e+04
SE.mean	NA 2.774345e+03	2.236118e+03	2.246601e+03	2.406549e+03
CI.mean	NA 6.276004e+03	5.058450e+03	5.082164e+03	5.443991e+03
var	NA 7.696989e+07	5.000223e+07	5.047214e+07	5.791476e+07
std.dev	NA 8.773248e+03	7.071226e+03	7.104375e+03	7.610175e+03
coef.var	NA 2.303294e-01	1.930215e-01	1.486405e-01	1.546714e-01

The C++ code gives students a list of the HBCU that are available to them to attend based on the criteria they selected. Using the HBCUs listed, they can research further on the specific schools for things such as cost of attendance or what sports the school offers.

Below is a screenshot of the search tool.

```
This tool will help you choose the HBCU that is right for you!
This search engine is designed to not only help you find the right school but also give you information and understand the choices
your making along the way. This was designed especially with first generation students in mind.
-----
Two-year schools focus more on hands-on education of the core classes, and also tend to provide real-life opportunities to apply y
our knowledge while four-year schools require you to take general education and theory-based courses.
Choose the Institution type your interested in attending:
1. 2-year
2. 4-year
2
Public colleges are government-funded, while private schools rely more on tuition and endowments.
Choose a type of school:
1. Private
2. Public
2
A smaller sized college can feel more comfortable while a larger school can give a sense of freedom with all types of activities a
nd events.
You can have smaller classes where your teacher knows you by name or larger classes that are crowded and are lecture style of you
can have something in between.
Choose your school size:
1. Small (Less than 3,000 students)
2. Medium (3,000-10,000 students)
3. Large (More than 10,000 students)
2
Lastly, choose the type of setting the school is located in:
1. Urban - Located in citites
2. Suburban - In small cities, large towns or residential areas near cities
3. Rural - Often near farms or wilderness areas and a small town
2
Thank you for answering those questions, now lets determine which schools fit your preferences.
The schools available to you are:
Bowie State University - Bowie, MD
Savannah State University - Savannah, GA
Southern University and A&M College - Baton Rouge, LA
```

### **Summary**

In conclusion, even though we couldn't prove if graduates of HBCUs salaries are increasing, it shouldn't deter students from attending an HBCU. HBCUs provide quality education just like any other institution as well as provide students with an experience like no other. Colleges provide opportunities to students but it is up to the students to take advantage of those opportunities. With the search tool, our hopes are to influence high school graduates to consider HBCUs when making their decision on which school to attend. We hope to expand on this code and to eventually make it an actual search engine for students to use. HBCUs make up about 1% of schools across the country so we just want students to know that there are over 100 of them to choose from.

The next step in this research is to look at the median salary of popular majors at HBCUs over time to see how it has increased and/or decreased. We would also like to look at which HBCU graduates are getting the most financial benefit out of their degree by comparing the tuition they paid while they were in school to their salary 1 year after graduation, 5 years after graduation, and 10 years after graduation. This would be beneficial to our research because it will show the monetary benefit of choosing an HBCU.

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