**Chicago K-12 Public Schools: A Quantitative Data Review**

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April 18th, 2025

**Objective:**

This project explores the chosen indicators of performance and climate for Chicago Public Schools to ascertain whether there are patterns related to student attendance, safety at school, environment quality, and misconduct rates. It aims to show how these factors relate to each other and what they indicate about schools in general.

**Introduction:**

This data is from Data.gov, a trusted government website which has over 300,000 datasets regarding public education, public health and more. This dataset holds data from Chicago public schools, which describes "school level performance" for the 2011-2012 school year. This analysis investigates relationships between a number of variables involved in the data.

**Methods:**

*Data cleaning:* The data was relatively clean, with no duplicate values. The missing values were not relevant to the analysis and the amount of missing values was very low for such a large dataset. Some variables had to be converted to numeric categories.

*Tools:* Pandas was used for data manipulation and analysis. Seaborn and Matplotlib were used for data visualizations.

**Data Analysis/Storytelling:**

To uncover significant patterns of student performance and school climate, I initially looked at the range of Safety Scores among Chicago Public Schools through a boxplot. This plotting revealed that most schools had safety scores ranging from 30 to 60, though there were a couple of schools that were clear outliers—either significantly higher or lower. These outliers reflect significant differences in how safe students perceive themselves within school communities, and these differences can have a significant effect on behavior and learning.

Next, I looked at the breakdown of school types in the dataset as a bar chart. Elementary schools dominated, followed by fewer high schools and still fewer middle schools. This matters: it primes us to think about the patterns that follow, especially in measures like attendance, graduation, and misconducts, which vary strongly across grade levels.

To see how supportive school environments are perceived, I created a count plot of Environment Scores, grouping schools into ranges such as 0–50, 51–60, etc. Most schools scored between 61–70, which is a quality environment. There were hardly any schools that scored over 90, which means there was potential for systemic development within the district for physical space, teacher support, and student satisfaction.

I then went on to compare average Safety and Environment Scores between school levels on a grouped bar chart. High schools and elementary schools had the highest safety scores, while environment scores were reasonably similar for all three school levels. This may reflect the increased emphasis put on physical safety within older student bodies, where behavioral issues are possibly more involved or security hardware more sophisticated.

To see relations among variables, I created a scatter plot for Safety and Environment Scores, where it showed that there is certainly a positive pattern: schools whose safety scores were higher also tend to have healthier environments. It reflects how different aspects of the school climate all work together in supporting each other.

A correlation heatmap with just four of the key variables—Safety Score, Environment Score, Average Student Attendance, and Graduation Rate—also maintained these relationships. The greatest correlation was between environment and safety, but both also had positive correlations with student attendance and graduation rates. This suggests that when students feel safe and supported, they are more likely to stay in school and graduate.

To explore student behavior, I graphed Environment Score vs. Rate of Misconducts as a scatter plot. As environment scores rose, the rate of misconducts tended to fall. This suggests that enhancing school environments—through classroom culture, teacher training, or physical conditions—could have a direct effect on decreasing disciplinary incidents.

Together, these visualizations send a straightforward message: school climate matters. From attendance and graduation to behavior and feelings of safety, schools with stronger environments and safety measures fare better on a variety of measures. These results can inform future policy and investment decisions for improving Chicago's public schools.

**References:**

Chicago Public Schools – Progress Report Cards, 2011–2012  
<https://data.cityofchicago.org/Education/Chicago-Public-Schools-Progress-Report-Cards-2011-2/kh4r-387c>

**Acknowledgements:**

Special thanks to Howard University’s Doctor Meenakshi Nerolu for the support in this project. Analysis was completed using Python, pandas, matplotlib, and seaborn libraries.