PyCity Schools Analysis Report

Summary:

In-depth research was done on school performance data from 15 different schools, looking into a range of variables that can affect students' academic success. Important variables including reading and math scores, passing percentages, and overall student passing rates were included in the dataset. We examined these measures in connection to school size, budget per student, and school type (charter vs. district). Finding trends and patterns in student performance was intended to provide information for district-wide choices and enhancements.

Important Comparisons and Conclusions:

1. Performance Is Significantly Affected by School Type:

The results of our investigation showed that district schools and charter schools performed very differently. In every indicator that was measured, charter schools continuously outperformed district schools.

School Type	Average Math Score	Average Reading Score	% Passing Math	% Passing Reading	% Overall Passing
Charter	83.473852	83.896421	93.620830	96.586489	90.432244
District	76.956733	80.966636	66.548453	80.799062	53.672208

As seen in the aforementioned type_summary dataframe:

- District schools averaged 76.96 in math, while charter schools got an average of 83.47.
- The average reading score for charter schools was 83.90, while the district schools' average was 80.97.
- Passing Rates: Here is where the differences are much more noticeable:
    - Math: public schools' 66.55% compared to charter schools' 93.62%
    - Reading: district schools' 80.80% against charter schools' 96.59%
- Overall Passing Rate: The most noteworthy finding was that charter schools had an overall passing rate of 90.43%, which was almost twice as high as district schools' average of 53.67%.

This significant difference in performance indicates that the charter school model in this district is outperforming traditional district schools in terms of academic performance.

2. Academic achievement and School Size Are Strongly correlated:

Our research showed that there is a definite negative correlation between academic achievement and school size. In this district, smaller classrooms seem to be more supportive of student achievement.

School Size	Average Math Score	Average Reading Score	% Passing Math	% Passing Reading	% Overall Passing
Small (<1000)	83.821598	83.929843	93.550225	96.099437	89.883853
Medium (1000-2000)	83.374684	83.864438	93.599695	96.790680	90.621535
Large (2000-5000)	77.746417	81.344493	69.963361	82.766634	58.286003

This tendency is demonstrated by the size_summary dataframe above:

In every parameter, small schools (less than 1000 students) and medium-sized schools (between 1000 and 2000 students) notably outperform large schools (between 2000 and 5000 students).

- Math and Reading Scores: While large schools see a decline to 77.75 for math and 81.34 for reading, small and medium-sized schools continue to maintain average scores above 83 in both areas.
- Passing Percentages: The difference in passing rates is considerably more pronounced:
    - Math: just 69.96% for large schools, 93.55% for small schools, and 93.60% for medium schools
    - Reading: 82.77% for large schools, 96.79% for medium-sized schools, and 96.10% for tiny schools
- Overall Passing Rate: This metric shows the most dramatic difference, with small and medium schools achieving about 90% overall passing rates, compared to just 58.29% for large schools.

This trend suggests that smaller learning environments may offer advantages such as more individualized attention, stronger student-teacher relationships, or more effective classroom management. The district should consider these factors when making decisions about school sizes and resource allocation.

3. Spending Per Student Does Not Correspond with Better Performance:

The analysis revealed the surprising finding that higher per-student spending was not associated with improved academic performance. Actually, it seems that the reverse is the case.

Spending Ranges (Per Student)	Average Math Score	Average Reading Score	% Passing Math	% Passing Reading	% Overall Passing
<$585	83.455399	83.933814	93.460096	96.610877	90.369459
$585-630	81.899826	83.155286	87.133538	92.718205	81.418596
$630-645	78.518855	81.624473	73.484209	84.391793	62.857656
$645-680	76.997210	81.027843	66.164813	81.133951	53.526855

- Schools with the lowest spending range (<$585 per student) regularly outperformed schools in higher spending brackets across all parameters, as the spending_summary dataframe above demonstrates.
- The students in the highest spending bracket ($645–680 per student) performed the worst across the board.
- When per-student spending rises, overall passing rates fall, going from 90.37% in the lowest spending group to 53.53% in the highest.

This surprising pattern raises the possibility that boosting academic results may require more than just raising resources.