Introduction

As the Chief Data Scientist for our local government area, I have been tasked with analyzing the area-wide standardized test results. This analysis aims to provide a high-level snapshot of key metrics for the Local Government Area (LGA) and individual schools, allowing us to identify trends in school performance and make strategic decisions regarding future school budgets and priorities.

Local Government Area (LGA) Summary

In this section, we present a summary of key metrics for the entire Local Government Area:

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|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | student\_name | gender | year | school\_name | reading\_score | maths\_score | School ID | type | size | budget |
| 0 | Paul Bradley | M | 9 | Huang High School | 96 | 94 | 0 | Government | 2917 | 1910635 |
| 1 | Victor Smith | M | 12 | Huang High School | 90 | 43 | 0 | Government | 2917 | 1910635 |
| 2 | Kevin Rodriguez | M | 12 | Huang High School | 41 | 76 | 0 | Government | 2917 | 1910635 |
| 3 | Richard Scott | M | 12 | Huang High School | 89 | 86 | 0 | Government | 2917 | 1910635 |
| 4 | Bonnie Ray | F | 9 | Huang High School | 87 | 69 | 0 | Government | 2917 | 1910635 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |

School Summary

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| total\_school | total\_student | total\_budget | average\_math\_scores | average\_reading\_scores | percentage\_math\_pass | percentage\_reading\_pass | percentage\_both\_pass |  |
| 15 | 39,170 | $24,649,428.00 | 70.33819249425581 | 69.98013786060761 | 86.07863160582077 | 84.42685728874139 | 72.80827163645647 | |

Next, we delve into a detailed analysis of total school within the LGA. The School Summary DataFrame provides

Each school summary

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| school\_type | total\_students | total\_budget | per\_student\_budget | average\_math\_scores | average\_reading\_scores | %passing\_math | %passing\_reading | overall\_passing |
| Government | 4976 | $3,124,928.00 | 628 | 72.35 | 71.01 | 91.64 | 87.38 | 80.08 |
| Independent | 1858 | $1,081,356.00 | 582 | 71.66 | 71.36 | 90.85 | 89.07 | 80.79 |
| Government | 2949 | $1,884,411.00 | 639 | 68.70 | 69.08 | 81.65 | 82.81 | 67.65 |
| Government | 2739 | $1,763,916.00 | 644 | 69.09 | 69.57 | 82.44 | 82.22 | 67.47 |
| Independent | 1468 | $917,500.00 | 625 | 71.79 | 71.25 | 91.21 | 88.49 | 81.34 |
| Government | 4635 | $3,022,020.00 | 652 | 68.87 | 69.19 | 80.95 | 81.88 | 66.36 |
| Independent | 427 | $248,087.00 | 581 | 72.58 | 71.66 | 89.93 | 88.52 | 78.92 |
| Government | 2917 | $1,910,635.00 | 655 | 68.94 | 68.91 | 81.69 | 81.45 | 66.71 |
| Government | 4761 | $3,094,650.00 | 650 | 68.84 | 69.04 | 82.06 | 81.98 | 67.19 |
| Independent | 962 | $585,858.00 | 609 | 72.09 | 71.61 | 91.68 | 86.59 | 79.21 |
| Government | 3999 | $2,547,363.00 | 637 | 72.05 | 70.94 | 90.80 | 87.40 | 79.42 |
| Independent | 1761 | $1,056,600.00 | 600 | 72.03 | 70.26 | 91.54 | 86.71 | 78.88 |
| Independent | 1635 | $1,043,130.00 | 638 | 69.58 | 69.77 | 83.85 | 82.63 | 69.48 |
| Independent | 2283 | $1,319,574.00 | 578 | 69.17 | 68.88 | 82.79 | 81.30 | 67.46 |
| Independent | 1800 | $1,049,400.00 | 583 | 72.05 | 70.97 | 91.78 | 86.67 | 79.72 |

-Performing Schools (by % Overall Passing)

To identify the top-performing schools, we have sorted the schools by % Overall Passing in descending order. The top 5 schools are:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| school\_type | total\_students | total\_budget | per\_student\_budget | average\_math\_scores | average\_reading\_scores | %passing\_math | %passing\_reading | overall\_passing |
| Independent | 1468 | $917,500.00 | 625 | 71.79 | 71.25 | 91.21 | 88.49 | 81.34 |
| Independent | 1858 | $1,081,356.00 | 582 | 71.66 | 71.36 | 90.85 | 89.07 | 80.79 |
| Government | 4976 | $3,124,928.00 | 628 | 72.35 | 71.01 | 91.64 | 87.38 | 80.08 |
| Independent | 1800 | $1,049,400.00 | 583 | 72.05 | 70.97 | 91.78 | 86.67 | 79.72 |
| Government | 3999 | $2,547,363.00 | 637 | 72.05 | 70.94 | 90.80 | 87.40 | 79.42 |

Lowest-Performing Schools (by % Overall Passing)

Similarly, we have sorted the schools by % Overall Passing in ascending order to identify the lowest-performing schools. The bottom 5 schools are:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| school\_type | total\_students | total\_budget | per\_student\_budget | average\_math\_scores | average\_reading\_scores | %passing\_math | %passing\_reading | overall\_passing |
| Government | 4635 | $3,022,020.00 | 652 | 68.87 | 69.19 | 80.95 | 81.88 | 66.36 |
| Government | 2917 | $1,910,635.00 | 655 | 68.94 | 68.91 | 81.69 | 81.45 | 66.71 |
| Government | 4761 | $3,094,650.00 | 650 | 68.84 | 69.04 | 82.06 | 81.98 | 67.19 |
| Independent | 2283 | $1,319,574.00 | 578 | 69.17 | 68.88 | 82.79 | 81.30 | 67.46 |
| Government | 2739 | $1,763,916.00 | 644 | 69.09 | 69.57 | 82.44 | 82.22 | 67.47 |

Maths Scores by Year

This section presents the average math scores for students in each year level (9, 10, 11, 12) at each school. The Maths Scores by Year DataFrame shows the following data:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | 9 | 10 | 11 | 12 | | Bailey HighSchool | 72.49382716 | 71.8975 | 72.3749 | 72.67509728 | | Cabrera High School | 72.3219697 | 72.43777 | 71.0083 | 70.60471204 | | Figueroa High School | 68.47780374 | 68.33159 | 68.811 | 69.3252818 | | Ford High School | 69.02160864 | 69.38701 | 69.24886 | 68.61781076 | | Griffin High School | 72.78973105 | 71.0936 | 71.69252 | 71.46917808 | | Hernandez High School | 68.58683068 | 68.86716 | 69.15441 | 68.98507463 | | Holden High School | 70.54330709 | 75.10526 | 71.64078 | 73.40963855 | | Huang High School | 69.08175355 | 68.53325 | 69.43135 | 68.63931624 | | Johnson High School | 69.46928571 | 67.99022 | 68.63773 | 69.28739316 | | Pena High School | 71.99636364 | 72.396 | 72.52344 | 71.1878453 | | Roddriguez High School | 71.94072165 | 71.77981 | 72.36481 | 72.15462611 | | Shelton High School | 72.93207547 | 72.5067 | 70.09709 | 72.33153639 | | Thomas High School | 69.23427332 | 70.05701 | 69.65783 | 69.36982249 | | Wilson High School | 69.21236133 | 69.45545 | 68.37896 | 69.78747204 | | Wright High School | 71.74117647 | 72.17901 | 73.27586 | 70.84823848 | |  |  |  |  |

Reading Scores by Year

Similarly, the Reading Scores by Year DataFrame lists the average reading scores for students in each year level (9, 10, 11, 12) at each school.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| school\_name | 9 | 10 | 11 | 12 |
| Bailey High School | 70.90192 | 70.84826 | 70.31735 | 72.19553 |
| Cabrera High School | 71.17235 | 71.32833 | 71.20124 | 71.85602 |
| Figueroa High School | 70.26168 | 67.67759 | 69.15233 | 69.08213 |
| Ford High School | 69.61585 | 68.9887 | 70.73596 | 68.84972 |
| Griffin High School | 72.02689 | 70.74631 | 72.38504 | 69.43493 |
| Hernandez High School | 68.47757 | 70.62184 | 68.4182 | 69.24414 |
| Holden High School | 71.59843 | 71.09649 | 73.31068 | 70.48193 |
| Huang High School | 68.67062 | 69.5163 | 68.74064 | 68.67179 |
| Johnson High School | 68.71929 | 69.29503 | 69.96912 | 67.99252 |
| Pena High School | 70.94909 | 72.324 | 71.70313 | 71.51381 |
| Rodriguez High School | 70.90292 | 70.1375 | 71.42445 | 71.41445 |
| Shelton High School | 70.71509 | 69.87946 | 71.15049 | 69.07008 |
| Thomas High School | 69.67245 | 69.74109 | 70.7494 | 68.73077 |
| Wilson High School | 68.68304 | 68.41254 | 68.79633 | 69.88814 |
| Wright High School | 71.82353 | 71.38683 | 70.47586 | 69.82114 |

Scores by School Spending

We have categorized school performance based on average spending ranges per student. The following spending ranges have been used:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Spending Ranges (Per Student) | average\_math\_scores | average\_reading\_scores | %passing\_math | %passing\_reading |
| < $585 | 71.36 | 70.72 | 88.84 | 86.39 |
| $585 - $630 | 72.06 | 71.03 | 91.52 | 87.29 |
| $630 - $645 | 69.86 | 69.84 | 84.68 | 83.76 |
| $645 - $680 | 68.88 | 69.05 | 81.57 | 81.77 |

Scores by School Size

In this section, we have classified schools based on their size into three categories: Small (<1000), Medium (1000-2000), and Large (2000-5000). The Scores by School Size DataFrame provides the following insights:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| school\_size | average\_math\_scores | average\_reading\_scores | %passing\_math | %passing\_reading |
| < 1000 | 72.34 | 71.63 | 90.8 | 87.56 |
| 1000 - 2000 | 71.42 | 70.72 | 89.85 | 86.71 |
| 2000 - 5000 | 69.75 | 69.58 | 84.25 | 83.3 |
|  |  |  |  |  |

Scores by School Type

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| school\_type | average\_math\_scores | average\_reading\_scores | %passing\_math | %passing\_reading |  |
| Government | 69.83429 | 69.67714 | 84.46143 | 83.58857 |  |
| Independent | 71.36875 | 70.72 | 89.20375 | 86.2475 |  |

Conclusion

Based on the data analysis, we can observe the following trends:

1. The smaller the school size is, the higher performance students have.
2. The students from the independent schools had a significantly higher mean achievement than those from the government schools,

The above analysis will help the school board and mayor make informed decisions regarding school budgets and priorities for the Local Government Area.