Task 2: Student Performance Analysis

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**Problem statement**

This task requires a data visualization dashboard to represent key metrics and trends. The dataset proposes research questions in regards to the student performance to mathematics, reading, and writing exams considering multiple factors such as gender, parental educational background, preparations for the test, quality and magnitude of meals, and racial or ethnic groups (A through E).

**Datasets**

The dataset was acquired from [Kaggle](https://www.kaggle.com/datasets/spscientist/students-performance-in-exams/data) as a hypothetical or fictional source that is purely for educational purposes. The dataset requires a few research questions to be answered through data wrangling and processing in addition to the visualization phase:

1. How effective is the test preparation course?
2. Which major factors contribute to test outcomes?
3. What would be the best way to improve student scores on each test?
4. What patterns and interactions in the data can you find? Let me know in the comments section below.

**Details**

File Name: StudentsPerfomance.csv

Size: 70.3 kB

Source: [Kaggle\_Source](https://www.kaggle.com/datasets/spscientist/students-performance-in-exams/data)

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| --- | --- | --- | --- |
| Column Name | Type | Description | Categories |
| Gender | String | The gender of the student | Female/Male |
| Race/Ethnicity | String | The racial background of the student categorized into 5 groups | Group A through E |
| Parental Level of Education | String | The educational background of the student’s parents | Associate’s, Bachelor’s, Master’s, high school, some college, some high school |
| Lunch | String | The quality and quantity of the lunch rations for the student s based on the living wages of their parents | Standard, free/reduced |
| Test Preparation Course | String | Whether the student has taken a preparation course for the tests or not | None, completed |
| Math Score | Integer | The total score for the math test | 0 - 100 |
| Reading Score | Integer | The total score for the reading test | 0 - 100 |
| Writing Score | Integer | The total score for the writing test | 0 - 100 |

**Analysis**

**Data Cleaning**

The csv file contains a clean datasheet made from hypothetical data for practice purposes.

**EDA**

From initial explorations, the race/ethnicity group A is 8.9% of the dataset, where 60% is male and 40% is female. Group B is 19% of the total dataset, where 45% is male and 55% is female. Group C is 31.9% of the dataset where 43.6% of group C is male and 56.4% is female. Group D is 26.2% of the dataset, where 50.7% was male and 49.3% was female. Finally, group E is 14% of the dataset where 50.7% is male and 49.3% is female.

When exploring the parental education of the students, six main degrees were considered in categories: associate's degree, bachelor's degree, high school, master's degree, some college, and some high school. The associates degree is 22.2% of the total student data set the bachelor's degree is 11.8%, the high school's degree is 19.6% the master's degree is 5.9% parents with some college background cover 22.6% and lastly parents with some high school background cover 17.9%. the male to female ratio is approximately 50/50.

When exploring the lunch category; meaning whether the parents living wages allow for a full standard meal or a free/reduced meal, group A scored the lowest percentage and both male and female statistics whereas group C scored the highest in standard lunch followed by a group D standard lunch. The highest percentage of free or reduced lunch is also in group C.

Another category that was explored is the test preparation course where the students are given the option to either take test preparation courses before the official test or not and the statistics show that 64.2% of the students did not take the test preparation course whereas 35.8% of the students have.

Lastly, the average math scores reading scores and writing scores were taken and the scores range from 63.6 to 72.6 with females and 63.3 to 68.7 in males. The chart shows that females score higher in reading and writing whereas the male group scored higher in math.

The analysis is more apparent when the average scores is paired with the gender of the students as well as their test preparation courses. Generally stating, females and males have been able to score higher grades when they have completed their test preparation courses.