

# Student Performance Project Documentation

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## 1. Summary -

This project studies student exam performance using data from 1,000 students. Each student has scores in math, reading, and writing, along with background information such as gender, parental education, lunch type, and test preparation status.

The average math score is 66, the average reading score is 69, and the average writing score is 68 (out of 100). This shows that students, on average, perform slightly better in reading and writing than in math.

By carefully analyzing numerical averages, score ranges, and group-wise comparisons, this document

explains what the data shows in simple terms, why the patterns exist, and how these insights can be useful for educators and decision-makers.

## 2. Problem Statement and Objectives-

### Problem Statement:

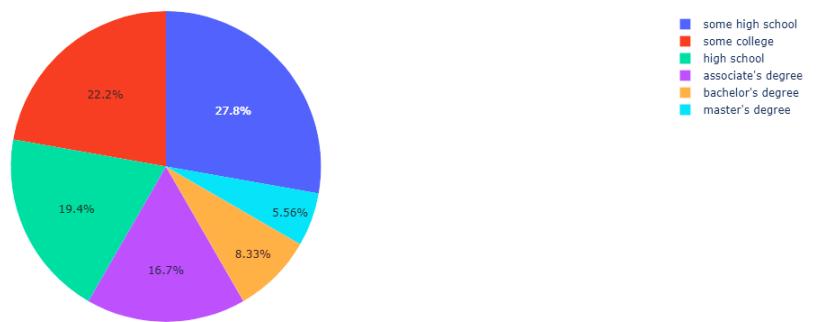
Educational institutions often collect large volumes of student data but struggle to convert it into actionable insights. Without proper analysis, it becomes difficult to identify performance gaps, design effective support, or allocate educational resources efficiently.

### Objectives:

- To analyze overall student performance across math, reading, and writing (or other subjects).

- To examine how demographic and socio-economic factors influence scores.
- To identify patterns that can inform academic support strategies.
- To present findings in a transparent and interpretable manner.

Distribution of Parental Education (Females – Group A)

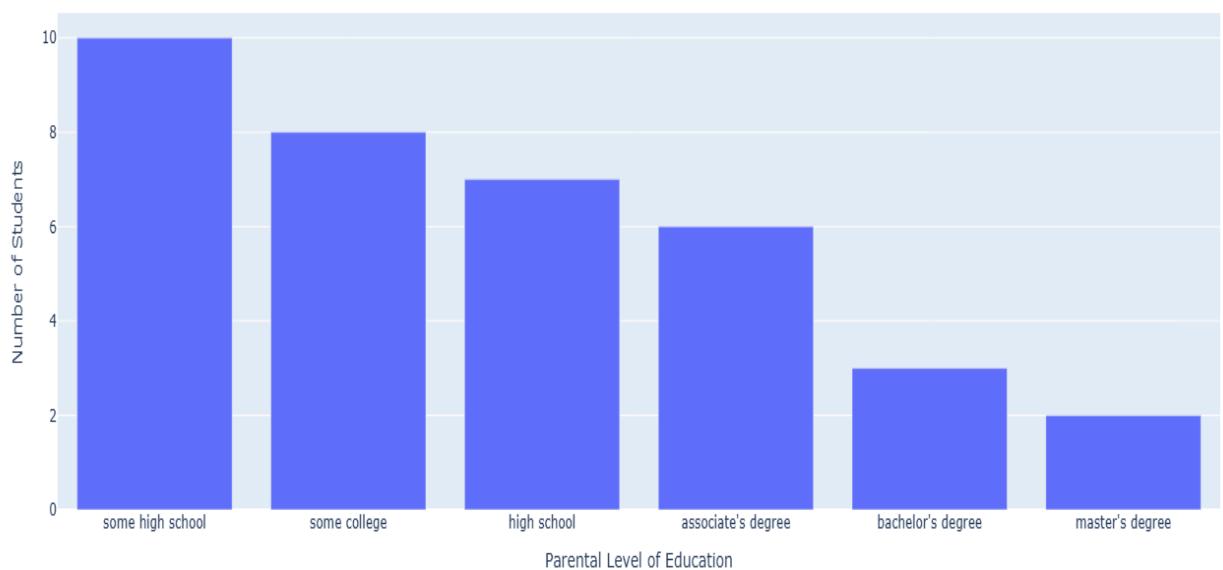


This data shows the Education qualification of parents belongs to Group-A of Females.

Why females not males? because we saw in the data that females are more efficient in academics than

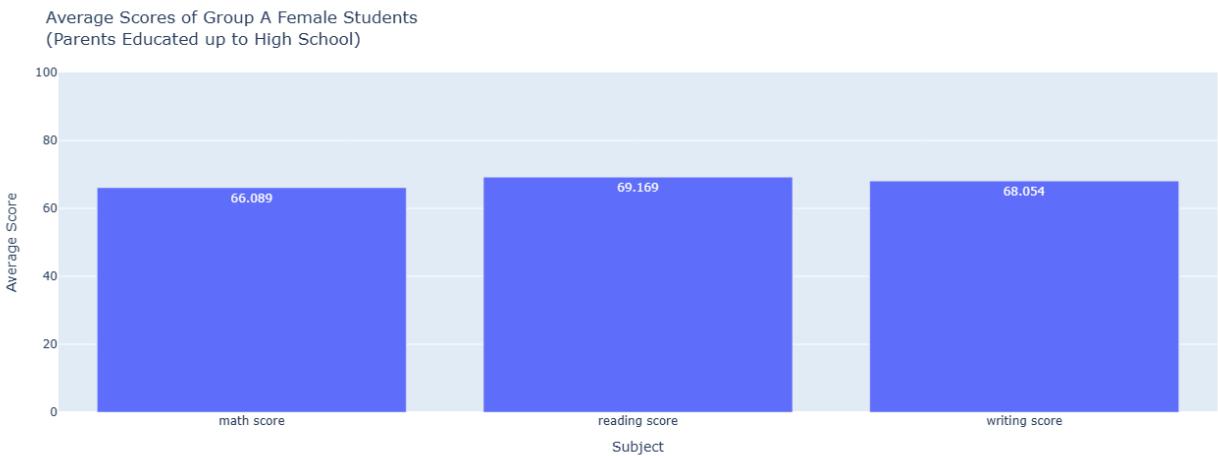
males. Now, here i think let's find out the females parents qualification.

Parental Education Levels of Female Students (Group A)



From above chart i can analyze that Parent Belongs to Group-A studied up-to only High School that are more in number as compared to others.

=> Now, from this data i can find out the education qualification of Girls from Group-A Whose parents studied up-to high school.



Here is the data of Group-A females Average scores whose parents studied up-to high school.

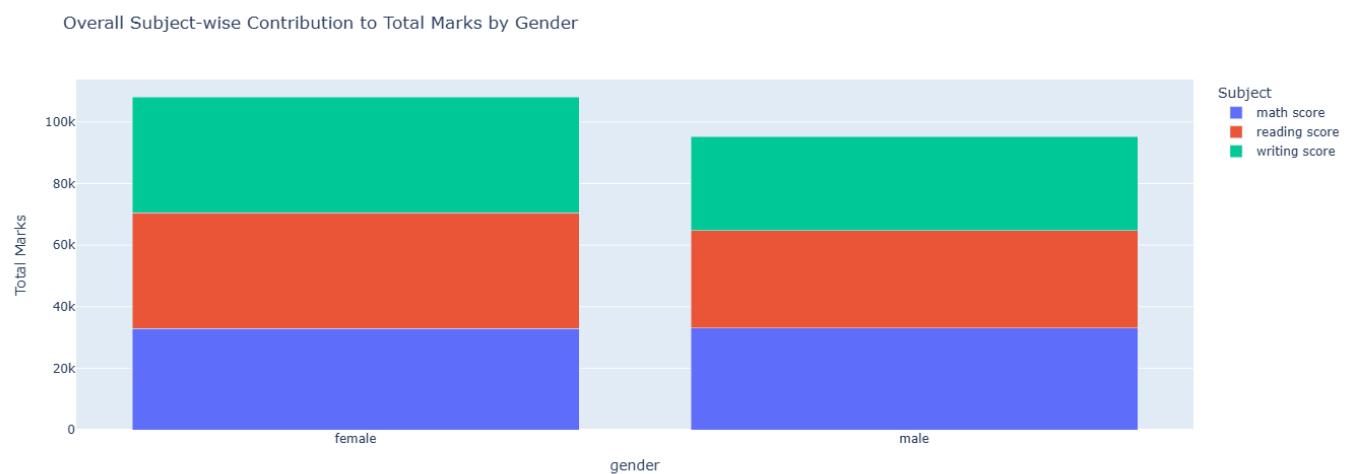
Means: Females performing Average, whose parents qualification is high school (Group-A).

### 3. Data Quality and Preprocessing-

Before the analysis, the data was checked to make sure it was good quality. There were no missing values and no duplicate records, so the data was complete. The data types were also checked to make sure categories

and numbers were correct. Only a small amount of data cleaning was needed. This means the results are reliable and not affected by data cleaning or guessing missing values.

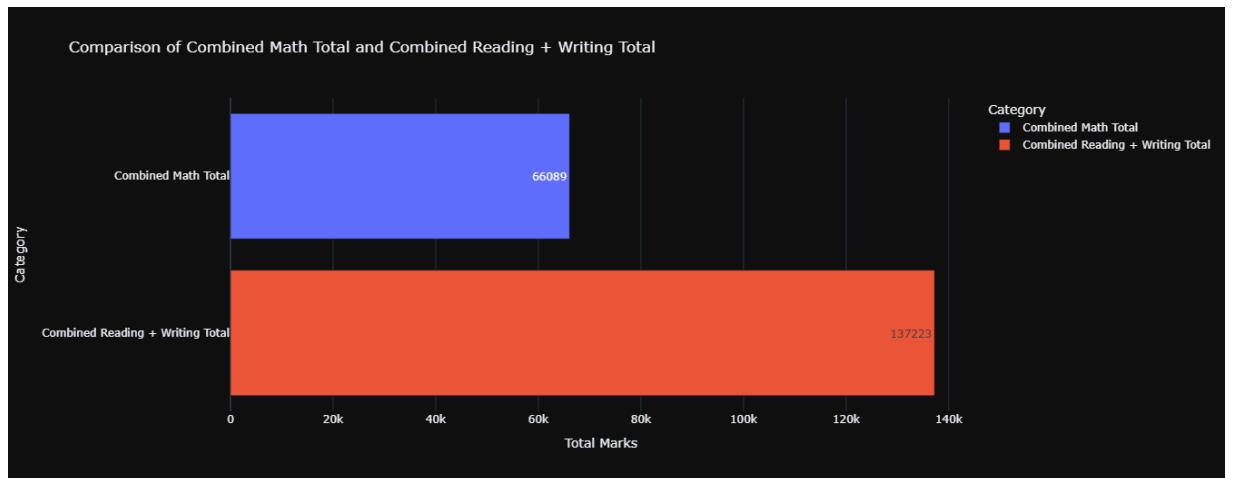
#### 4. Overall Performance Analysis-



This chart compares total marks of males and females in math, reading, and writing.

- Female students have higher total marks than male students.

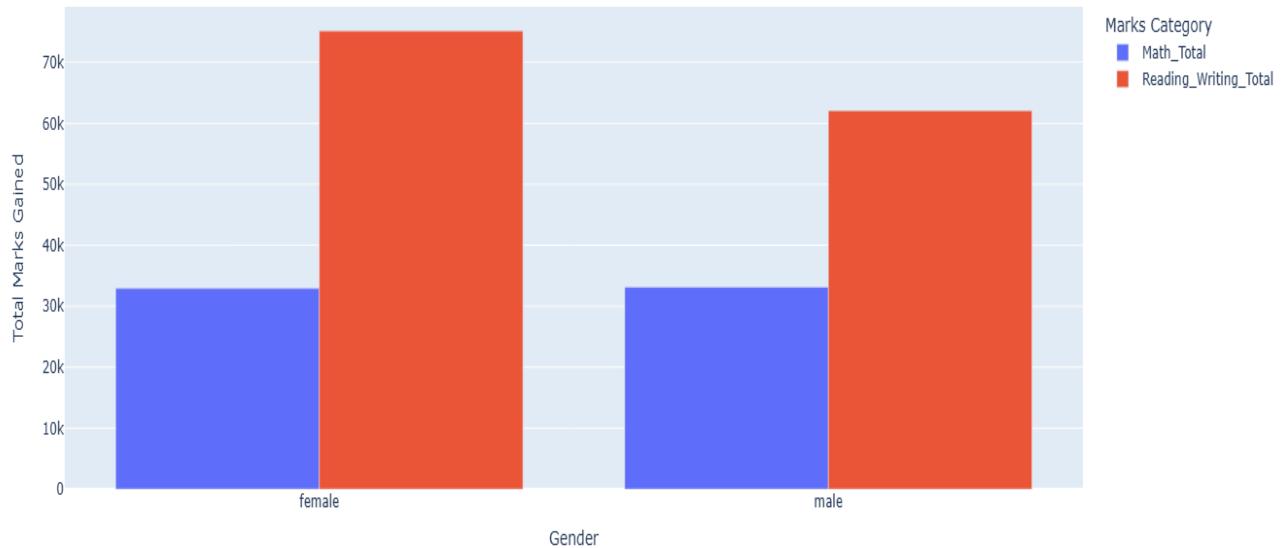
- Females score much better in reading and writing.
- Math scores are almost the same for both genders.
- Overall, females perform better mainly because of higher reading and writing scores.



- This tells us that math is the most difficult subject for many students, and it is the area where extra support is most needed.

## 5. GenderBased Performance Analysis-

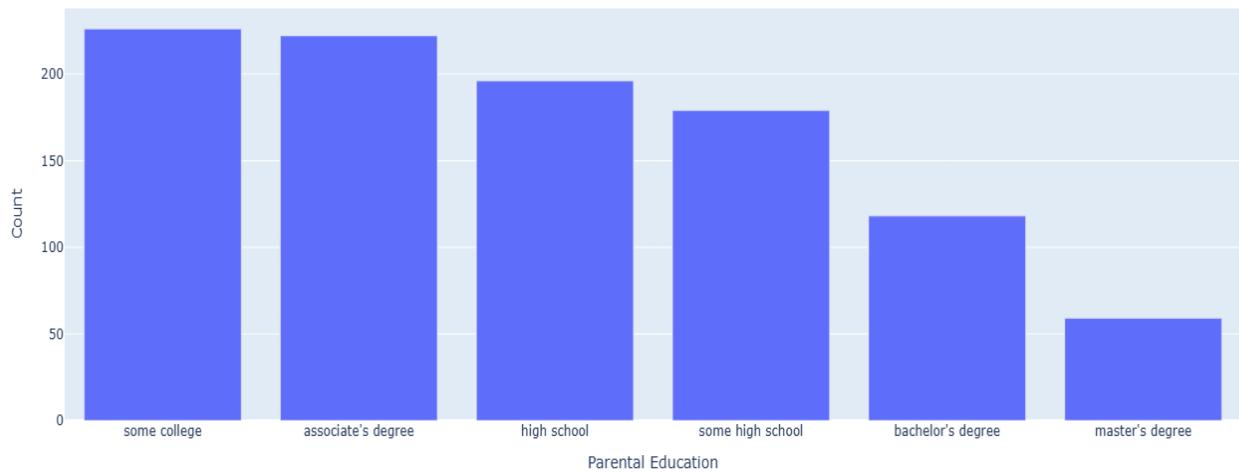
Total Marks by Gender: Math vs Reading + Writing



- Females perform best in Reading and Writing Subject than Males.
- Both males and females perform same in Maths subject.
- Overall Females perform best than Males.

## 6. Impact of Parental Education Level-

Parental Level of Education Distribution



This graph shows how student scores change based on parents' education level.

As, we seen before about females scores impact on Parental Education Qualification.

From the graph: Students whose parents completed high school score around 63–65.

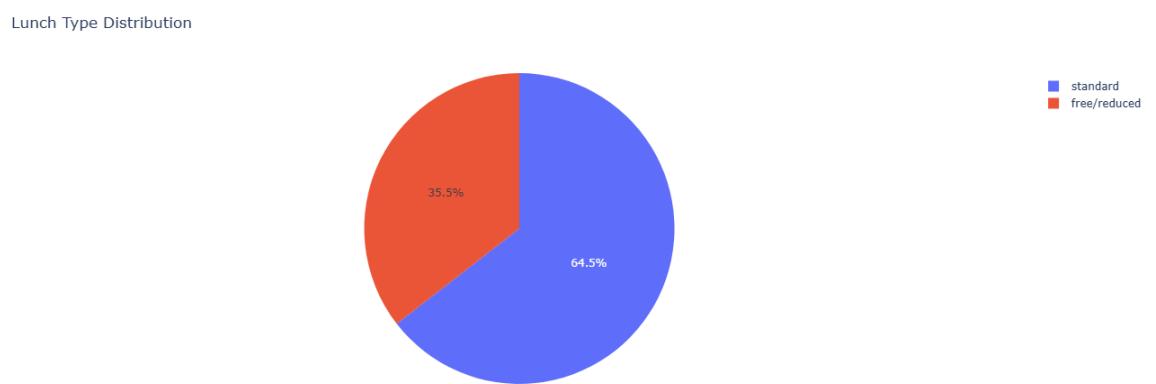
Students whose parents have a master's degree score around 72–75.

This is a difference of about 8–10 points.

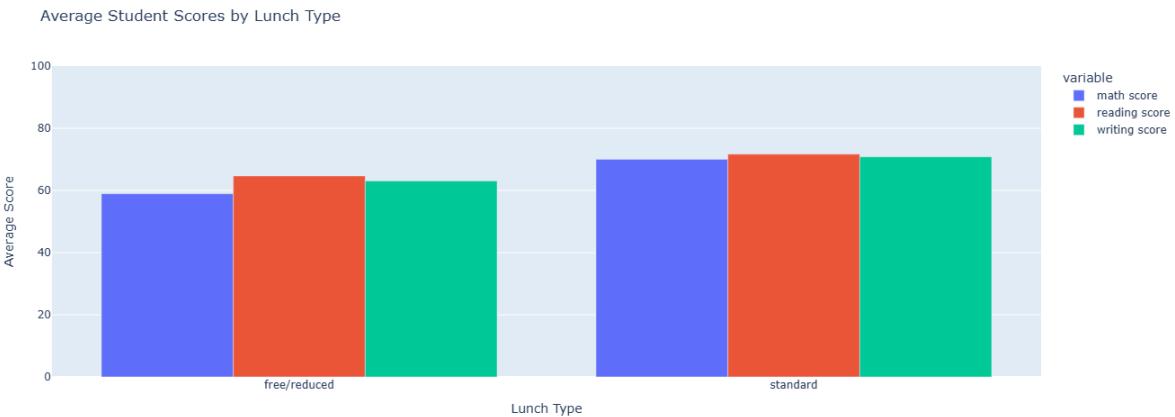


The graph clearly shows that as parental education level increases, student scores also increase. This may be because parents with more education can provide better learning support at home. However, this only shows a relationship, not direct cause.

## 7. Socioeconomic Influence: Lunch Type-



will effect the student prefers free/reduced Lunch



This graph compares student scores based on lunch type.

From the Graph:

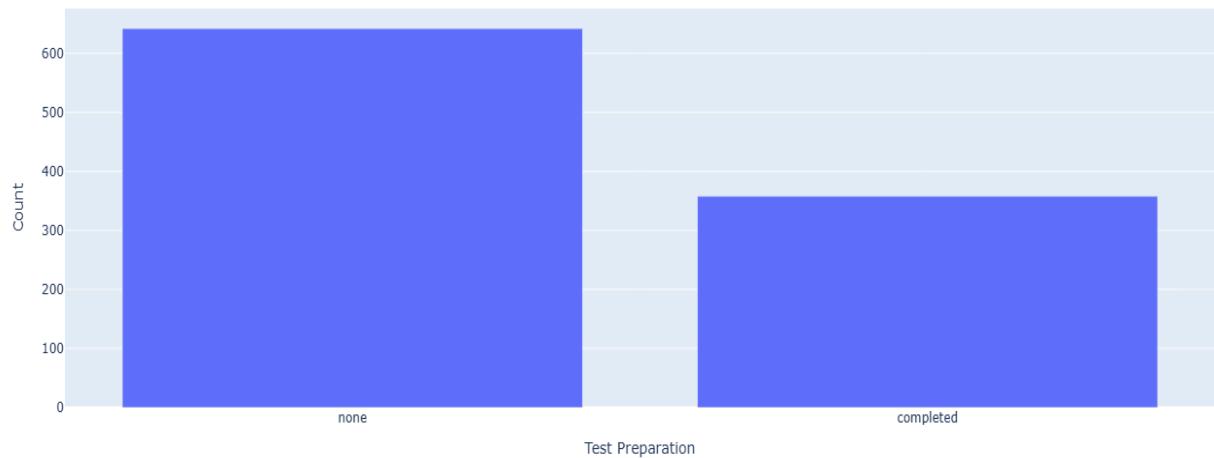
- Students with standard lunch score around 70–72.
- Students with free or reduced lunch score around 62–64

This shows a difference of about 7–8 points.

Lunch type is often linked to family income. The graph helps us understand that economic background can affect academic performance, but it does not define a student's ability or intelligence.

## 8. Effect of Test Preparation Courses-

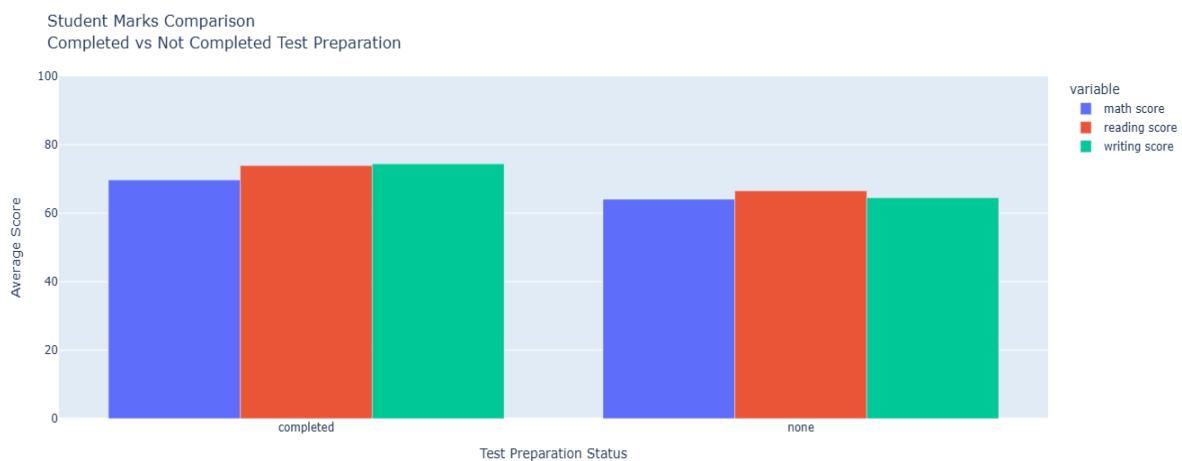
Test Preparation Course Participation



This graph shows the impact of test preparation courses on student scores.

Students who completed the test preparation course scored:  
69 in math, 74 in reading, 74 in writing. Students.

who did not complete the course scored:  
64 in math, 66 in reading, 65 in writing.



This shows an improvement of 5 to 9 points for students who completed the course. The graph clearly shows that test preparation helps students perform better, especially in math.

## 9. Key Insights-

Average math score: 66 (lowest among subjects)

Average reading score: 69 (highest among subjects).

Test preparation improves scores by up to 9 points.

Standard lunch students score 7–8 points higher on average.

Higher parental education links to 8–10 point score increases.

## 10. Limitations-

This analysis only uses exam scores and basic background data. It does not include teaching quality, study time, mental health, or school

infrastructure. Also, all results show relationships, not cause-and-effect.

## Conclusion-

Using clear numbers and simple explanations, this analysis shows how different factors relate to student performance. The findings help readers clearly understand where students struggle, what helps them improve, and how data can support better educational decisions.