



STUDENTS PERFORMANCE ANALYSIS PROJECT

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OBJECTIVE

Our goal was to analyze a dataset of student performance to identify key factors influencing academic achievement. By doing so, we aimed to understand trends related to demographics, parental education, socioeconomic status, test preparation, and their impact on student scores across different subjects.

PROBLEM STATEMENT

Understanding the factors that influence student academic performance is crucial for educators and policymakers. We sought to answer key questions such as:

- ✓ What is the impact of parental education  on student scores?
- ✓ How does the completion of a test preparation course  affect performance?
- ✓ Are there significant performance differences across gender   and racial/ethnic groups ?
- ✓ Does socioeconomic status (as indicated by lunch type ) play a role in academic achievement?
- ✓ What are the key correlations between scores in different subjects ?

METHODOLOGY



Our project involved four major steps:

- ① Data Cleaning & Processing
(Python/Pandas)
- ② Exploratory Data Analysis (EDA) &
Visualization
(Python/Matplotlib/Seaborn)
- ③ SQL Analysis (MySQL)
- ④ Statistical Analysis
(Python/SciPy/StatsModels)

KEY INSIGHTS



After performing EDA, SQL analysis, and statistical analysis, here are some key insights we discovered:

- **Gender Differences ♂ ♀:**
 - Females tend to score higher in Reading 📖 and Writing 📝, while males have a slight advantage in Math ✎.
- **Parental Education Impact 🎓:**
 - Higher levels of parental education are strongly correlated with better student performance across all subjects.
- **Race/Ethnicity Group Differences 🌎:**
 - Significant performance variations exist among racial/ethnic groups, with Group E showing the highest averages and Group A the lowest.
- **Lunch Type 🍎:**
 - Students with standard lunch generally outperform those with free/reduced lunch.
- **Test Preparation Course 📄:**
 - Completion of the test preparation course is associated with higher scores in all subjects.
- **Correlation Between Subjects 📈:**
 - Strong positive correlations exist between Math ✎, Reading 📖, and Writing 📝 scores.

PROBLEMS IDENTIFIED

During our analysis, we identified several key problems and areas of concern:

- **Performance Gaps by Demographics **:

 - Significant differences in performance based on gender  .

- **Impact of Lack of Test Preparation **:

 - Students who did not complete the test preparation course tend to perform at a lower level.

- **Influence of Parental Education **:

 - Students whose parents have lower levels of education face a potential disadvantage.

- **Score Variability  **:

 - A wide range in scores indicates varying levels of academic preparedness and potential disparities in support.

ACTIONABLE RECOMMENDATIONS

Based on our analysis, we recommend the following:

- **Targeted Academic Support Programs** :
 - Implement programs focused on underperforming demographic groups and students without test preparation.
- **Parental Engagement Initiatives** :
 - Develop strategies to involve parents, especially those with lower educational backgrounds, in their children's academic journey.
- **Expand Access to Test Preparation** :
 - Increase the availability and encourage participation in test preparation courses.
- **Socioeconomic Support** :
 - Provide resources and support to students from lower socioeconomic backgrounds.
- **Early Identification and Intervention** :
 - Utilize data to identify at-risk students early and provide timely support.
- **Continuous Monitoring and Evaluation** :
 - Regularly track the effectiveness of implemented programs and make data-driven adjustments.

CONCLUSION

To summarize, our project analyzed student performance data to identify key factors influencing academic achievement across various demographic and socioeconomic categories. Our findings highlight significant disparities and provide a foundation for targeted interventions.

FUTURE SCOPE



- ★ Integrate additional data sources such as attendance records 📆, extracurricular activities 🏷️, and teacher feedback 🤷.
- ★ Develop predictive models 🤖 to identify students at high risk of underperformance.
- ★ Create an interactive dashboard 🖥️ for educators and administrators to visualize student performance and the impact of interventions.
- ★ Explore the impact of specific teaching methodologies 🍎📘 on student outcomes.



Thank you for your time!

We hope you found our analysis
insightful and the
recommendations valuable.