Student Performance Analysis Report

Introduction

This report presents an analysis of student performance based on a dataset containing information about 200 students. The dataset includes variables such as age, study hours, previous GPA, extracurricular activities, final grade, gender, and family income. The analysis aims to explore relationships between these variables and identify key factors influencing academic performance.

Data Summary

The dataset comprises 200 student records with no missing values. Key statistical measures for the 'final_grade' variable are:

- Mean: 47.77
- Median: 47.5
- Standard Deviation: 30.866

Key Findings

1. Relationship between Study Hours and Final Grade:

The scatter plot visualizing the relationship between study hours and final grade suggests a weak negative correlation. This indicates a slight tendency for students who spend more time studying to achieve lower final grades, although the relationship is very weak and potentially insignificant. Further investigation and statistical testing might be needed to confirm this relationship.

2. Impact of Family Income on Academic Performance:

The bar plot illustrating the average final grade across different income quartiles reveals no significant relationship between family income and academic performance. The average final grades remain consistent across income levels, implying that family income may not be a primary factor influencing academic success.

3. Grade Differences between Genders:

The box plot comparing final grade distributions for males and females demonstrates minimal differences in academic performance based on gender. Both groups exhibit similar median grades, variability, and overlap in their distributions. This suggests that gender does not substantially influence academic outcomes in this dataset. However, statistical testing would be necessary to validate these observations statistically.

4. Relationship between Extracurricular Activities and Academic Performance:

The violin plot examining the distribution of final grades across different levels of extracurricular activities indicates no strong relationship between the two. Median grades and grade distributions remain relatively consistent regardless of the number of extracurricular activities. This implies that extracurricular involvement does not significantly impact final grades, either positively or negatively.

Conclusion

Based on the analysis, there is no evidence to suggest that family income, gender, or extracurricular activities significantly impact academic performance. Study hours seem to have a weak negative correlation, requiring further exploration.