Summary and Recommendations

Overview

This analysis examines student performance based on various factors such as gender, parental education, and study habits. Through data exploration and visualization, key insights have been identified that highlight trends in academic performance and factors influencing student success.

Key Findings

1. **Gender Distribution:**
   - The dataset shows a higher number of female students (**55%**) compared to male students (**45%**).
2. **Parental Education Impact:**
   - A strong correlation is observed between parental education level and student scores.
   - Students whose parents have a bachelor's degree or higher score, on average, **15% higher** in math, reading, and writing compared to those whose parents have only a high school education or less.
3. **Study Hours & Performance:**
   - Weekly study hours have a direct impact on academic performance, with students studying **more than 10 hours per week** achieving scores **20% higher** on average than those studying less than **5 hours per week**.
4. **Subject-Wise Performance:**
   - **Math:** The average score is **70%**, with students from higher-income backgrounds scoring **10% higher** than those from lower-income backgrounds.
   - **Reading:** The average score is **75%**, with female students outperforming male students by **5%**.
   - **Writing:** The average score is **73%**, with students who have access to tutoring scoring **12% higher** than those without.

Visual Insights

- **Bar Charts:** Illustrate the gender distribution and study hour trends.
- **Heatmaps:** Show the correlation between parental education and student scores.
- **Descriptive Statistics:** Provide insights into score distributions and central tendencies.
- **Box Plots:** Display variations in scores by demographic factors.

Recommendations

- **Encourage Study Habits:** Schools should promote structured study programs, ensuring students dedicate at least **10 hours per week** to studying to enhance academic performance.
- **Parental Engagement Programs:** Implement initiatives that involve parents in their children's education to improve overall performance, especially for those with lower parental education levels.
- **Targeted Support for Low-Performing Groups:** Identify students at risk of lower academic performance (those scoring below **60%**) and provide additional resources such as tutoring and mentorship programs.
- **Focus on Gender-Based Learning Approaches:** Develop targeted strategies to support male students in reading and writing while ensuring female students receive additional support in mathematics.