**STUDENT PERFORMANCE ANALYSIS**

1. **Introduction:**

Mathematics, a foundational pillar in education, is critical for a student's academic and professional trajectory. This study dives deep into the multifaceted factors influencing mathematics performance among high school students. Examining a range of variables - from socio-economic backgrounds and parental education levels to personal habits and school environments - aims to shed light on the complex dynamics shaping a student's proficiency in mathematics. Utilizing MySQL for intricate data analysis and Tableau for insightful data visualization, this research seeks to unravel these diverse factors' interdependencies and singular impacts. The findings will guide educators, policymakers, and parents in creating more effective, evidence-based strategies to enhance mathematics education. In an era where data-driven decisions are paramount, this study is a testament to the power of combining rigorous data analysis with advanced visualization tools to understand and improve educational outcomes.

1. **Problem Statement:**

Determining factors affecting students' math performance is complex. Traditional research often overlooks the interaction between personal, familial, and institutional influences. This study addresses this gap by analyzing a range of variables, aiming to provide a more holistic understanding. It seeks to inform educational strategies and policies, improving their effectiveness by considering this multifaceted nature.

1. **Objectives:**

Analyze the dataset to identify significant factors directly impacting students' math grades. Investigate the interplay between variables, such as personal habits, family background, and school environment, and their influence on math performance. Utilize MySQL for comprehensive data analysis, ensuring accuracy and depth in examining the dataset. Employ Tableau for effective data visualization, facilitating a more precise understanding and communication of complex relationships within the data. Understand how these influencing factors vary across student demographics, including age, gender, and socioeconomic status.

1. **Scope of the Study:**

Focused on high school students, this study examines various factors affecting math performance. While offering detailed insights, it acknowledges limitations like regional specificity and potential unaccounted variables due to data constraints. Though robust within its context, the findings might not be universally applicable.

1. **Significance of the Study:**

This study's importance goes beyond just academic interest. It offers practical benefits for education professionals. Pinpointing the main factors affecting students' math grades gives teachers, school leaders, and policymakers valuable information. This information can help create better teaching methods, improve educational resource use, and lead to policies that meet students' specific needs. Understanding these factors is vital to reducing educational inequalities and ensuring all students have the same opportunities, regardless of their background. Additionally, the study helps parents understand their children's educational needs and how to support them. In a time when education greatly influences students' future careers and their role in society, this research provides a guide for improving math education and enhancing students' future opportunities.

1. **Methodology:**
   1. **Data Collection and Management:**

The dataset, encompassing a range of student-related variables, was managed using MySQL. This database management system was chosen for its efficiency and effectiveness in handling and querying large volumes of data, ensuring the integrity and accuracy of the data analysis process.

* 1. **Data Visualization:**

Tableau was used to present the data. This tool is crucial for turning complex data sets into clear, understandable, and insightful visual representations. It helps quickly identify trends and relationships between different variables in the dataset.

* 1. **Interpretation and Application:**

The study carefully interprets the data to understand the impact of various factors on students' performance in mathematics. These interpretations form the basis for the study's conclusions and recommendations, which are geared towards educators, policymakers, and other stakeholders in the educational sector.

1. **Conclusions**

* Male students have higher average grades (10.91) than female students (9.97), indicating a gender gap in academic performance.
* Increased study time correlates with higher grades, particularly for students studying over 5 hours weekly, with average grades of 11.40 and 11.26 for 5-10 hours and over 10 hours, respectively.
* Alcohol consumption shows a complex relationship with academic performance without a clear linear trend.
* Students with one absence have an unusually high average grade of 13.00, suggesting non-linear effects of absenteeism on grades.
* Students with parents having higher education levels achieve higher average grades, above 11.65.
* Students from smaller families (three or fewer members) have slightly higher average grades (11.00) than those from larger families.
* Parental job combinations, like health and services, are associated with higher student grades (average of 12.4).
* Internet access at home is linked to higher average student grades (10.6170) compared to those without internet (9.4091).
* Average grades vary between schools, with students from GP school averaging 10.49 compared to 9.8478 at MS school.
* Higher health status and better family relationship quality correlate with increased academic performance.
* Participation in extracurricular activities is associated with slightly higher student grades (10.4876).
* Attending extra paid classes relates to higher average grades (10.9227) than students who do not attend such classes (9.9860).
* Students not in romantic relationships have higher average grades (10.8365) than those in relationships (9.5758).
* A balanced social life, remarkably rated 2 and 5, correlates with higher average grades (11.1942 and 11.3000, respectively).

1. **Recommendations**

* Develop targeted support programs to address the academic performance gap between male and female students, focusing on areas where females may be underperforming.
* Encourage and facilitate longer study hours through structured study programs and support, as increased study time is correlated with higher grades.
* Implement counselling and educational programs about responsible alcohol use, understanding its complex relationship with academic performance.
* Investigate the underlying reasons for student absences and address these through tailored support strategies, considering the non-linear impact of absenteeism on grades.
* Enhance engagement with parents, especially those with lower educational backgrounds, to foster a supportive home learning environment.
* Offer resources and guidance to students from more prominent families, recognizing potential challenges.
* Ensure equitable access to internet resources for all students, given the positive impact of internet access on academic performance.
* Address environmental and resource disparities between schools to provide an equitable educational experience for all students.
* Integrate health and wellness programs into the school curriculum, considering the positive correlation between good health and academic performance.
* Promote and facilitate extracurricular activities, recognizing their role in enhancing academic performance.
* Support the availability of extra paid classes for students who might benefit from additional academic assistance.