# Student Database

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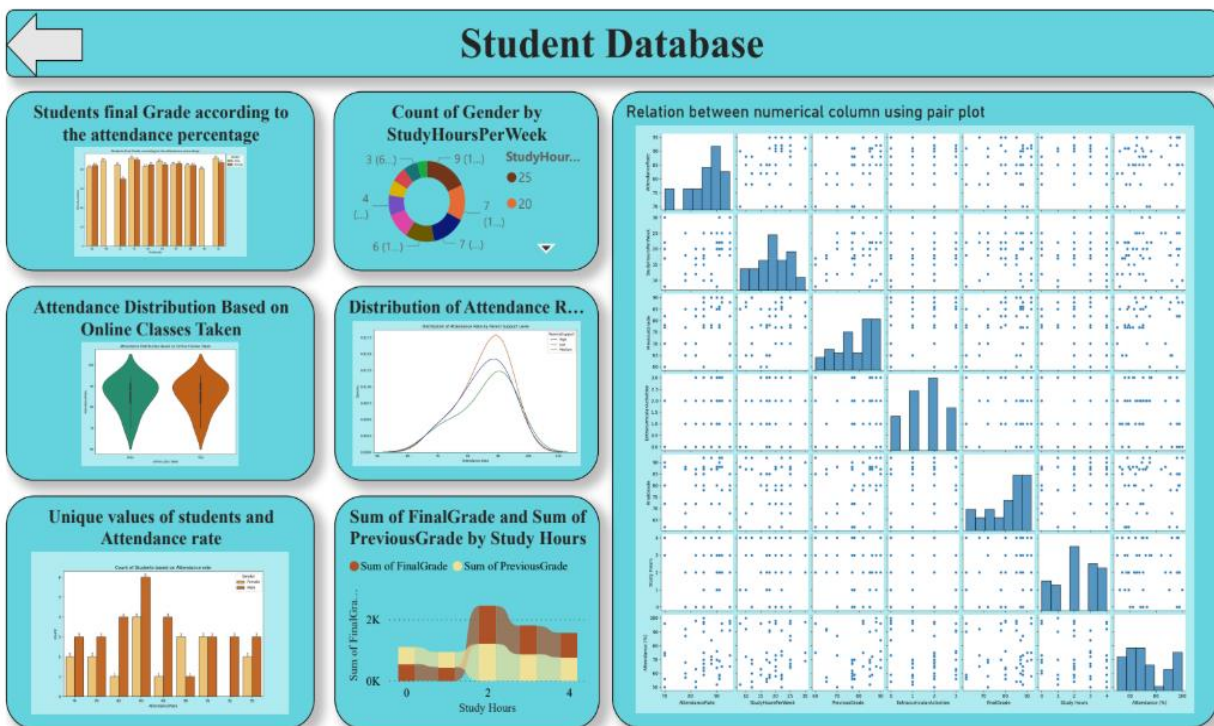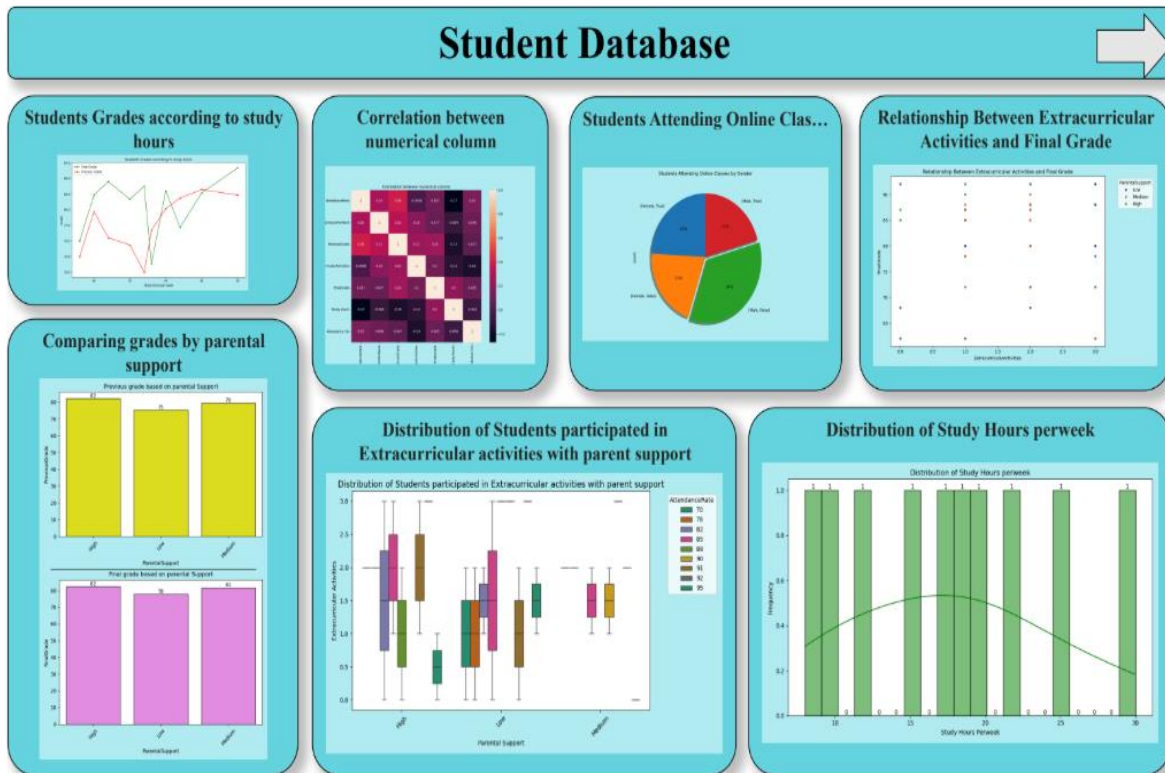- Recommendation for Students Developments
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## Introduction:

In this project, a dataset sourced from Kaggle was initially imported into Google Colab, where it underwent a thorough examination to ensure accuracy, consistency, and reliability. The raw data was carefully inspected for missing values, duplicates, formatting issues, and inconsistencies that could affect the final analysis. These issues were resolved using systematic data-cleaning techniques, including handling null values, correcting data types, correcting outliers, removing unnecessary entries, and standardizing formats. Once the data quality was ensured, the dataset was further transformed and preprocessed through essential techniques such as encoding categorical variables, scaling numerical features, and new attributes to enhance analytical value. With a clean and well-structured dataset, a comprehensive Exploratory Data Analysis (EDA) was performed. This included generating statistical summaries, distribution plots, correlation maps, and various visualizations to uncover meaningful patterns, trends, and relationships hidden within the data. These visual insights provided a clearer understanding of the dataset's overall highlighted key factors influencing the final outcomes. Based on these findings, the insights were translated into practical recommendations and actionable steps that could support better decision-making, guide future improvements, and deepen the overall understanding of the dataset's implications.

## Visualization link:

https://drive.google.com/file/d/1zo9NLDW-DZpnfy7fXtvlEtt-BtN0fDAL/view?usp=sharing

# Dashboard screenshot:



## Student Database

Students Grades according to study hours

Correlation between numerical column

Students Attending Online Clas...

Relationship Between Extracurricular Activities and Final Grade

Comparing grades by parental support

Distribution of Students participated in Extracurricular activities with parent support

Distribution of Study Hours perweek



## Student Database

Students final Grade according to the attendance percentage

Count of Gender by StudyHoursPerWeek

Relation between numerical column using pair plot

Attendance Distribution Based on Online Classes Taken

Distribution of Attendance R...

Unique values of students and Attendance rate

Sum of FinalGrade and Sum of PreviousGrade by Study Hours

# Summary of dashboard:

This dashboard shows different charts that help us understand how students perform based on several factors like study hours, attendance, parental support, online classes, and extracurricular activities. The charts compare how grades change when students study more, get more support from parents, or attend online classes regularly. Some charts show the distribution of study hours and attendance, while others show how students are grouped by gender or participation in activities. The heatmap and pair plot help us see which numerical values are related to each other. Overall, the dashboard gives a clear picture of what factors affect a student's final grade and helps identify patterns in their performance.

# Key Insights:

### 1. Study hours strongly influence academic performance

Analysis shows a clear upward trend in performance as study hours increase. Students who dedicate more time to studying each week consistently achieve higher previous and final grades. This suggests that structured and regular study habits play a major role in overall academic success.

### 2. Attendance rate has a significant impact on student outcomes

Students with higher attendance percentages perform better across all major academic indicators. Regular class participation helps students stay updated with lessons, receive clarifications on time, and maintain a strong foundation for assessments.

### 3. Parental support contributes positively to grades

Students who report strong or moderate parental support tend to score higher than those with minimal support. This highlights the role of a supportive home environment in motivating students and helping them develop effective study routines.

**4. Online class participation enhances performance consistency**

Students who regularly take online classes show slightly higher and more stable performance levels. This indicates that online classes help reinforce learning, provide additional explanations, and offer flexible support outside regular school hours.

**5. Some students show high study hours but low performance**

A small group appears to invest many hours in studying but still scores lower than expected. This may indicate ineffective study methods, stress, low comprehension, or lack of guidance—areas where academic counseling could help.

# Recommendation for Students Developments:

### 1. Encourage Regular and Structured Study Habits

Students who study consistently perform better, so schools should guide students to follow a fixed weekly study routine. Teachers can introduce study planners, provide revision timetables, and monitor study hours during academic review sessions. Extra support can be given to students who struggle with time management to help them develop productive study habits.

### 2. Strengthen Attendance Monitoring and Support Systems

Since attendance has a direct impact on performance, schools should actively track and address absenteeism. Students with low attendance should be identified early and supported through counseling sessions, parent-teacher meetings, or personalized learning plans. Regular reminders and follow-ups can help students understand the importance of attending classes.

### 3. Increase Parental Involvement in Student Learning

Parental support significantly boosts student performance. Schools can enhance communication with parents by sharing academic progress, attendance reports, and improvement suggestions. Workshops or awareness programs could be conducted to help parents understand how they can assist their children at home.

### 4. Encourage Participation in Extracurricular Activities

Extracurricular activities help students develop discipline, time management, and confidence. Schools should promote balanced participation in sports, clubs, and creative programs. These activities can indirectly improve academic performance by reducing stress and building overall well-being

### 5. Promote Participation in Online Learning

Online classes provide additional learning opportunities, especially for students who miss physical classes or need extra revision. Schools should encourage students to make use of online learning platforms. Teachers can record lessons or provide digital materials so that students can revisit topics whenever needed.

### 6. Offer Personalized Support for Struggling Students

Some students study for long hours but still score low. These students may need support in understanding concepts or improving their study techniques. Teachers can provide one-on-one guidance, tutoring sessions, or alternative learning resources to help them study smarter rather than harder.

## Conclusion:

This dashboard explains how different student habits affect academic performance. It shows that regular study hours, good attendance, and strong parental support lead to higher grades. Online classes and extracurricular activities also help students stay consistent in their learning. The correlation charts highlight how multiple factors work together to influence performance. The dashboard also identifies students who may need extra support. Overall, it provides a clear picture of what helps students succeed academically.