Student Study Habits Survey Visualization Dashboard

In partial fulfillment of the requirements for the course
Visualizations and Data Analysis
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I. Problem Background and Validation

This section explores how inconsistent or ineffective study habits contribute to students' academic difficulties, identifies the groups most impacted, and explains the methods used to validate and understand the problem.

a. The Problem

Many students do not closely monitor or evaluate their study habits, which results in a limited understanding of how their study methods, environments, and schedules impact their performance in exams. Without this awareness, they often resort to guesswork or cramming instead of following a consistent and effective study routine. This lack of insight can lead to several problems, including lower exam scores, increased stress, and missed opportunities for improvement. Here are key several issues:

- Students may underestimate the time required for meaningful learning, resulting in studying too little, starting too late, or relying heavily on cramming before assessments.
- Teachers have limited visibility into how students prepare outside the classroom, making it difficult to provide tailored guidance or identify the root causes of academic problems.
- Academic coordinators lack comprehensive data on student study behaviors, hindering their ability to design evidence-based support programs, monitor learning trends, or intervene early when students fall behind.

Together, these gaps contribute to poor academic performance, increased stress, and missed opportunities for targeted support.

Who is affected?

- High school and college students who depend on structured study habits to keep up with coursework and maintain strong performance.
- Teachers and academic advisors, who seek to help students improve but often receive only grade-based information without context on how students are studying.
- Parents and guardians who try to support their children's learning but rarely have insight into the quality, consistency, or effectiveness of their study routines.

These groups are interconnected, and each is impacted by the absence of accurate and consistent information about student study behavior.

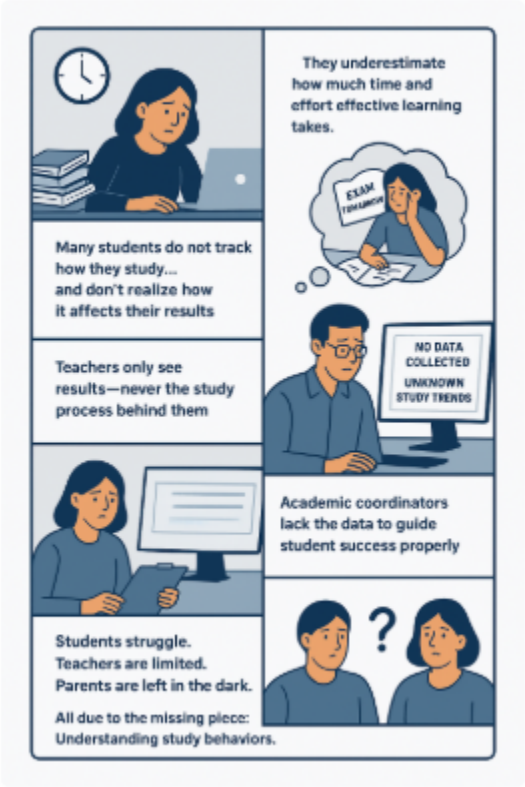


Figure 1: Story board for the Problem

b. Problem Validation

To further validate the findings from the student survey, a deeper analysis was performed using the Kaggle Student Performance Dataset - a widely recognized resource containing real-world academic and behavioral data from students. The results of this analysis revealed significant insights regarding students' exam performance. For instance, students with consistent study habits, supportive environments, and effective time management strategies tended to achieve higher exam scores. Conversely, irregular study patterns, limited parental support, and lack of preparation were strongly associated with poorer performance. These findings align with the survey results and highlight the need for students to adopt more structured and mindful study approaches to improve their exam outcomes.

- Students who study regularly tend to get higher exam scores than those who cram at the last minute.
- A clear negative correlation was observed between student absences and final grades. Students with more frequent absences were significantly more likely to receive low scores, pointing to the importance of consistency not just in studying - but also in attendance and routine.
- Students who maintained steady routines - even at moderate duration - outperformed those who studied intensively only before exams.
- These findings are reinforced by academic research, which concludes that structured and sustained learning routines improve memory retention, reduce stress, and enhance overall

academic performance. Research also emphasizes that regular review and spaced repetition are more effective than short-term studying or last-minute cramming.

Overall, both the survey results and the data analysis confirm that inconsistent study habits and lack of structure directly undermine student success. These insights emphasize the need for tools and systems that promote consistent, monitored, and effective learning routines.

II. The Project

This dashboard provides an interactive, visual analysis of student study habits and academic performance. It combines insights from a Kaggle data set with data collected from a customized class survey to reveal meaningful patterns and trends. By integrating real-world data and firsthand responses, the dashboard offers a comprehensive view of how different study behaviors - such as study duration, consistency, and engagement - impact academic outcomes. This tool aims to support students, teachers, and academic coordinators in making data-informed decisions to improve learning strategies and overall performance.

Whether you're a student aiming to enhance your study strategy or an educator interested in promoting positive learning habits, this dashboard offers valuable evidence-based insights. It serves as a practical tool for understanding how everyday study decisions impact long-term academic success.

a. Dataset

This dataset focuses on student performance across three core academic subjects. It contains each student's scores in these subjects, providing a comprehensive view of their academic achievement. By analyzing this data, we can identify patterns, compare performance levels, and gain insights into areas where students excel or may need additional support.

b. Data Dashboard

The main objective of this dashboard is to visually analyze student study behaviors and identify key patterns that influence academic performance. By presenting data in a clear and engaging way, it aims to help educators, students, and academic coordinators better understand how different habits impact learning outcomes.

c. Project Description

A comprehensive visual analytics dashboard, developed using tools such as Excel, Google Sheets, Tableau, or Power BI, is designed to simplify the monitoring of student performance while providing meaningful and actionable insights. This interactive dashboard serves as a centralized platform for analyzing student behaviors, academic outcomes, and study patterns, allowing both students and educators to make informed decisions.

Key objectives:

- Identify Effective Study Habits: By analyzing study routines, preferred study times, and study methods, the dashboard highlights behaviors that correlate with higher academic performance.
- Visualize Survey and Kaggle Data: Integrates data from student surveys and publicly available datasets, such as those on Kaggle, to create dynamic visualizations that reveal trends, patterns, and correlations in student performance.
- Encourage Better Study Practices: Provides students with clear, visual feedback on their habits compared to high-performing peers, motivating them to adopt strategies that enhance learning outcomes.
- Support Teachers in Academic Monitoring: Equips educators with an intuitive overview of class-wide

performance and individual progress, enabling them to identify at-risk students, tailor interventions, and improve overall teaching effectiveness.

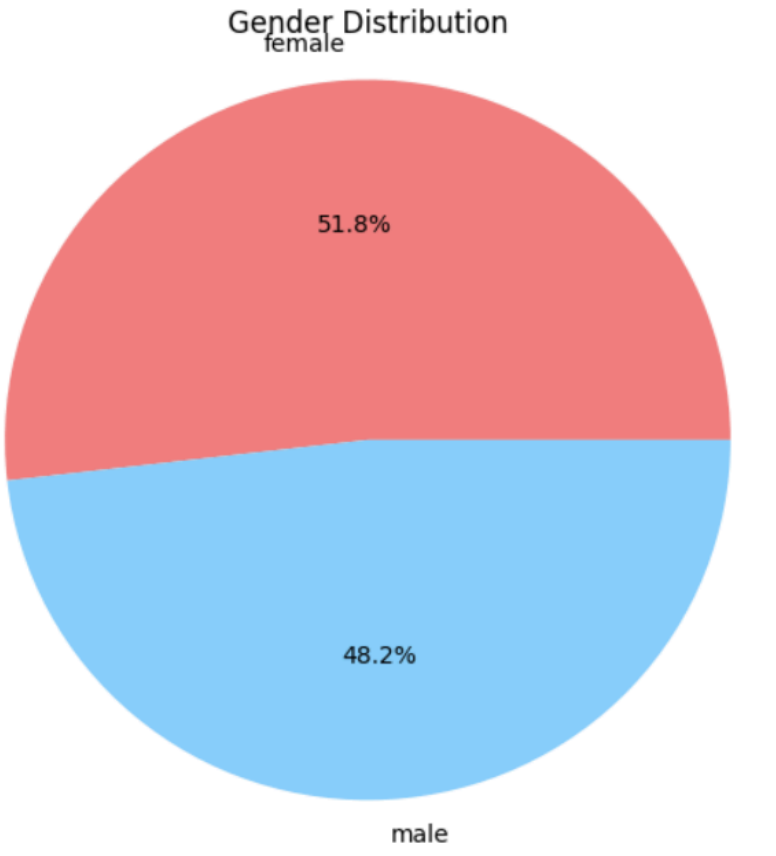
- Promote Data-Driven Decisions: The dashboard's visual analytics foster a culture of evidence-based decision-making, helping both students and teachers optimize study approaches and improve academic success.

III. Output

- **Gender Distribuion**

```python
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Load the dataset
df = pd.read_csv("StudentsPerformance.csv")

# Gender distribution count
gender_counts = df['gender'].value_counts()
print("Gender Distribution:")
for gender, count in gender_counts.items():
    print(f"{gender}: {count}")

# Pie chart
plt.figure(figsize=(6, 6))
plt.pie(gender_counts, labels=gender_counts.index, autopct='%1.1f%%', colors=['lightcoral', 'lightskyblue'])
plt.title("Gender Distribution")
plt.axis('equal')
plt.show()
```

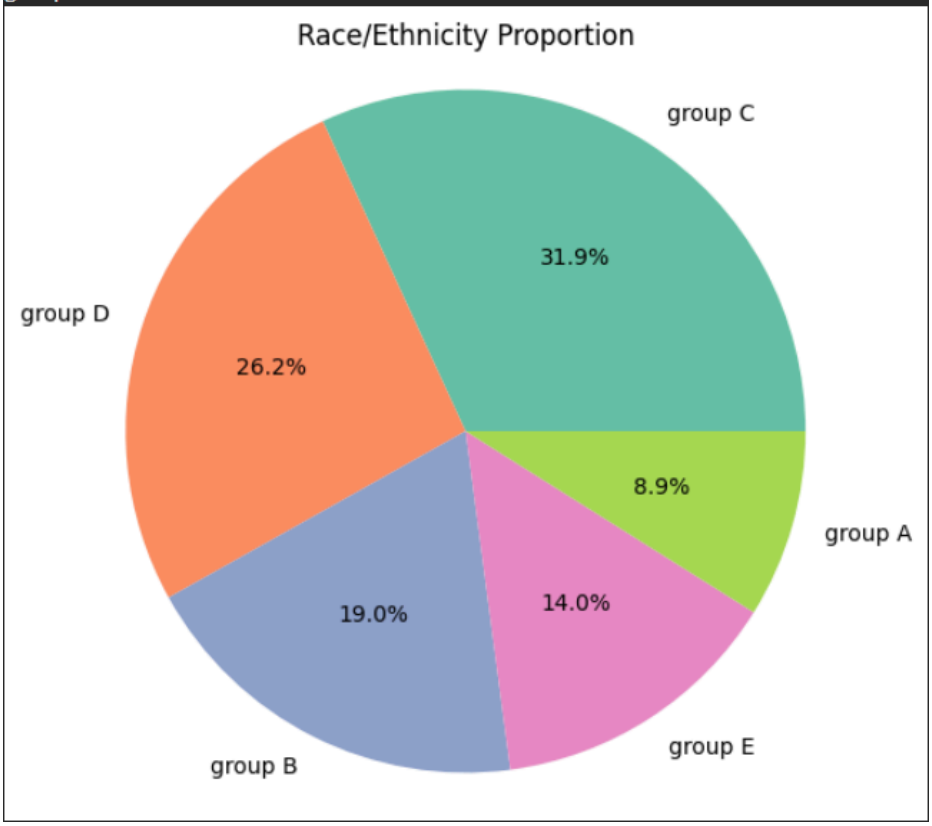
```
Gender Distribution:
female: 518
male: 482
```



- **Race/ Ethnicity**

```python
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Load the dataset
df = pd.read_csv("StudentsPerformance.csv")

# Race/Ethnicity distribution count
race_counts = df['race/ethnicity'].value_counts()
print("Race/Ethnicity Distribution:")
for race, count in race_counts.items():
    print(f"{race}: {count}")

# Pie chart
plt.figure(figsize=(6, 6))
plt.pie(race_counts, labels=race_counts.index, autopct='%1.1f%%', colors=sns.color_palette('Set2'))
plt.title("Race/Ethnicity Proportion")
plt.axis('equal')
plt.show()
```

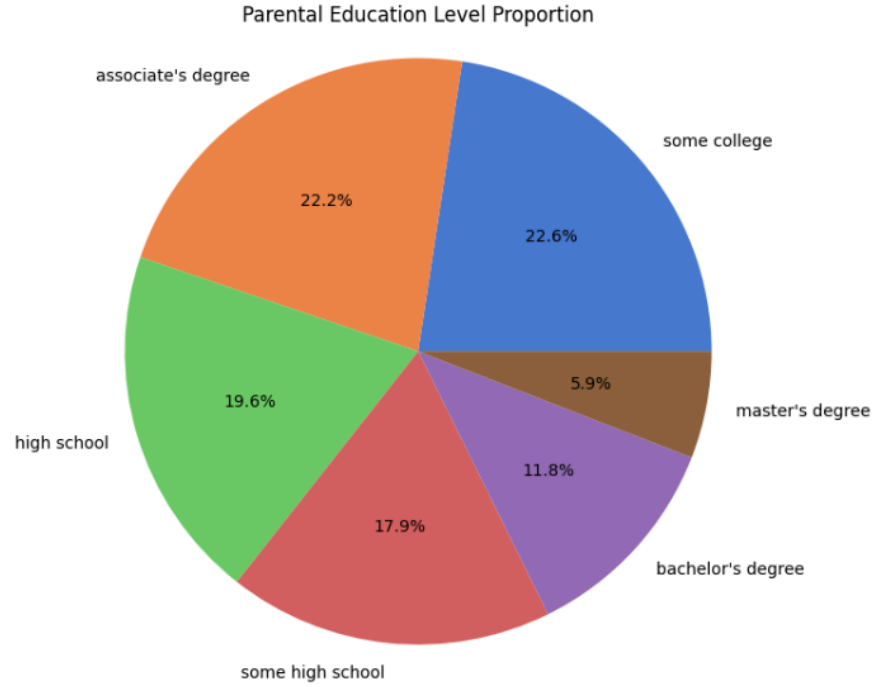
```
Race/Ethnicity Distribution:
group C: 319
group D: 262
group B: 190
group E: 140
group A: 89
```



- **Parental level of Education**

```python
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Load the dataset
df = pd.read_csv("StudentsPerformance.csv")

# Count distribution
education_counts = df['parental level of education'].value_counts()
print("Parental Level of Education Distribution:")
for level, count in education_counts.items():
    print(f"{level}: {count}")

# Pie chart
plt.figure(figsize=(7, 7))
plt.pie(education_counts, labels=education_counts.index, autopct='%1.1f%%',
        colors=sns.color_palette('muted'))
plt.title("Parental Education Level Proportion")
plt.axis('equal')
plt.show()
```

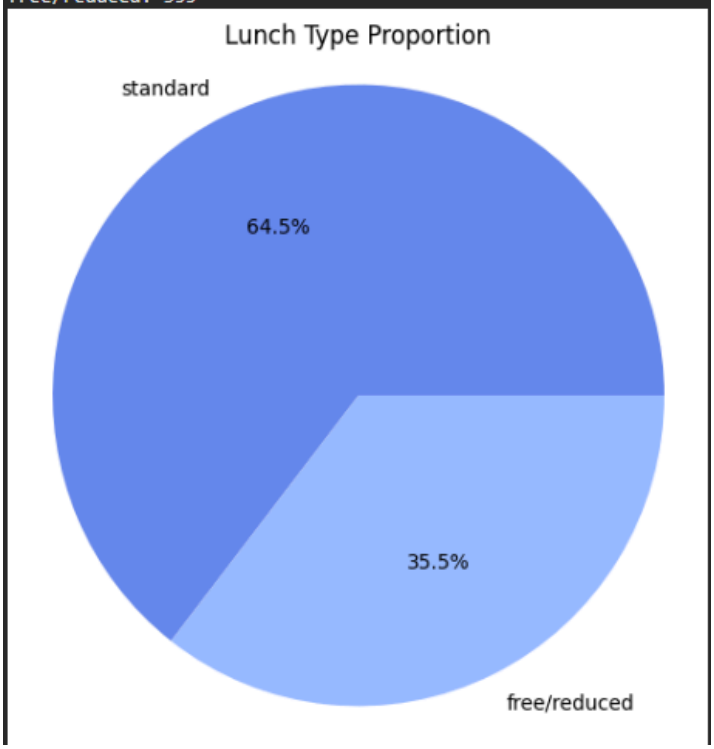
```
Parental Level of Education Distribution:
some college: 226
associate's degree: 222
high school: 196
some high school: 179
bachelor's degree: 118
master's degree: 59
```



- **Lunch Distribution**

```python
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Load the dataset
df = pd.read_csv("StudentsPerformance.csv")

# Count distribution
lunch_counts = df['lunch'].value_counts()
print("Lunch Distribution:")
for lunch_type, count in lunch_counts.items():
    print(f"{lunch_type}: {count}")

# Pie chart
plt.figure(figsize=(6, 6))
plt.pie(lunch_counts, labels=lunch_counts.index, autopct='%1.1f%%',
        colors=sns.color_palette('coolwarm'))
plt.title("Lunch Type Proportion")
plt.axis('equal')
plt.show()
```

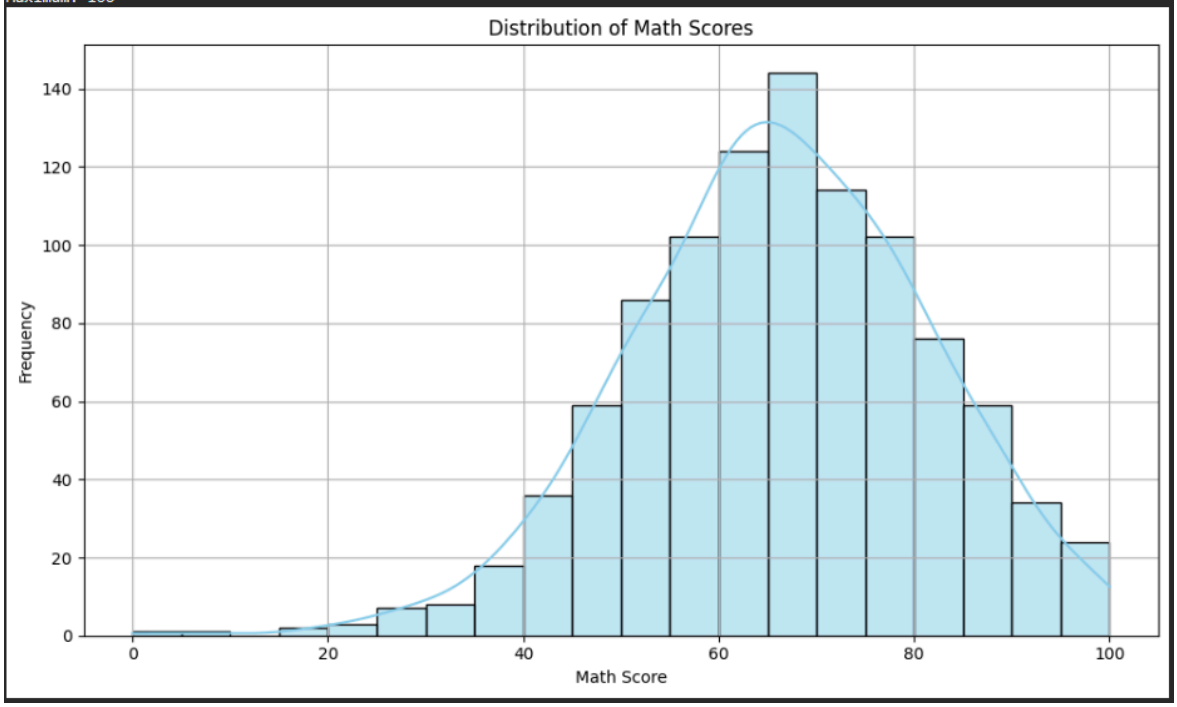
```
Lunch Distribution:
standard: 645
free/reduced: 355
```



- **Math Score**

```python
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Load the dataset
df = pd.read_csv("StudentsPerformance.csv")

# Extract math scores
math_scores = df["math score"]

# Basic statistics
print("Math Score Statistics:")
print(f"Count: {math_scores.count()}")
print(f"Mean: {math_scores.mean():.2f}")
print(f"Median: {math_scores.median()}")
print(f"Standard Deviation: {math_scores.std():.2f}")
print(f"Minimum: {math_scores.min()}")
print(f"Maximum: {math_scores.max()}")

# Histogram
plt.figure(figsize=(10, 6))
sns.histplot(math_scores, bins=20, kde=True, color='skyblue')
plt.title("Distribution of Math Scores")
plt.xlabel("Math Score")
plt.ylabel("Frequency")
plt.grid(True)
plt.tight_layout()
plt.show()
```

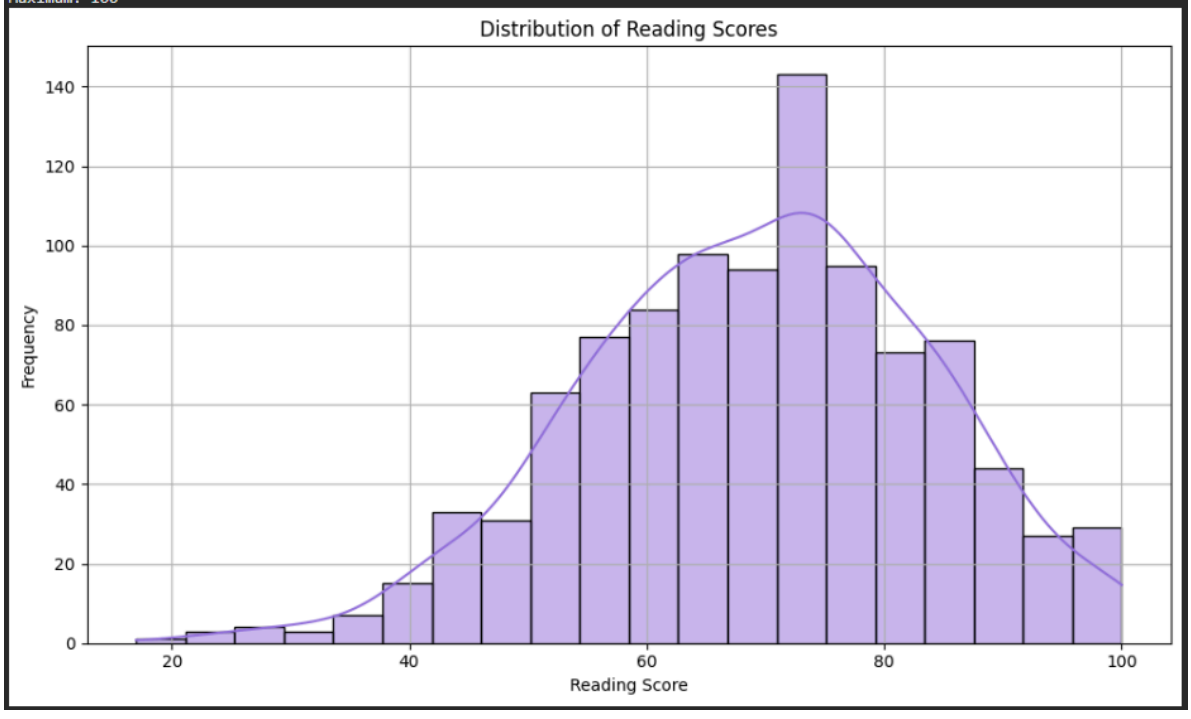
```
Math Score Statistics:
Count: 1000
Mean: 66.09
Median: 66.0
Standard Deviation: 15.16
Minimum: 0
Maximum: 100
```



- **Reading score**

```python
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Load the dataset
df = pd.read_csv("StudentsPerformance.csv")

# Extract reading scores
reading_scores = df["reading score"]

# Basic statistics
print("Reading Score Statistics:")
print(f"Count: {reading_scores.count()}")
print(f"Mean: {reading_scores.mean():.2f}")
print(f"Median: {reading_scores.median()}")
print(f"Standard Deviation: {reading_scores.std():.2f}")
print(f"Minimum: {reading_scores.min()}")
print(f"Maximum: {reading_scores.max()}")

# Histogram
plt.figure(figsize=(10, 6))
sns.histplot(reading_scores, bins=20, kde=True, color='mediumpurple')
plt.title("Distribution of Reading Scores")
plt.xlabel("Reading Score")
plt.ylabel("Frequency")
plt.grid(True)
plt.tight_layout()
plt.show()
```

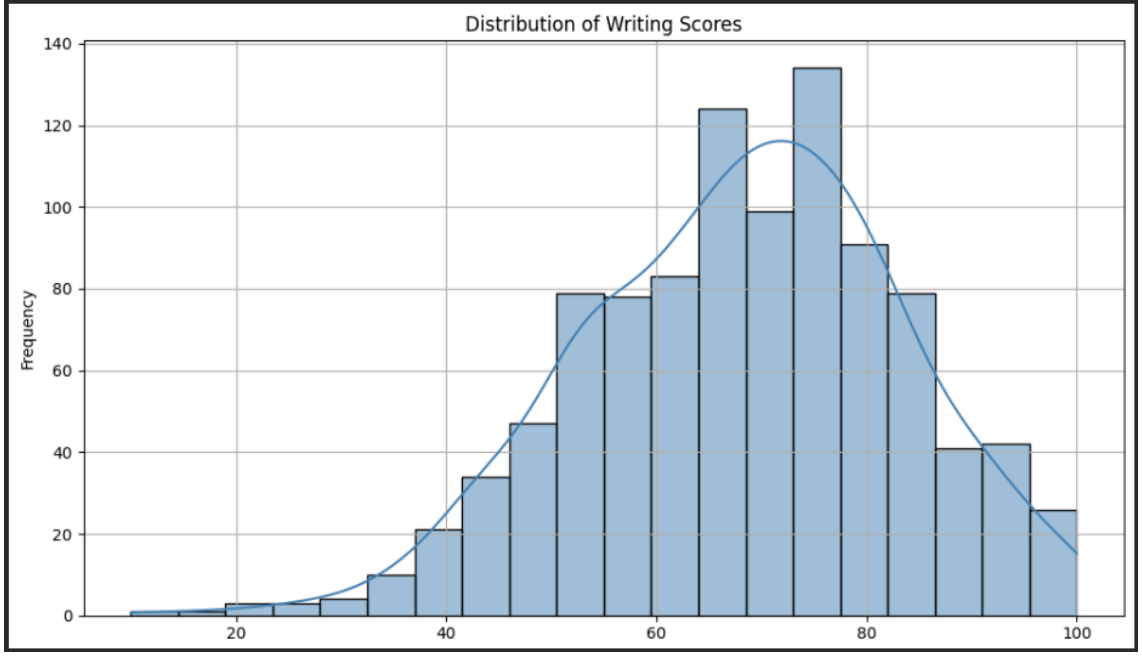
```
Reading Score Statistics:
Count: 1000
Mean: 69.17
Median: 70.0
Standard Deviation: 14.60
Minimum: 17
Maximum: 100
```



- **Writing score**

```python
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Load the dataset
df = pd.read_csv("StudentsPerformance.csv")

# Extract writing scores
writing_scores = df["writing score"]

# Basic statistics
print("Writing Score Statistics:")
print(f"Count: {writing_scores.count()}")
print(f"Mean: {writing_scores.mean():.2f}")
print(f"Median: {writing_scores.median()}")
print(f"Standard Deviation: {writing_scores.std():.2f}")
print(f"Minimum: {writing_scores.min()}")
print(f"Maximum: {writing_scores.max()}")

# Histogram
plt.figure(figsize=(10, 6))
sns.histplot(writing_scores, bins=20, kde=True, color='steelblue')
plt.title("Distribution of Writing Scores")
plt.xlabel("Writing Score")
plt.ylabel("Frequency")
plt.grid(True)
plt.tight_layout()
plt.show()
```

```
Writing Score Statistics:
Count: 1000
Mean: 68.05
Median: 69.0
Standard Deviation: 15.20
Minimum: 10
Maximum: 100
```



- Summary of Key Outcomes
    - Our analysis of the Students Performance dataset revealed several important insights:
        1. **Demographic Distributions**
            - Gender: The gender of the students, 51.8% are female and 48.2% are male, indicating a fairly equal gender ratio.
            - Race/Ethnicity: Groups B and D were the next most represented, after Group C.
            - Parental Education: The parents with "some college" or "an associate's degree" made up the largest group, while those with master's degrees made up the smallest.
            - Lunch Type: While the free/reduced lunch accounted for a sizable amount of the total, many students received the conventional lunch.
            - Test Preparation: The test preparation course was not attended by most of the pupils.
        2. **Academic Performance**
            - Math, Reading and Writing scores
                - The average scores varied from the mid-60s to the low-70s.
                - Reading and writing scores were typically higher than math scores.
                - Students' test scores improved across the board as they finished their preparation.
                - On average, students who ate a regular lunch and those whose parents were more educated performed better on the examinations.

IV. Conclusion

The Study Habits Dashboard provides a clear view of how students' study behaviors relate to their academic performance. It shows that students who follow regular study schedules, attend classes consistently, and study with peers in groups generally perform better.

The dashboard turns simple survey data into meaningful insights, making it easy to see which habits help improve learning. It highlights patterns such as the importance of consistently study time, collaboration, and balanced routines for achieving higher grades.

By presenting this information visually, the dashboard helps students understand their own habits, encourages them to adopt more effective study strategies, and supports teachers in monitoring progress and identifying students who may need extra help. Overall, it demonstrates how even basic data, when visualized clearly, can guide better learning decisions and improve academic outcomes.

V. Development Team

a. Team Description

b. Profile

c. Roles and Responsibilities

Our team has two members who work closely together, sharing ideas and understanding each other's perspectives. We divide tasks fairly and can switch roles when needed, making it easy to reach agreements on any topic. By communicating well and collaborating effectively, we ensure our work is organized and well thought out.

Lacsamana, Timothy Justin	Role: Dashboard designer and Presentation Profile: Designed the visual charts, Structured the dashboard Responsibilities: Visualization of the dataset.
Voces, Kirt Lorenz	Role: Data encoding, Documentation, Presentation Profile: Cleaned the data, finding the dataset and surveys Responsibilities: Processed survey results, Interpret findings and Formatted the documentation

VI. References

Students Performance in Exams (Kaggle) — dataset link:
https://www.kaggle.com/datasets/spscientist/students-performance-in-exams

Educational Psychology Studies on Student Learning Habits
https://ijcsrr.org/wp-content/uploads/2025/07/43-1707-2025.pdf